ChM®

CHARFIX system 2

INTRAMEDULLARY OSTEOSYNTHESIS OF TIBIA
retrograde method

- *IMPLANTS*
- *INSTRUMENT SET 40.5300.500*
- *INSTRUMENT SET 40.5380.500*
- *SURGICAL TECHNIQUE*

SYMBOLS DESCRIPTION

Ti	Titanium or titanium alloy
St	Steel
L	Left
R	Right
L R	Available versions: left/right
Len	Length
	Torx drive
	Torx drive cannulated
	Hexagonal drive
	Hexagonal drive cannulated
	Cannulated
	Locking
	Diameter
	Inner diameter
	Recommended length range for a particular nail
	Angle
16 ÷ 90	Available lengths
Ster Non Ster	Available in sterile/ non- sterile condition

	Caution - pay attention to a special procedure.
	Perform the activity under X-Ray control.
	Information about the next stages of a procedure.
	Proceed to the next stage.
	Return to the specified stage and repeat the activity.
	Before using the product, carefully read the Instructions for Use. It contains, among others, indications, contraindications, side effects, recommendations and warnings related to the use of the product.
	The above description is not a detailed instruction of conduct. The surgeon decides about choosing the operating procedure.

www.chm.eu

Document No	ST/46A
Date of issue	04.05.2010
Review date	P-006-28.01.2021

The manufacturer reserves the right to introduce design changes.
Updated INSTRUCTIONS FOR USE are available at the following website: ifu.chm.eu

I. INTRODUCTION

CHARFIX2 tibial retrograde intramedullary nails manufactured by **ChM** company are designed for stable osteosynthesis of the tarsus and distal tibia, for the treatment of degenerations and deformities of the tarsal joints.
The system consists of:

- implants (*intramedullary nail, locking screws, compression screw, end cap*),
- instrument set for implants insertion and removal,
- surgical technique.

The presented range of implants is made of titanium and its alloys and implantable steel in accordance with ISO 5832 standard. Compliance with the requirements of quality management systems and the requirements of Directive 93/42/EEC concerning medical devices guarantee high quality of the offered implants.

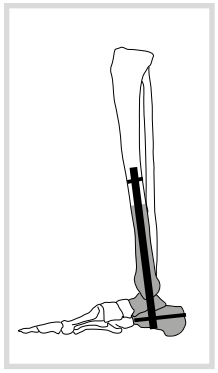
Indications for retrograde nailing:

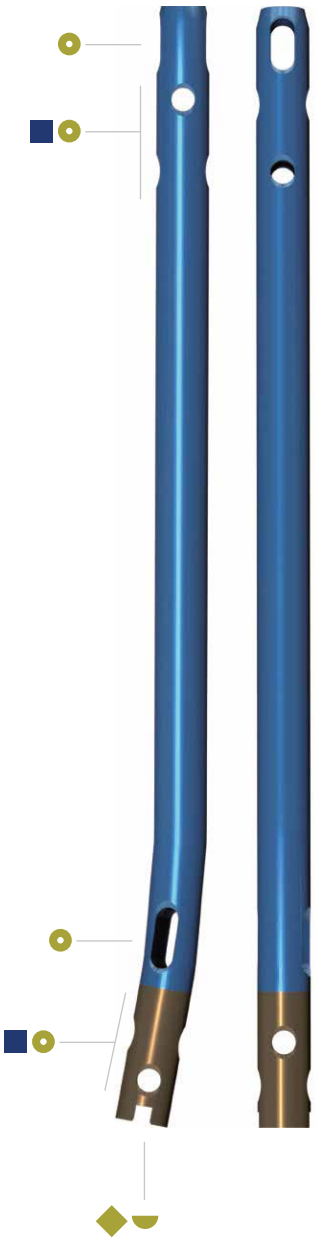
- tibiocalcaneal arthrodesis;
- combined arthrodesis of talocrural joint and talocalcaneal joint;
- avascular necrosis of talocalcaneal joint and talocrural joint;
- rheumatoid arthritis;
- severe, secondary deformity of untreated congenital club foot (*talipes equinovarus*) or in the case of the neuromuscular disease;
- seriously deformed foot / ankle, arthritic deformity of ankle with associated stiffness in the talocalcaneal joint;
- osteoarthritis;
- instability and skeletal defects after tumor resection;
- distal tibial fracture non-unions;
- tibial and/or talus plafond fracture where reconstruction is not possible;
- severe multifragmentary fractures with associated damage to the talocalcaneal joint;
- fractures, dislocations of the ankle combined with serious arthritic changes and loss of function;
- above-ankle non-union combined with stiffness in the talocalcaneal joint;
- mal-union of ankle;
- failed total ankle replacement with talocalcaneal joint intrusion.

II. IMPLANTS

CHARFIX2 RETROGRADE TIBIAL NAIL

CHARFIX system 2

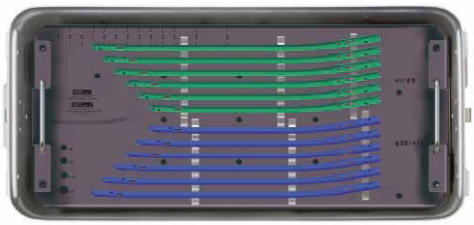




	Len	L	R
10	180	3.5679.180	3.5680.180
	200	3.5679.200	3.5680.200
	220	3.5679.220	3.5680.220
	240	3.5679.240	3.5680.240
	260	3.5679.260	3.5680.260
	280	3.5679.280	3.5680.280
	300	3.5679.300	3.5680.300
	320	3.5679.320	3.5680.320
11	180	3.5681.180	3.5682.180
	200	3.5681.200	3.5682.200
	220	3.5681.220	3.5682.220
	240	3.5681.240	3.5682.240
	260	3.5681.260	3.5682.260
	280	3.5681.280	3.5682.280
	300	3.5681.300	3.5682.300
	320	3.5681.320	3.5682.320
12	180	3.5683.180	3.5684.180
	200	3.5683.200	3.5684.200
	220	3.5683.220	3.5684.220
	240	3.5683.240	3.5684.240
	260	3.5683.260	3.5684.260
	280	3.5683.280	3.5684.280
	300	3.5683.300	3.5684.300
	320	3.5683.320	3.5684.320

available	Ø	8 mm ÷14 mm	pitch	1 mm
	L	130 mm ÷ 400 mm		5 mm

	Ti					
3.5160.xxx	✓	✓		5.5	30÷100	
3.5159.xxx	✓			5.0	30÷100	
3.5162.006	✓		✓			
3.5161.006	✓					



Stand for tibial nails CHARFIX/CHARFIX2 (implants not included) 40.5750.000

LOCKING ELEMENTS

Ti Ster Non Ster

CHARFIX system 2

CHARFIX2 DISTAL SCREW 5.0

26	3.5159.026
28	3.5159.028
30	3.5159.030
35	3.5159.035
40	3.5159.040
45	3.5159.045
50	3.5159.050
55	3.5159.055
60	3.5159.060
65	3.5159.065
70	3.5159.070
75	3.5159.075
80	3.5159.080
85	3.5159.085
90	3.5159.090

16 ÷ 100

CHARFIX2 DISTAL SCREW 5.5

26	3.5160.026
28	3.5160.028
30	3.5160.030
35	3.5160.035
40	3.5160.040
45	3.5160.045
50	3.5160.050
55	3.5160.055
60	3.5160.060
65	3.5160.065
70	3.5160.070
75	3.5160.075
80	3.5160.080
85	3.5160.085
90	3.5160.090

16 ÷ 100

CHARFIX2 END CAP M8 SPEC.

	3.5161.006

CHARFIX2 COMPRESSION SCREW M7X1

	3.5162.006

Stand for CHARFIX2 nail locking elements (set with a box without implants) 40.5058.200

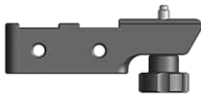
ChM sp. z o.o., Lewickie 3b, 16-061 Juchnowiec Kościelny, POLAND, tel. + 48 85 86 86 100, fax + 48 85 86 86 101, chm@chm.eu, www.chm.eu

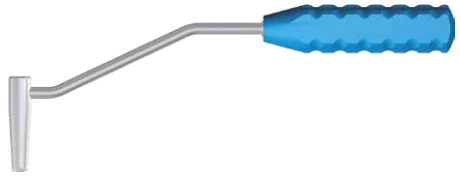
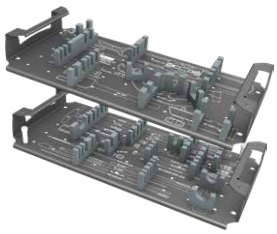
III. INSTRUMENT SET

To carry out tibial osteosynthesis, use instrument set for **CHARFIX2** tibial nails **[40.5300.500]** and instrument set **[40.5380.500]**.

INSTRUMENT SET FOR TIBIAL NAILS 40.5300.500

CHARFIX system 2

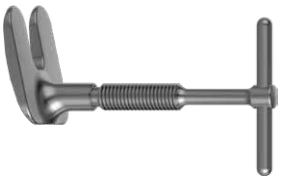
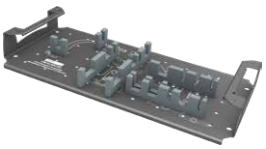
40.5300.500	Name	Catalogue No.	Pcs
	Targeter arm B	40.5301.000	1
	Targeter D	40.5302.100	1
	Targeter B	40.5303.100	1
	Wrench S8	40.5304.000	1
	Connecting screw M8x1.25 L-89	40.5305.000	1
	Connecting screw M8x1.25 L-22	40.5306.000	1
	Reconstruction targeter	40.5307.100	1
	Impactor-extractor	40.5308.000	1
	Connector M8x1.25/M14	40.5309.000	1
	Targeter arm B short	40.5312.000	1
	Compression screw	40.5313.000	1
	Mallet	40.3667.000	1
	Set block 9/5.0	40.5509.100	2
	Protective guide 9/7	40.5510.200	2
	Drill guide 7/3.5	40.5511.200	2
	Trocar 6.5	40.5534.100	1

40.5300.500	Name	Catalogue No.	Pcs
	Nail length measure	40.4798.500	1
	Guide rod handle	40.1351.000	1
	Teflon pipe guide 8/400	40.3700.000	1
	Drill with scale 3.5/150	40.5343.002	1
	Targeter D	40.1344.100	1
	Drill guide short 7/3.5	40.1358.100	1
	Trocar short 7	40.1354.100	1
	Aiming insert 9.0	40.5065.009	2
	Guide rod 2.5/580	40.3673.580	1
	Screwdriver T25	40.5575.400	1
	Drill with scale 3.5/350	40.5339.002	2
	Screw length measure	40.5530.200	1
	Hole depth measure	40.2665.000	1
	Curved awl 8.0	40.5523.000	1
	Perforated aluminum lid 1/1 595x275x15mm Gray	12.0750.200	1
	Stand for tibial nails	40.5319.500	1
	Container with solid bottom 1/1 595x275x185mm	12.0750.103	1

ChM sp. z o.o., Lewickie 3b, 16-061 Juchnowiec Kościelny, POLAND, tel. + 48 85 86 86 100, fax + 48 85 86 86 101, chm@chm.eu, www.chm.eu

INSTRUMENT SET FOR RETROGRADE TIBIAL NAILS CHARFIX2 40.5380.500

CHARFIX system 2

40.5380.500	Name	Catalogue No.	Pcs
	Proximal targeter	40.5382.000	1
	Lateral distal targeter	40.5384.000	1
	Connecting screw M8x1.25 L-84	40.5385.000	1
	Lateral targeter	40.5383.000	1
	Screwdriver T25	40.5381.100	1
	Compression screw	40.5386.000	1
	Connector M8x1.25/M14	40.5873.000	1
	Perforated aluminum lid 1/1 595x275x15mm Gray	12.0750.200	1
	Stand for instrument set of retrograde tibial nails	40.5389.500	1
	Container with solid bottom 1/1 595x275x185mm	12.0750.100	1

IV. SURGICAL TECHNIQUE

The following description covers the most important steps during the implantation of retrograde tibial nails. Nevertheless, it is not a detailed instruction of conduct.
The surgeon decides about choosing the operating technique and its application in each individual case.

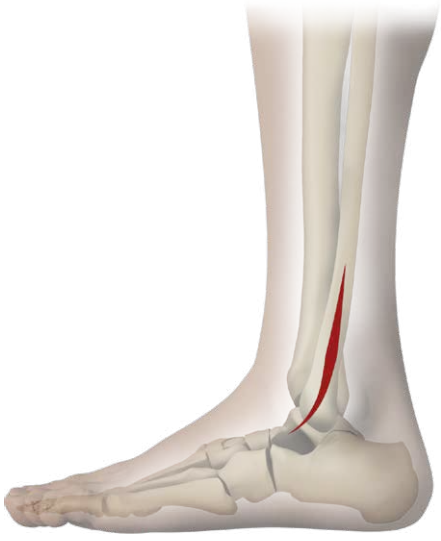
IV.1. SURGERY PLANNING

Each procedure must be planned accordingly. Prior to surgery, take an X-Ray image of the fractured extremity as to determine the type and location of the fracture and to determine the size of the nail to be implanted. It is recommended to take the AP, PA and lateral images.
Implantation procedure should be conducted on the operating table equipped with a real-time X-Ray imaging system.

IV.2. SURGICAL APPROACH

Position the patient prone.
Pneumatic tourniquet should be applied on the upper part of the thigh, providing a bloodless surgical field.

In order to obtain the access to the tibiotalar joint, perform a 5-6cm lateral incision in line with the distal lateral malleolus, and then perform a resection of the distal fibula (*see figure below*). This will allow for adequate exposure of the tibiotalar joint. Resect the distal end of the fibula which, if required, can be used as bone graft.



The above description is not detailed instruction of conduct. The surgeon decides about choosing the operating procedure.

When the bone fracture is properly reduced, perform 3cm long transverse or longitudinal incision on the plantar surface of the heel. To make it easier to find the entry point for the nail and to protect the neurovascular structures, stretch soft tissues using forceps. Open the plantar fascia down to the calcaneum.
Nail insertion point should be in line that goes from the second toe to the middle of the fascia in the medial / lateral plane, overlapping at the same time with the vertical axis of the tibia.

When incising and placing the nail, be careful not to damage the neurovascular structures.

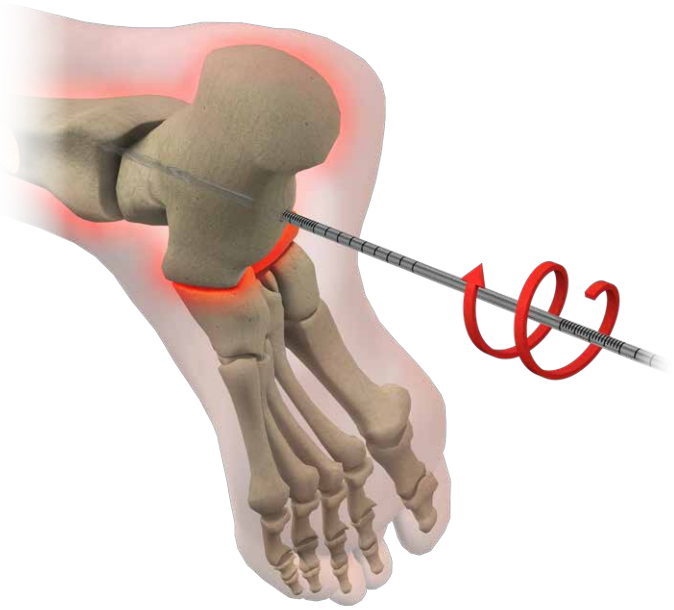
IV.3. MEDULLARY CANAL OPENING


40.5339.002

1 When surgical approach is prepared and the nail entry point is located, mark on the bone the entry point of the nail while holding the foot in the correct position. Using an electric drive and a drill with scale 3.5/350 **[40.5339.002]**, penetrate the cortex and insert it into the medullar cavity.

Make sure that the drill was inserted through the designated point along the axis of the tibia and through the calcaneum, talus and tibia.

Remove the drill.



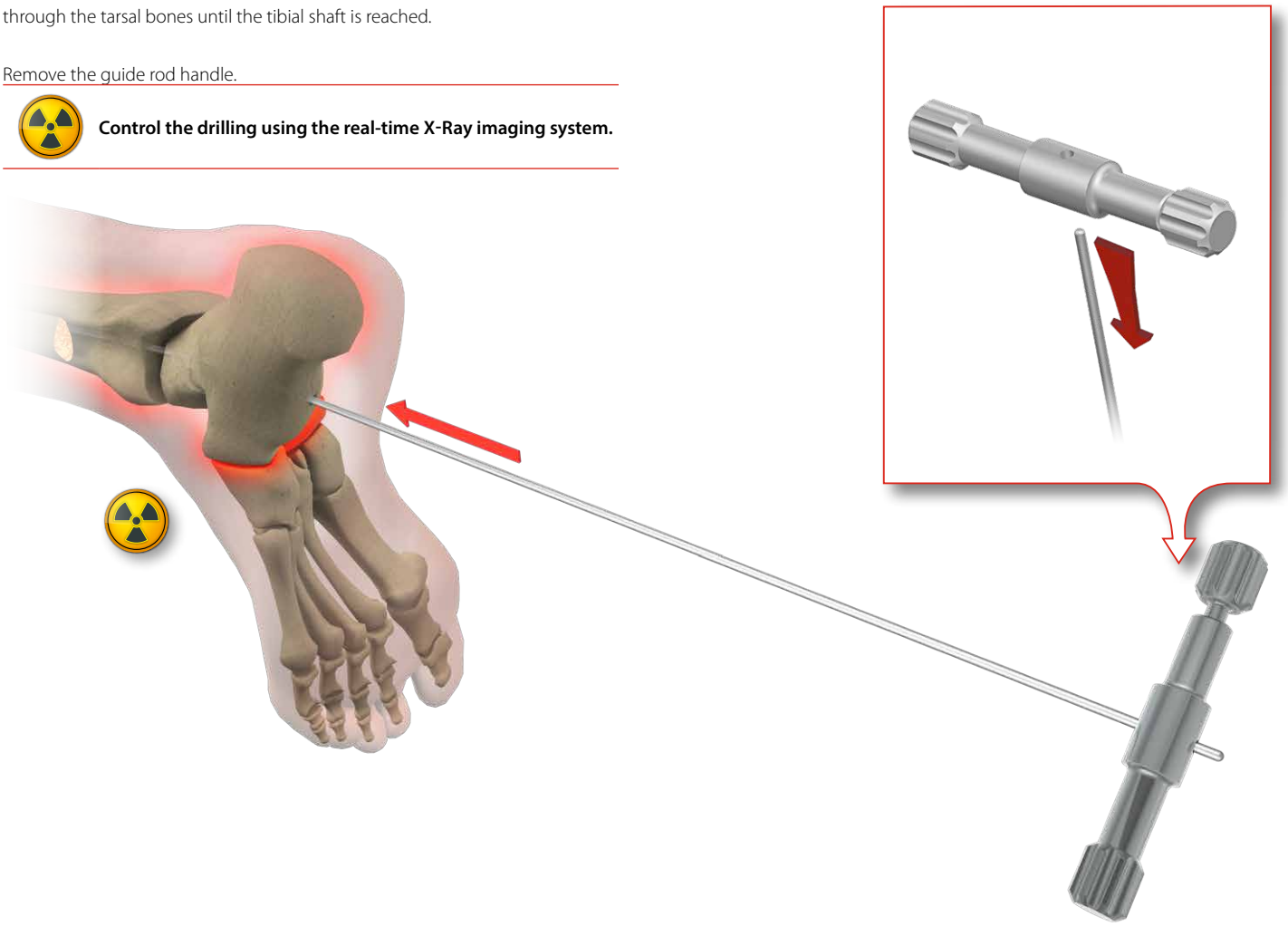
40.3673.580

40.1351.000

2 Mount the guide rod 2.5/580 **[40.3673.580]** to the guide rod handle **[40.1351]** and insert the system into the hole in the medullary cavity through the tarsal bones until the tibial shaft is reached.

Remove the guide rod handle.

Control the drilling using the real-time X-Ray imaging system.

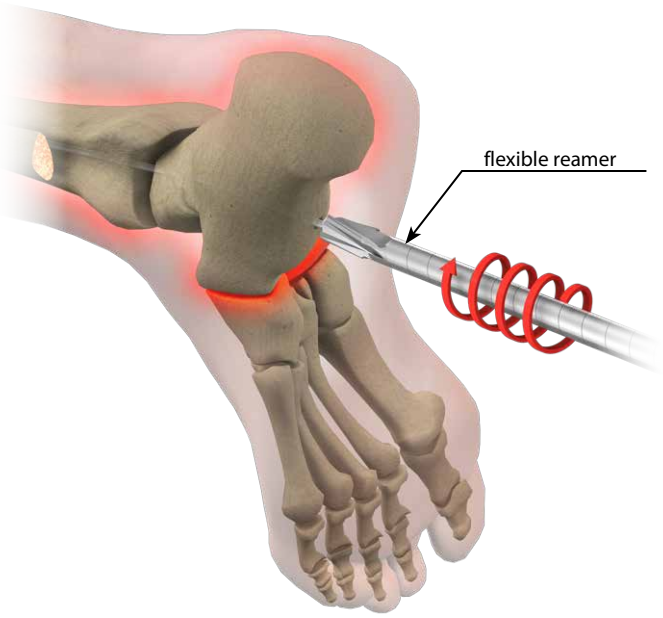


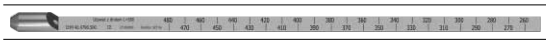
40.3673.580

3 Insert flexible reamer (*not included in the instrument set*) through the guide rod 2.5/580 **[40.3673.580]** Gradually ream the medullary cavity until the canal 0.5 ÷ 1.0mm greater than the diameter of the intramedullary nail to be implanted is reached.
It is recommended to drill the canal to a depth slightly longer than the length of the implant.

Remove flexible reamer.

It is advisable to use help in supporting the foot in the correct position as to reduce the fracture during reaming the canal.

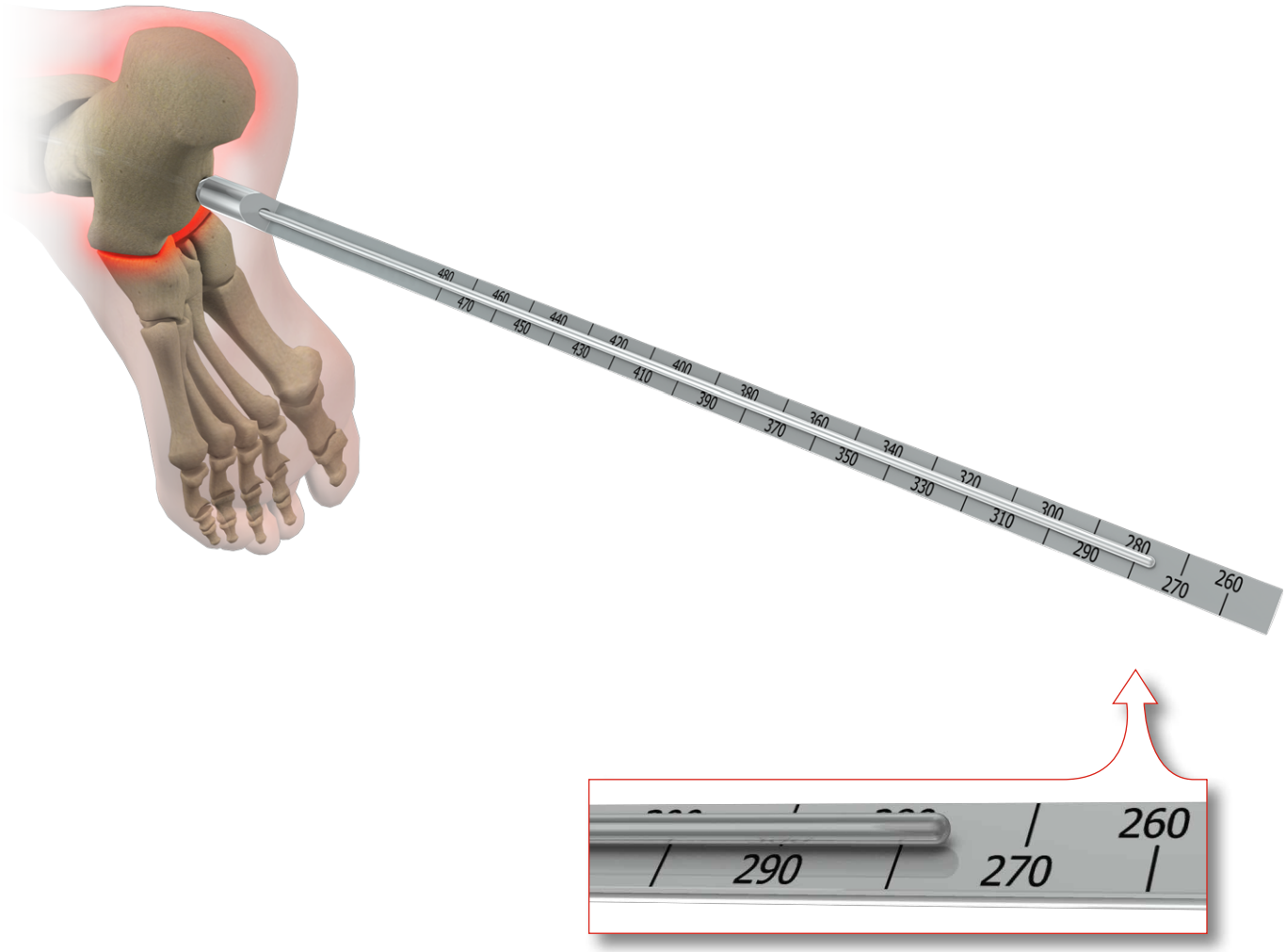



40.4798.500

4 Insert nail length measure **[40.4798.500]** through the guide rod. Place the nail length measure beginning in the entry point of the nail. Read the length of the nail on the scale.

Remove nail length measure from the guide rod.

Should a solid nail be implanted, remove the guide rod from the medullary canal.



IV.4. NAIL AND TARGETER ASSEMBLY AND TIBIAL NAIL IMPLANTATION

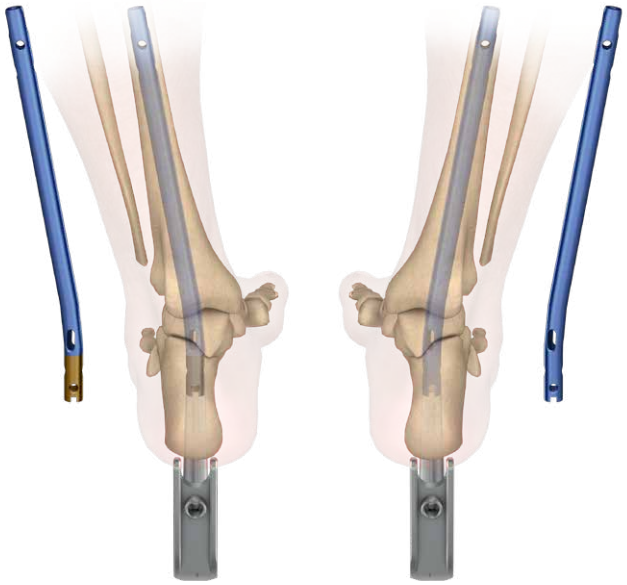
3.5162.006

5 Insert compression screw M7x1 **[3.5162.006]** (*implant*) to the intramedullary nail, between the second circular hole and the oval-shaped hole. Compression screw cannot obscure any of the holes.

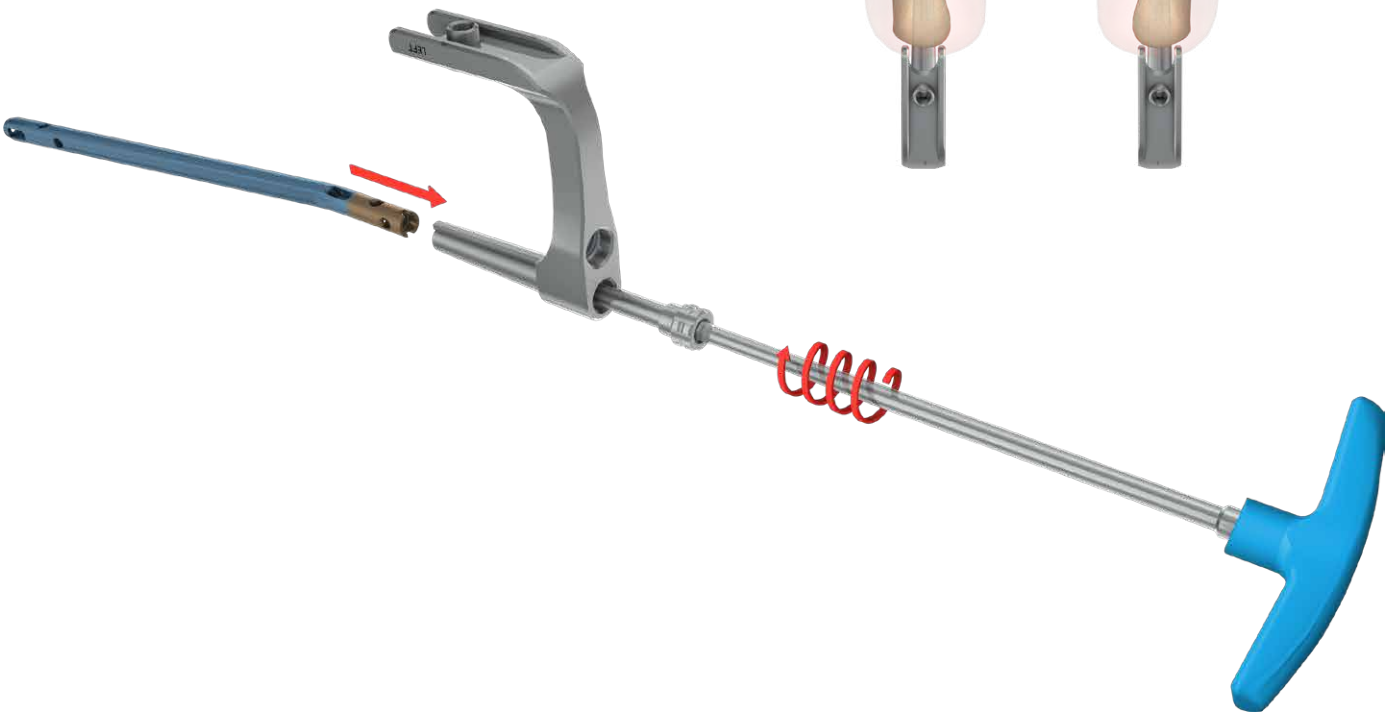
40.5301.000

40.5385.000

40.5304.000



6 Retrograde tibial nail is produced either for left or right limb. Therefore, it is important to mount properly the implant to the targeter arm B **[40.5301]** with left or right inclination respectively.
Using connecting screw M8x1.25 L-84 **[40.5385]** and wrench S8 **[40.5304]**, mount the nail to the the targeter arm B **[40.5301]**.




40.5302.100


40.5384.000


40.5301.000

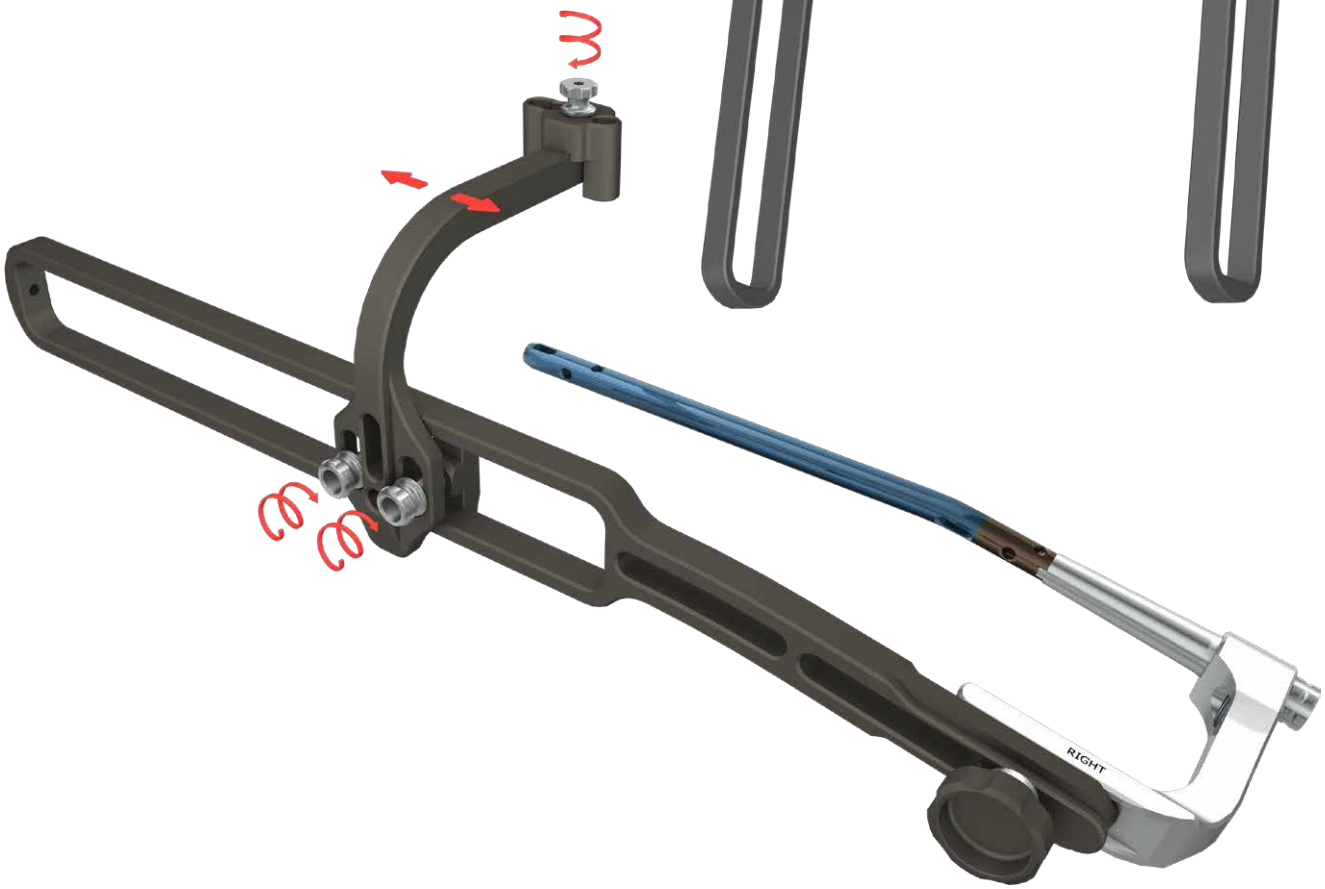
7 **Setting the slider of the targeter D [40.5302.100] and lateral distal targeter [40.5384] to the nail.**

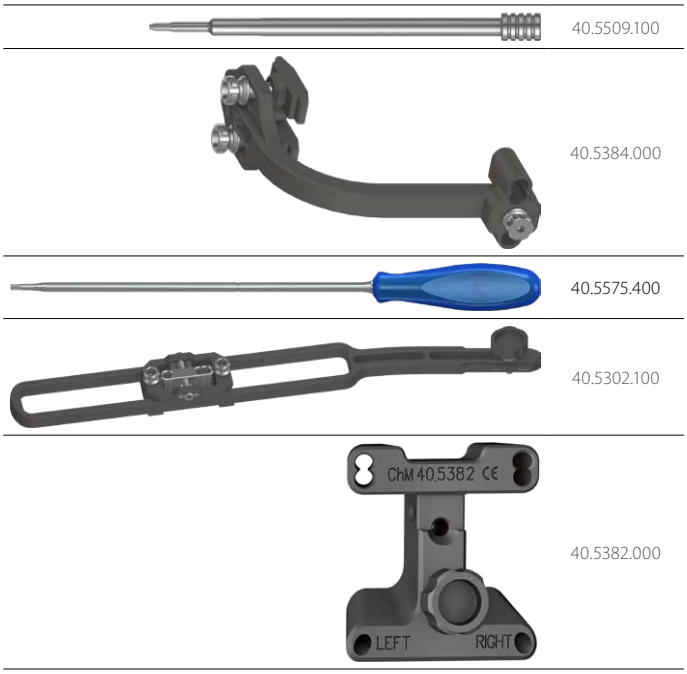
Prior to the insertion of a nail, set the lateral distal targeter **[40.5384]** in relation to the holes of the distal nail.

Attached targeter D **[40.5302.100]** to the targeter arm B **[40.5301]**. Inclination of the targeter D should be consistent with the inclination of the nail.

Remove the slider which is a standard part of this targeter.

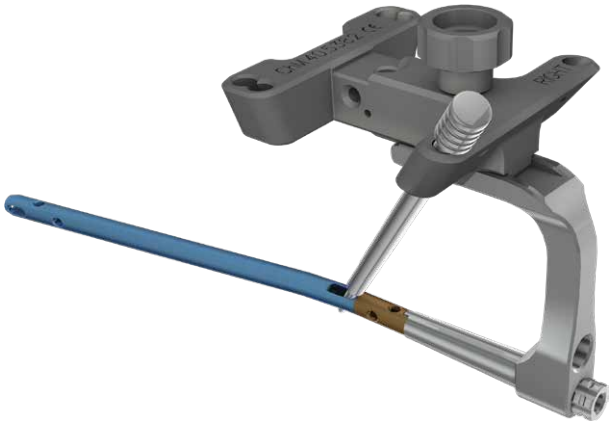
Mount the lateral distal targeter **[40.5384]** on the outer side of the targeter D.





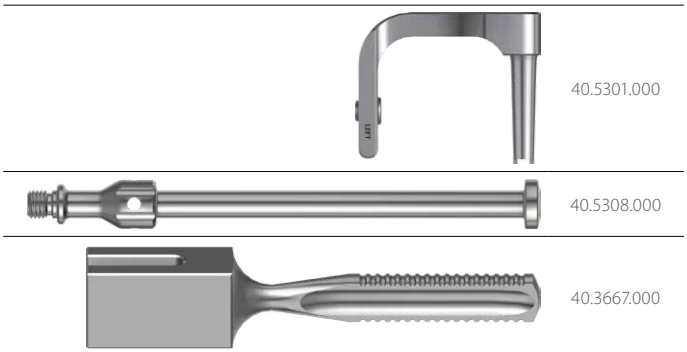
Using two set blocks 9/5.0 **[40.5509.100]**, set the targeter to the nail locking holes in the lateral and fibular plane. Lock the slider of the lateral distal targeter **[40.5384]** and the targeter itself using a screwdriver T25 **[40.5575.400]**.

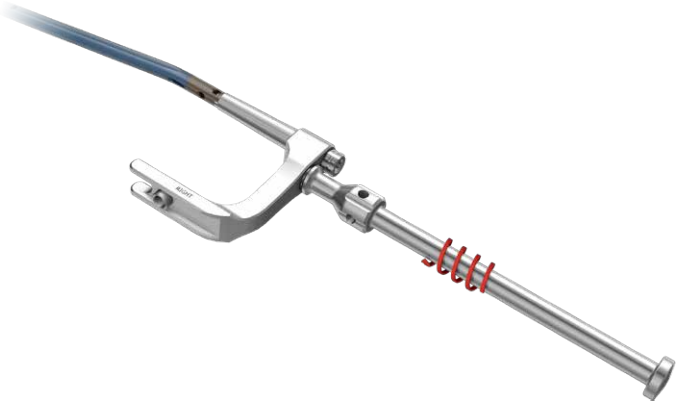
When the targeter slider is properly set and locked, set blocks should go through the nail holes freely.



Remove set blocks from the targeter slider.
Disconnect targeter **[40.5302.100]** from targeter arm.

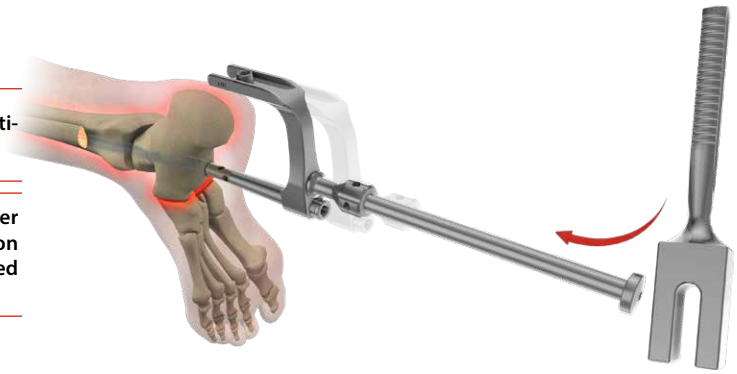
Prior to implantation, verify whether the proximal targeter holes overlap with the holes in the nail. To do so, insert the set block [40.5509.100] into the proximal targeter hole [40.5382].





8 Connect impactor-extractor **[40.5308]** (*through its threaded end*) to the targeter arm B **[40.5301]** to which a nail is mounted. Using the mallet **[40.3667]**, insert the nail to the desired depth into the medullary canal.

Remove impactor-extractor **[40.5308]**.



When inserting the nail, targeter arm B [40.5301] shall be vertically positioned (*from the heel*).

Ideally, the nail should be inserted about 5-10mm deeper than plantar-calcaneus cortex. In some cases where reduction of the calcaneum or tarsus is required, the nail can be inserted deeper.

IV.5. NAIL LOCKING IN TALUS

Locking the first screw in the talus allows for a separate compression between: tibia and talus (*talocrural joint*), and between the calcaneus and talus (*talocalcaneonavicular joint*).


40.5301.000

40.5382.000


40.5510.200


40.5534.100

9 Attach proximal targeter **[40.5382]** to the targeter arm B **[40.5301]**. Depending on the limb, use the holes on the right or left side of the targeter. Insert protective guide 9/7 **[40.5510.200]** and trocar 6.5 **[40.5534.100]** to the chosen hole of the proximal targeter.

Mark on the skin the entry point for the locking screw and perform soft tissue incision. Use the trocar to mark on the cortex the entry point for the drill. At the same time advance the protective guide as close to the bone as possible

Remove the trocar.
Leave the protective guide in place.


40.5510.200


40.5511.200

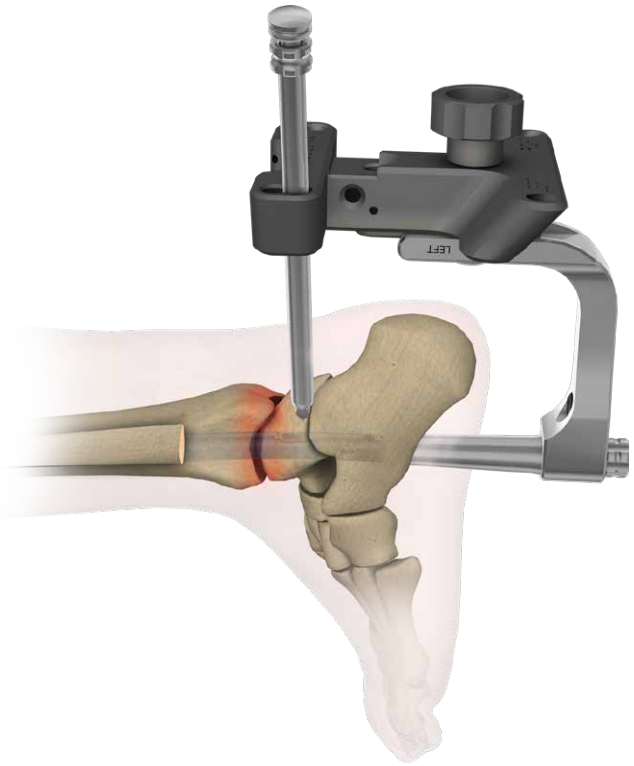

40.5339.002

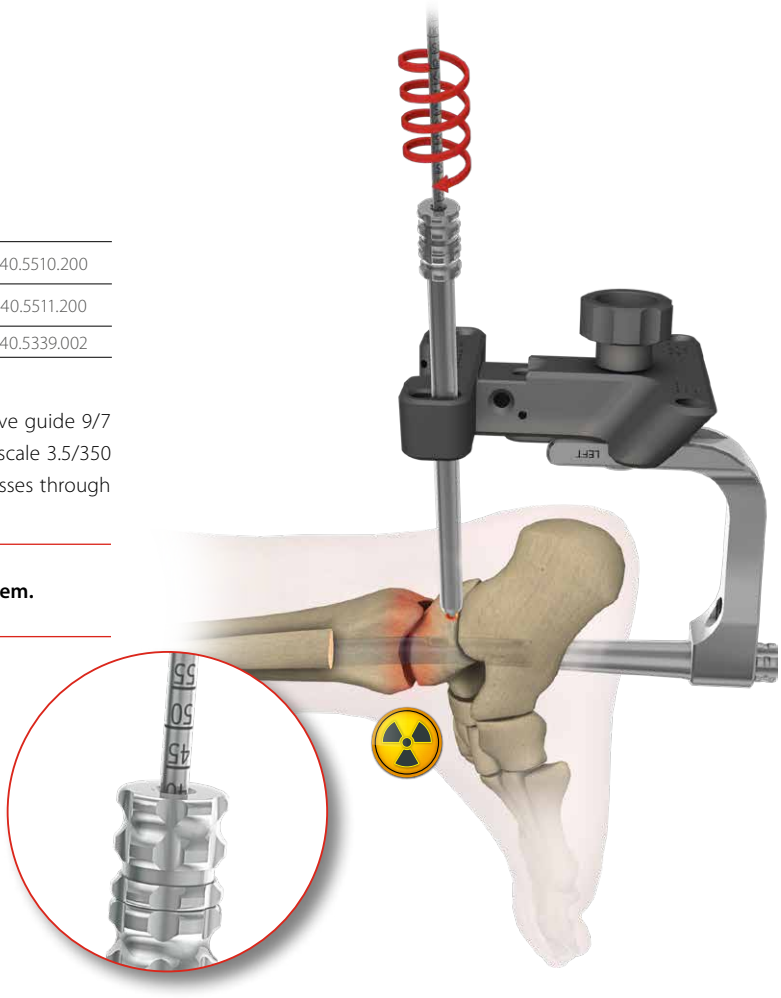
10 Insert drill guide 7/3.5 **[40.5511.200]** in the left protective guide 9/7 **[40.5510.200]**. Using a drilling machine and a drill with scale 3.5/350 **[40.5339.002]**, drill a hole via the drill guide in the talus that passes through the nail hole to the adequate depth.

Control drilling using real-time X-Ray imaging system.

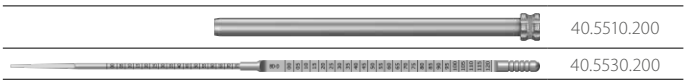
Read the length of the locking screw on a drill scale.

Remove the drill and drill guide.
Leave the protective guide in the hole of the targeter.



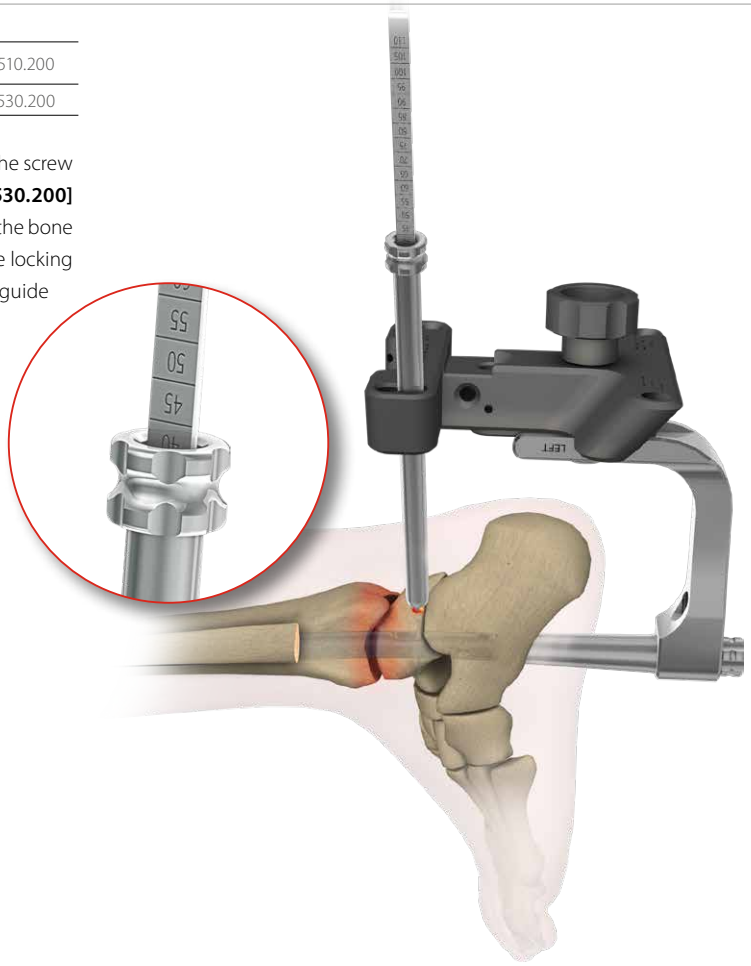


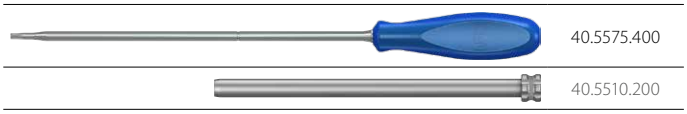
The above description is not detailed instruction of conduct. The surgeon decides about choosing the operating procedure.



11 The length of the locking screw can also be determined using the screw length measure. To do so, insert screw length measure **[40.5530.200]** through the protective guide 9/7 **[40.5510.200]** into the drilled hole in the bone until its hook reaches the "*exit*" plane of the hole. Read the length of the locking screw on scale. During the measurement, the end of the protective guide should lean against the cortex bone.

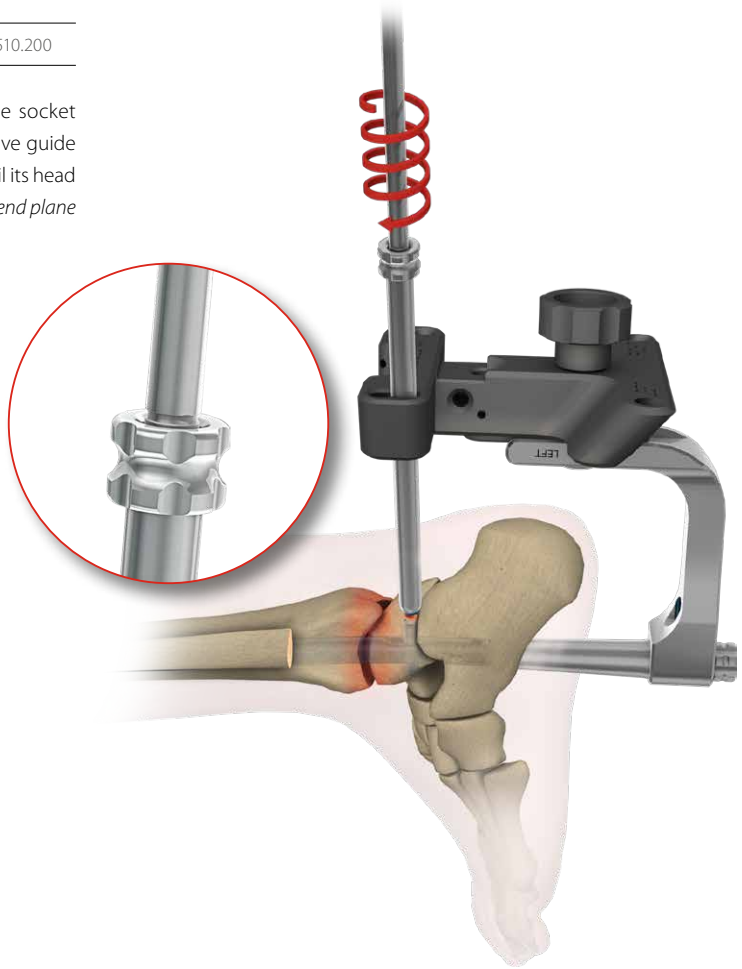
Remove the screw length measure.
Leave the protective guide in the hole of the targeter.





12 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the protective guide 9/7 **[40.5510.200]** and screw in the locking screw in the drilled hole until its head reaches the cortex bone (*the groove on the screwdriver shaft matches the end plane of the protective guide*).

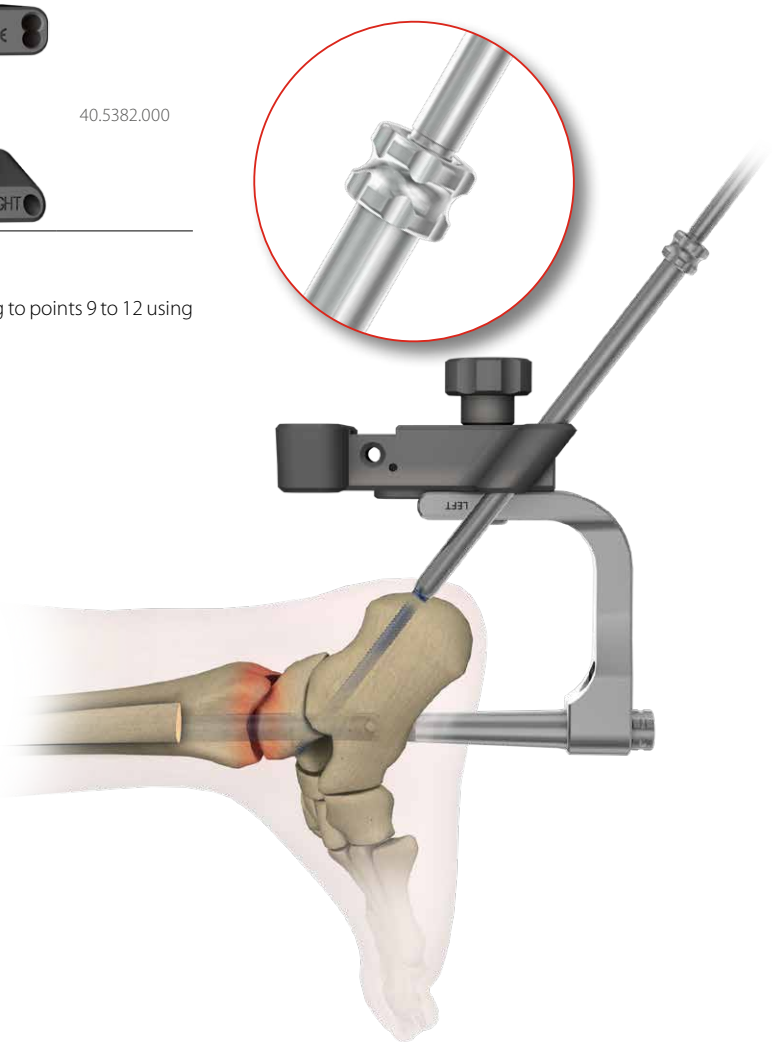
Remove the screwdriver and protective guide.
Detach the proximal targeter.



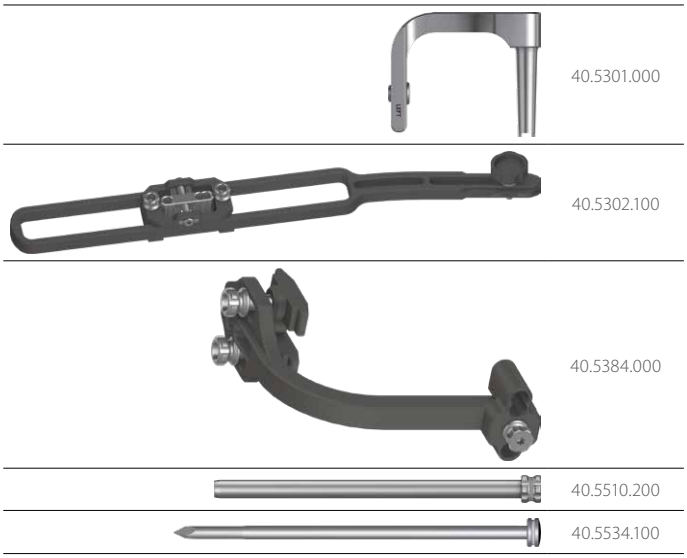
IV.6. OBLIQUE LOCKING THROUGH TALOCALCANEONAVICULAR JOINT - OPTIONAL

40.5382.000

13 Locking of the nail should be carried out according to points 9 to 12 using oblique hole of the proximal target **[40.5382]**.



IV.7. PROXIMAL NAIL LOCKING



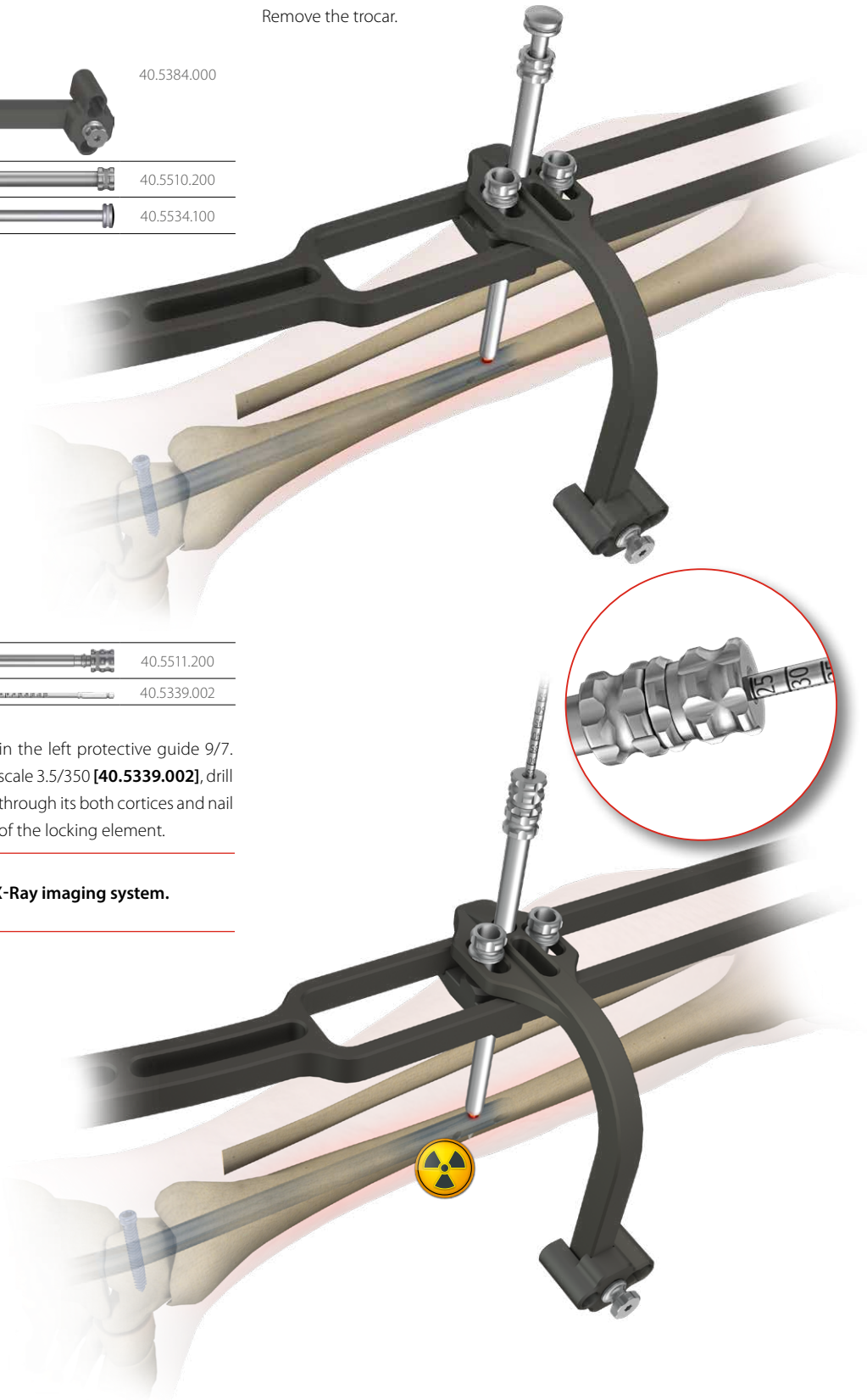
14 Attach targeter D **[40.5302.100]** with lateral distal targeter **[40.5384]** to the targeter arm B **[40.5301]**.
Insert protective guide 9/7 **[40.5510.200]** with trocar 6.5 **[40.5534.100]** to the lateral distal targeter hole corresponding to the round hole of the nail.
Mark on the skin the entry point for the locking screw and perform the soft tissue incision passing through this point. Insert the protective guide with trocar in that incision so that its end is placed as close to the cortical bone as possible. Using trocar, mark the entry point for the drill.

Remove the trocar.

15 Insert drill guide 7/3.5 **[40.5511.200]** in the left protective guide 9/7. Using a drilling machine and a drill with scale 3.5/350 **[40.5339.002]**, drill a hole via the drill guide in the bone that passes through its both cortices and nail hole. The scale on the drill indicates the length of the locking element.

Control drilling using real-time X-Ray imaging system.

Remove drilling machine.
Leave the drill in the hole.



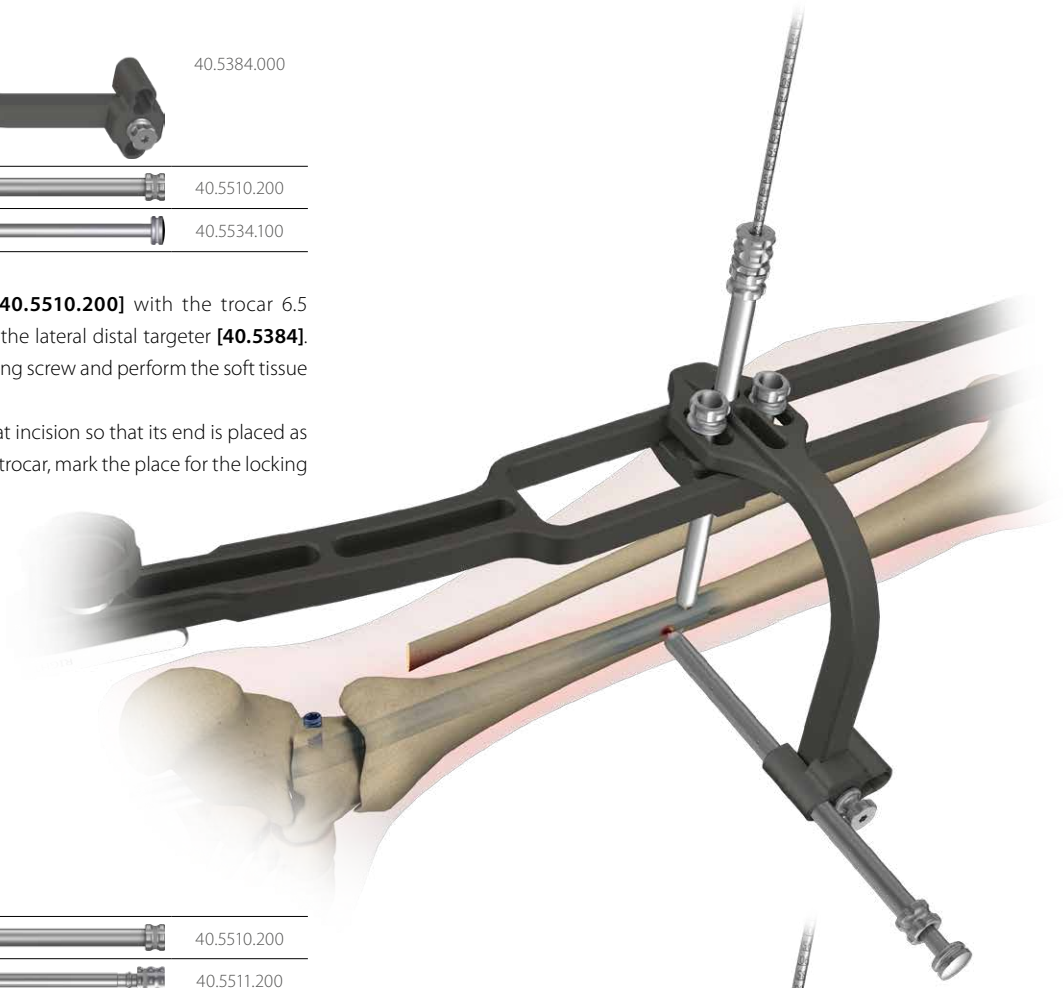
40.5384.000

40.5510.200

40.5534.100

16 Insert the protective guide 9/7 **[40.5510.200]** with the trocar 6.5 **[40.5534.100]** in the other hole of the lateral distal targeter **[40.5384]**. Mark on the skin the entry point for the locking screw and perform the soft tissue incision passing through this point.
Insert the protective guide with trocar in that incision so that its end is placed as close to the cortical bone as possible. Using trocar, mark the place for the locking screw canal to be drilled.

Remove the trocar.
Leave the protective guide in the hole of the targeter.



40.5510.200

40.5511.200

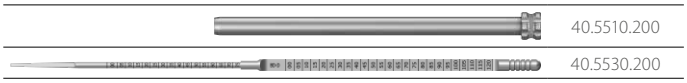
40.5339.002

17 Insert drill guide 7/3.5 **[40.5511.200]** in the left protective guide 9/7. Using a drilling machine and a drill with scale 3.5/350 **[40.5339.002]**, drill a hole via the drill guide in the bone that passes through its both cortices and nail hole. The scale on the drill indicates the length of the locking element.

Control drilling using real-time X-Ray imaging system.

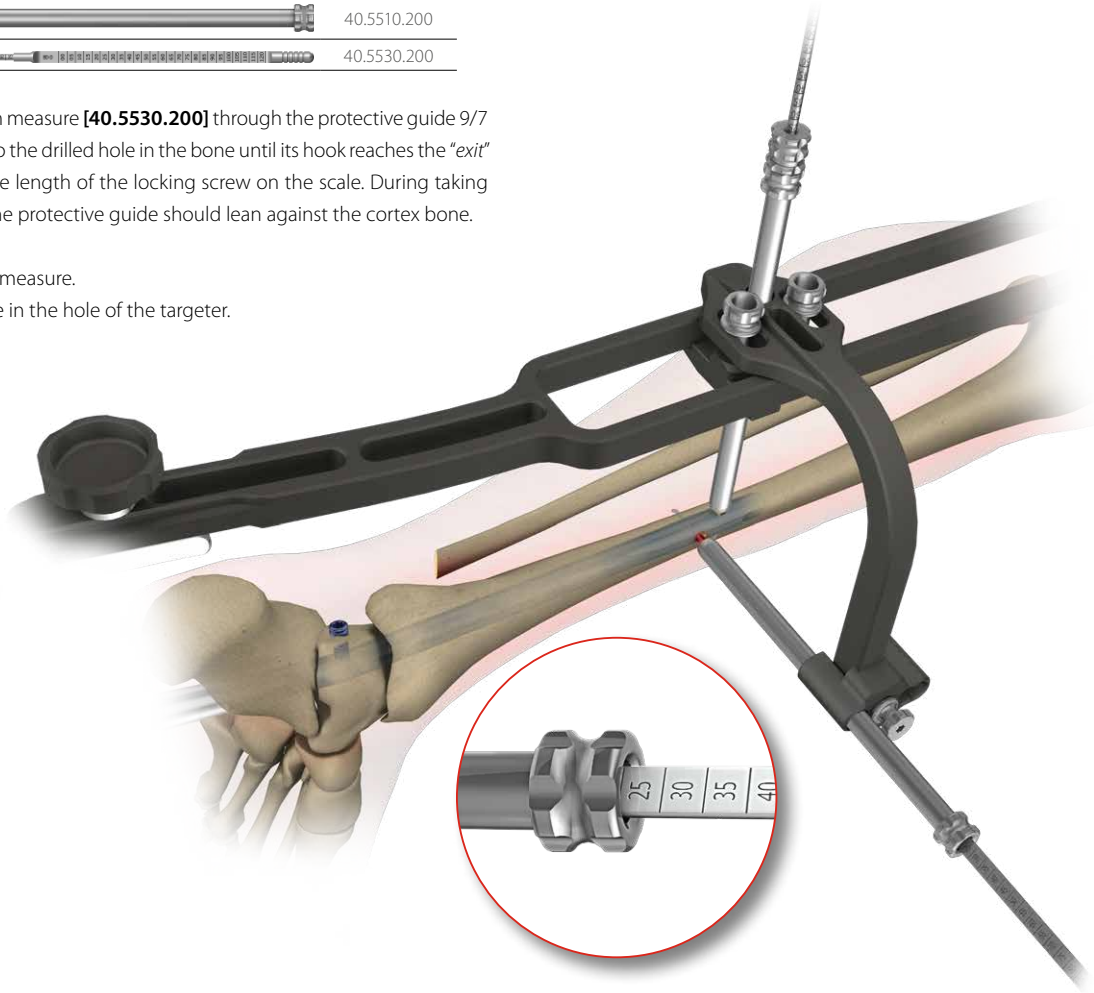
Remove the drill and drill guide.
Leave the protective guide in the hole of the targeter.

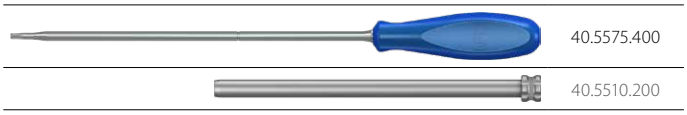
The above description is not detailed instruction of conduct. The surgeon decides about choosing the operating procedure.



18 Insert screw length measure **[40.5530.200]** through the protective guide 9/7 **[40.5510.200]** into the drilled hole in the bone until its hook reaches the "*exit*" plane of the hole. Read the length of the locking screw on the scale. During taking the measure, the end of the protective guide should lean against the cortex bone.

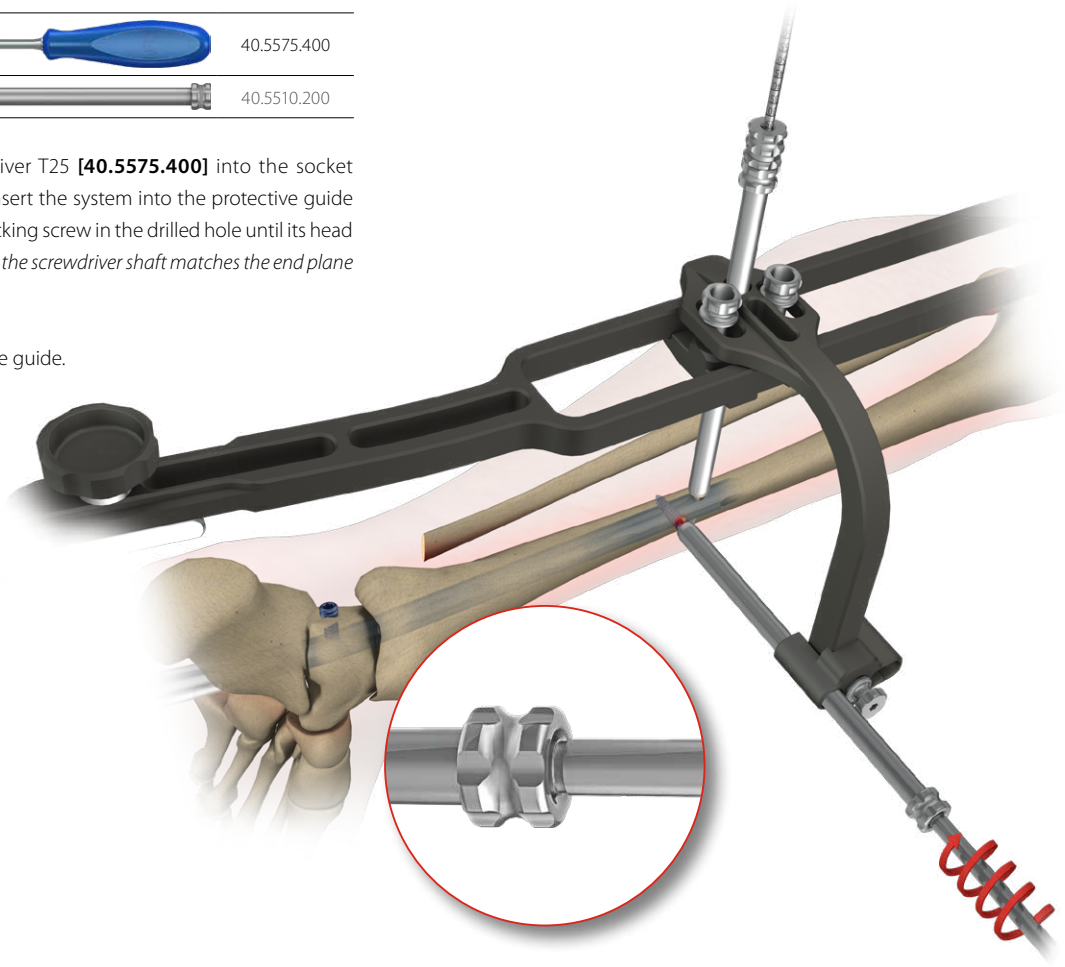
Remove the screw length measure.
Leave the protective guide in the hole of the targeter.

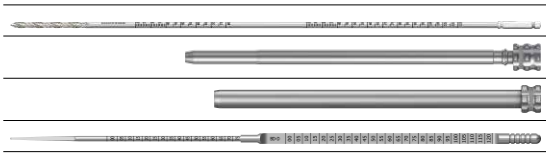




19 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the protective guide 9/7 **[40.5510.200]** and screw in the locking screw in the drilled hole until its head reaches the cortex bone (*the groove on the screwdriver shaft matches the end plane of the protective guide*).

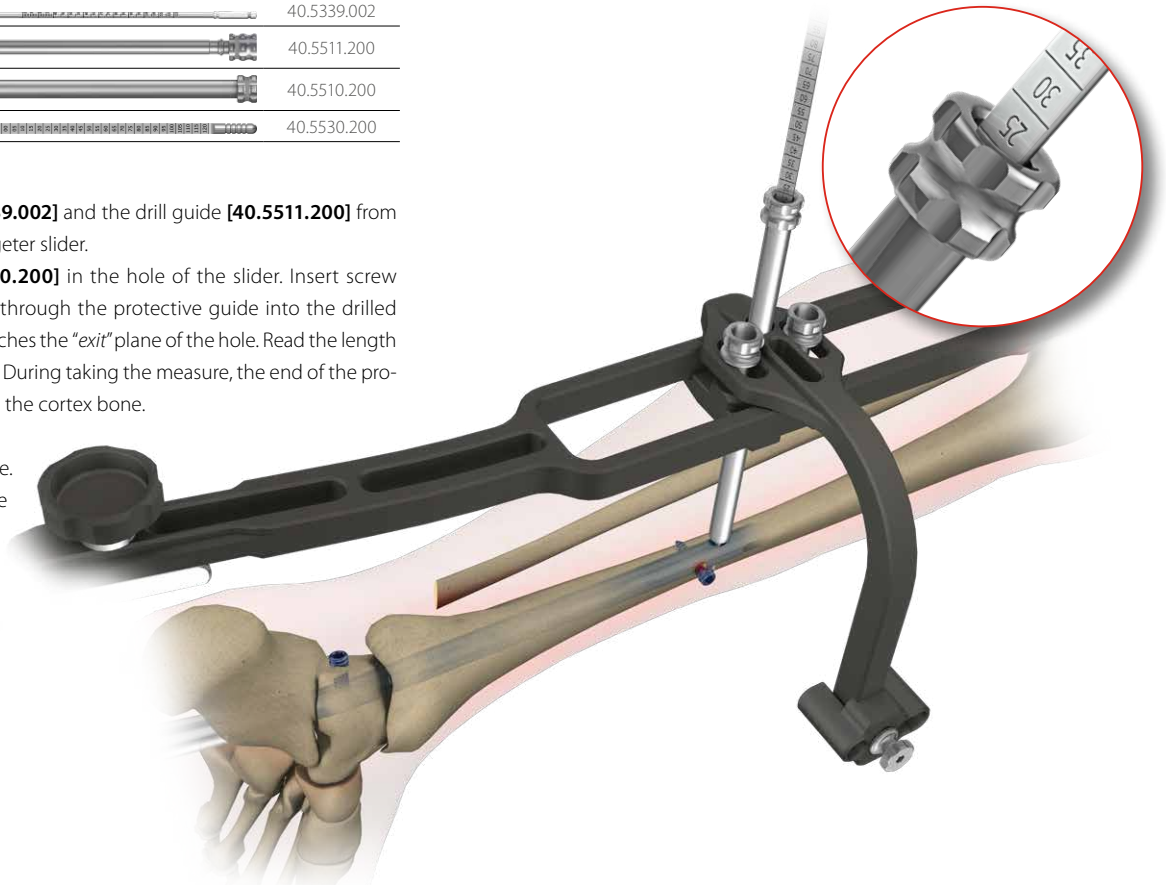
Remove the screwdriver and protective guide.

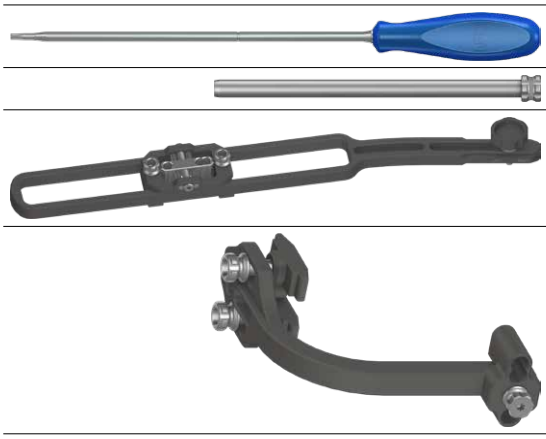




20 Remove the drill **[40.5339.002]** and the drill guide **[40.5511.200]** from the other hole of the targeter slider.
Leave protective guide **[40.5510.200]** in the hole of the slider. Insert screw length measure **[40.5530.200]** through the protective guide into the drilled hole in the bone until its hook reaches the "*exit*" plane of the hole. Read the length of the locking screw on the scale. During taking the measure, the end of the protective guide should lean against the cortex bone.

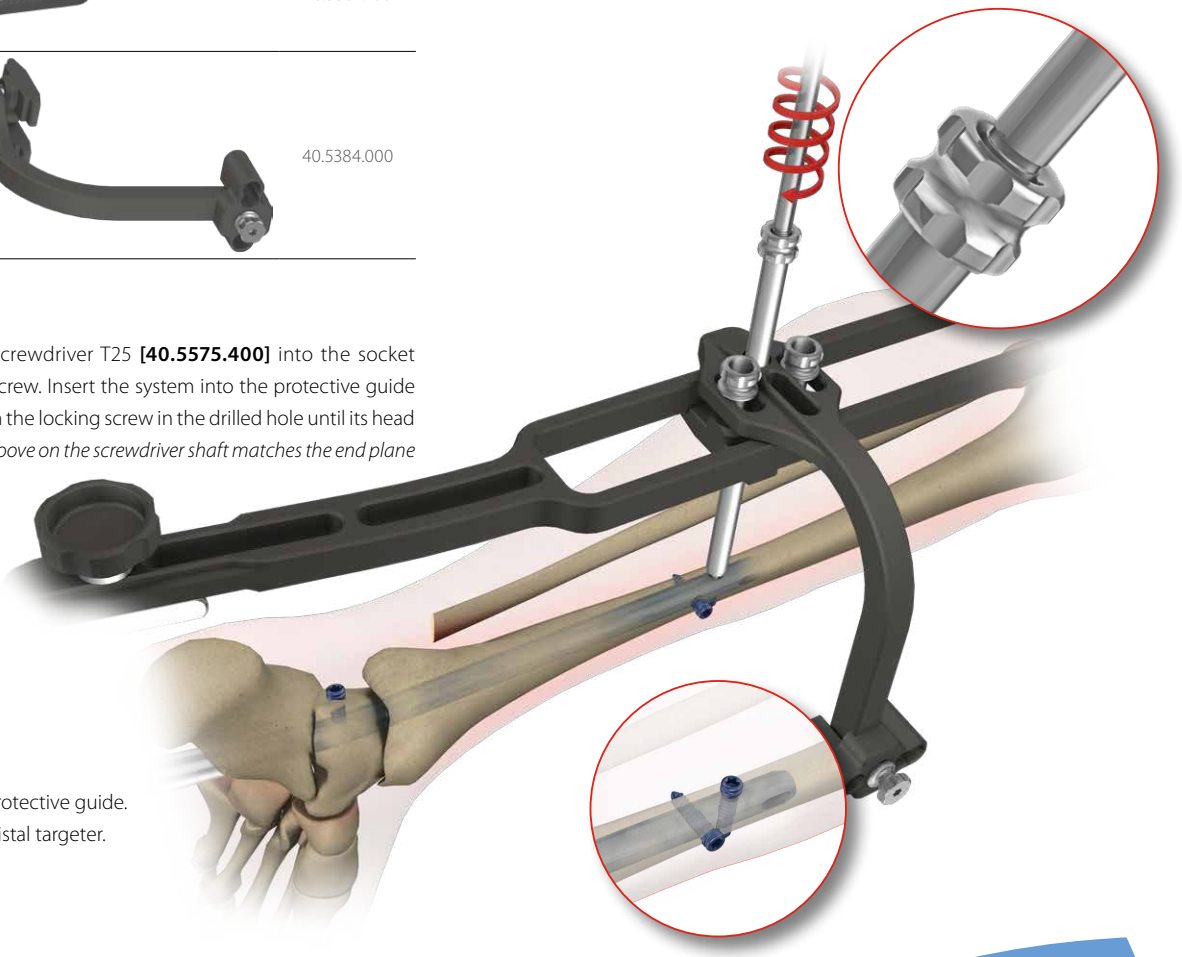
Remove the screw length measure. Leave the protective guide in the hole of the targeter.





21 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the protective guide 9/7 **[40.5510.200]** and screw in the locking screw in the drilled hole until its head reaches the cortex bone (*the groove on the screwdriver shaft matches the end plane of the protective guide*).

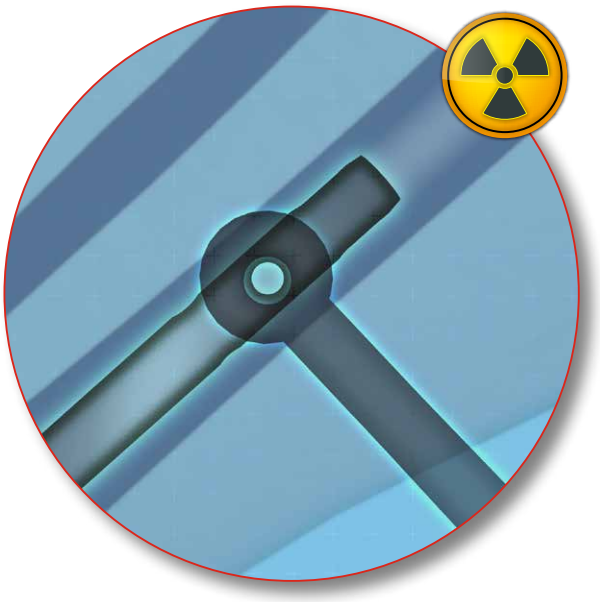
Remove the screwdriver and protective guide. Detach targeter D and lateral distal targeter.



The above description is not detailed instruction of conduct. The surgeon decides about choosing the operating procedure.

IV.8. PROXIMAL NAIL LOCKING USING "*FREE-HAND*" TECHNIQUE

40.1344.100



22 Proximal locking of the nail is carried out using "*free-hand*" technique and targeter D **[40.1344.100]**.

While drilling, it is recommended to use angular drill attachment so that the operator's hands are not directly exposed to X-Rays.

Mark on the skin the entry points and perform soft tissue incision passing through these points for the length of about 1.5 cm.

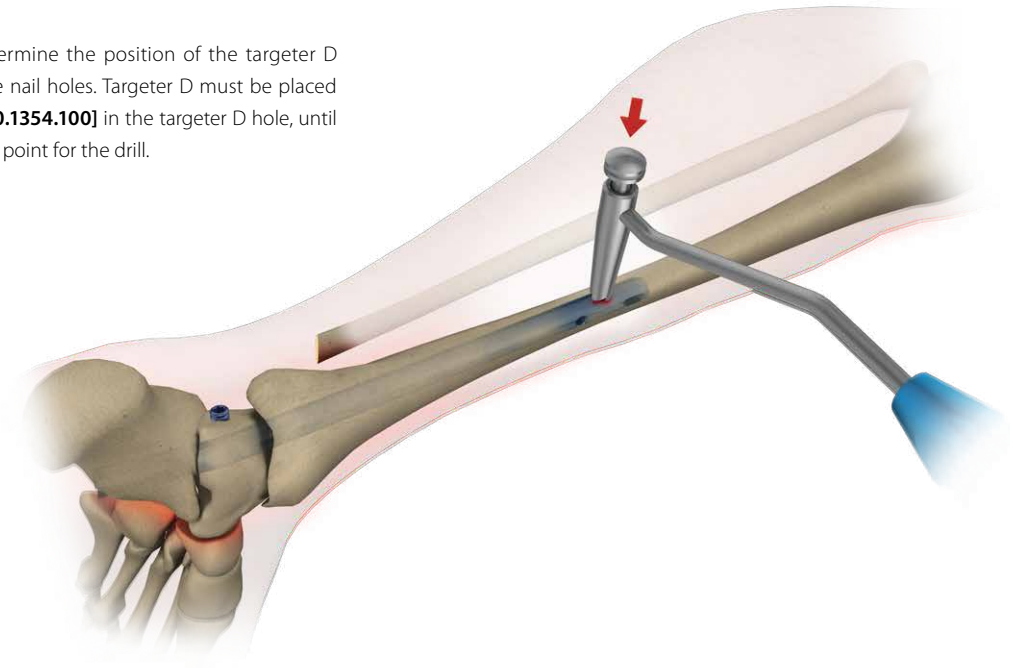
Control using the real-time X-Ray imaging system.

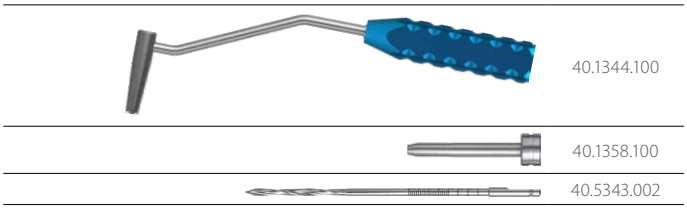
40.1344.100

40.1354.100

23 Using the X-Ray machine, determine the position of the targeter D **[40.1344.100]** in relation to the nail holes. Targeter D must be placed in cortical bone. Insert trocar short 7 **[40.1354.100]** in the targeter D hole, until it reaches the cortex and mark the entry point for the drill.

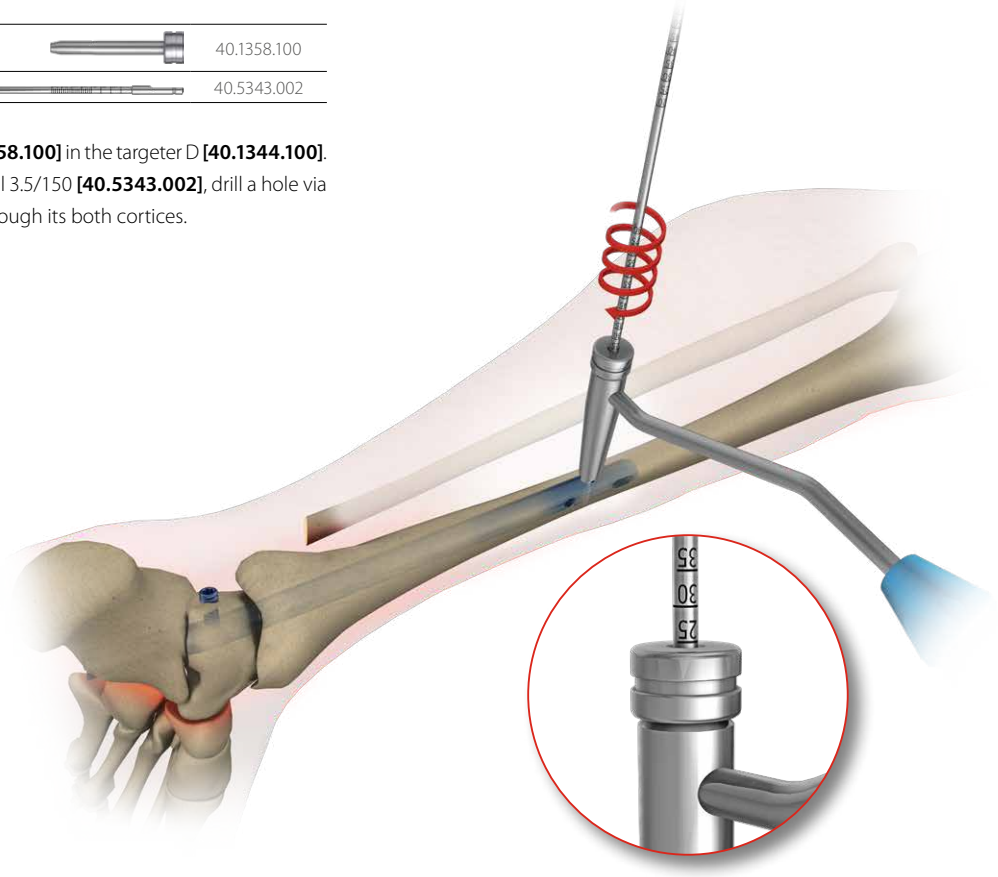
Remove the trocar.
Leave targeter D in place.

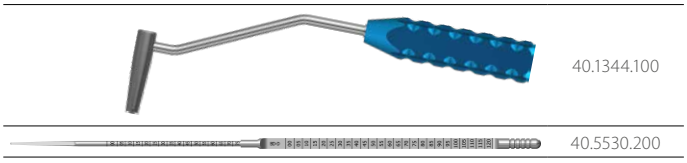




24 Insert drill guide short 7/3.5 **[40.1358.100]** in the targeter D **[40.1344.100]**. Using a drilling machine and a drill 3.5/150 **[40.5343.002]**, drill a hole via the drill guide in the bone that passes through its both cortices.

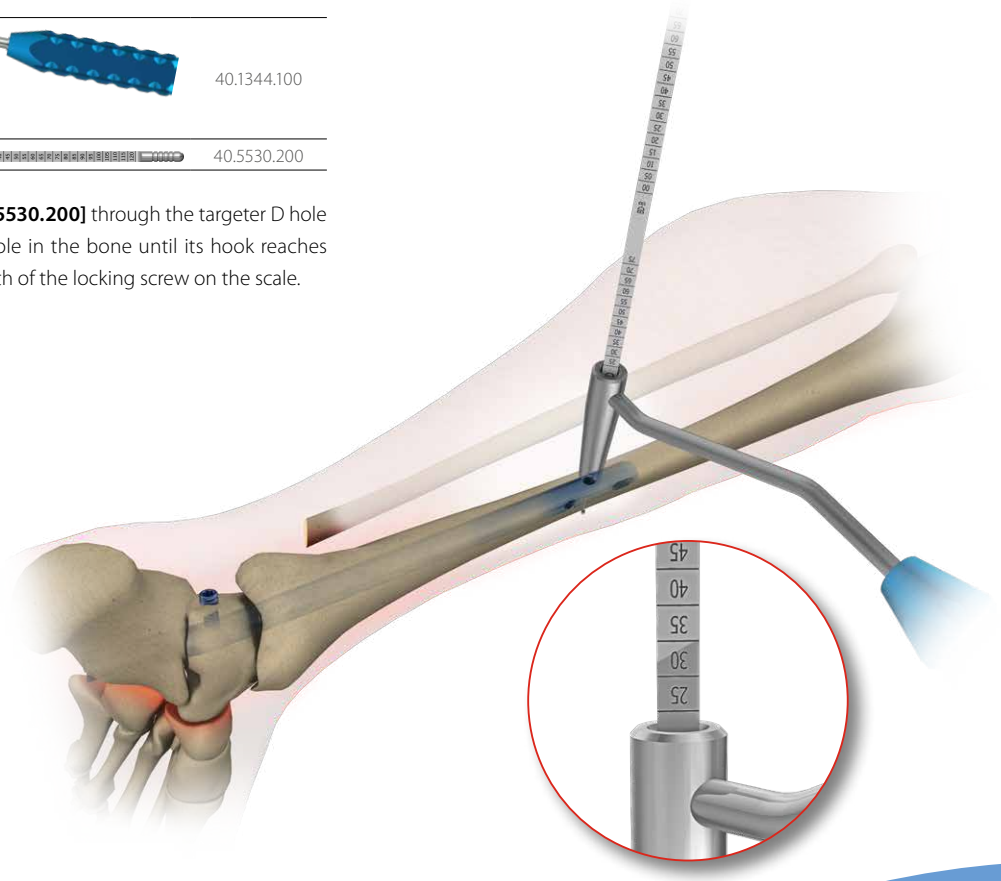
Remove the drill and drill guide.
Leave targeter D in place.

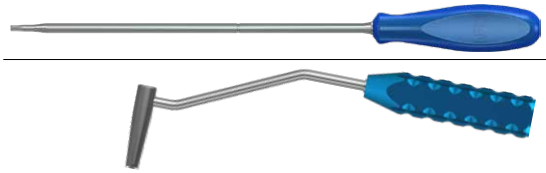




25 Insert screw length measure **[40.5530.200]** through the targeter D hole **[40.1344.100]** into the drilled hole in the bone until its hook reaches the *"exit"* plane of the hole. Read the length of the locking screw on the scale.

Remove the screw length measure.
Leave targeter D in place.

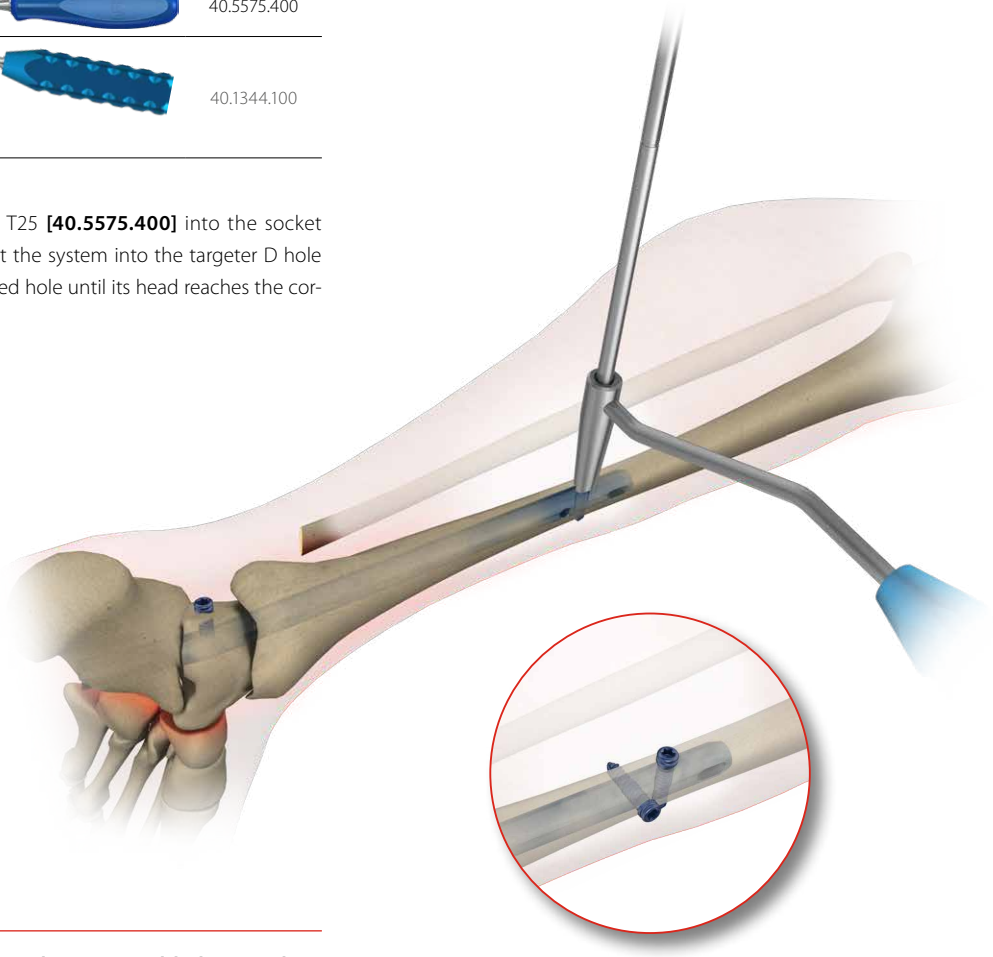



40.5575.400

40.1344.100

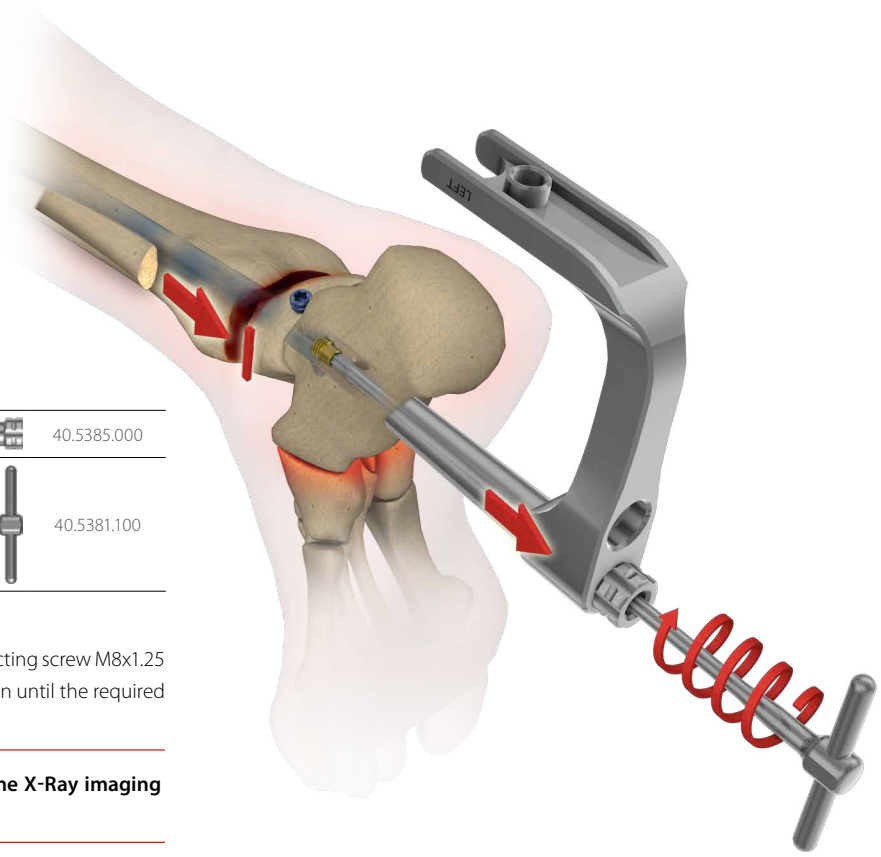
26 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the targeter D hole and screw in the locking screw in the drilled hole until its head reaches the cortex bone.

Remove the screwdriver and the targeter.



Perform nail locking in the other proximal hole according to steps 22-26 of this surgical technique.

IV.9. TALOCRURAL JOINT COMPRESSION



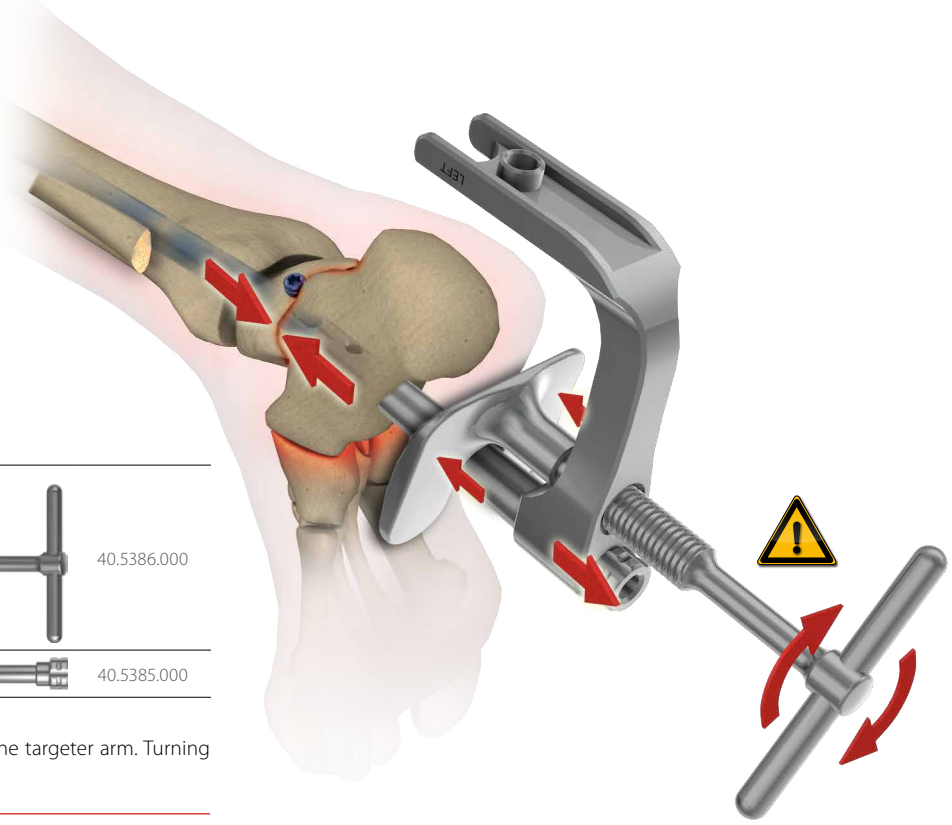

40.5385.000

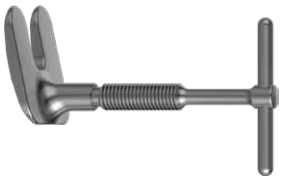

40.5381.100

27 Insert screwdriver T25 **[40.5381.100]** through connecting screw M8x1.25 **[40.5385]** and tighten the compression screw therein until the required level of compression is achieved.

Control compression level using the real-time X-Ray imaging system.

IV.10. TALOCALCANEONAVICULAR JOINT COMPRESSION




40.5386.000


40.5385.000

28 Attach the compression screw **[40.5386]** to the targeter arm. Turning the knob gently, compress the joint.

Excessive compression can damage the connecting screw [40.5385] or implant.

IV.11. NAIL LOCKING IN THE CALCANEUM


40.5301.000

40.5382.000


40.5383.000

29 Attach proximal targeter **[40.5382]** to the targeter arm B **[40.5301]** and then lateral targeter **[40.5383]** to the proximal one from the side.

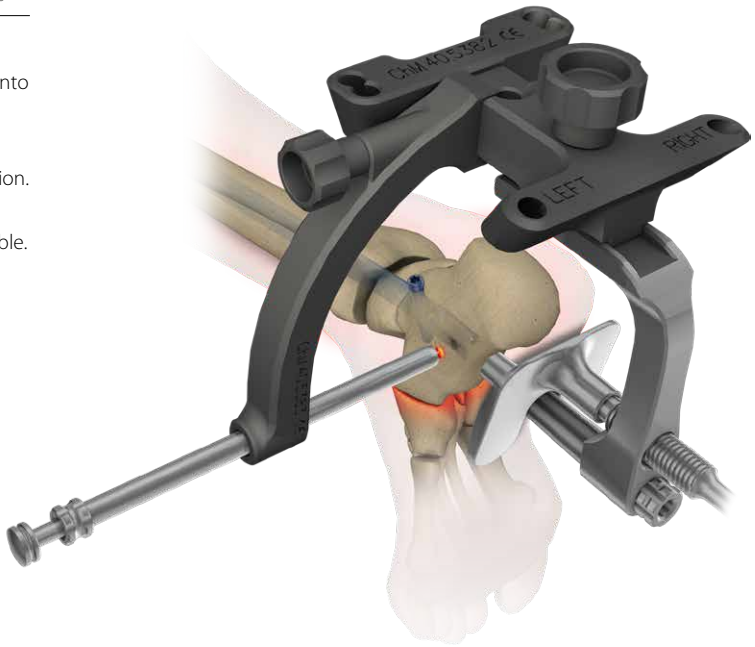

40.5510.200

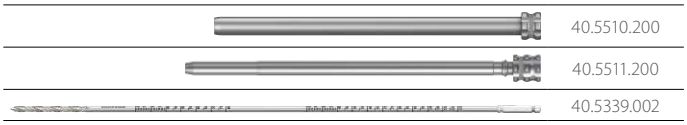

40.5534.100

Insert protective guide 9/7 **[40.5510.200]** and trocar 6.5 **[40.5534.100]** into the hole of lateral targeter.

Mark on the skin the entry point for the screw and perform soft tissue incision.
Use the trocar to mark on the cortex the entry point for the drill.
At the same time advance the protective guide as close to the bone as possible.

Remove the trocar.
Leave the protective guide in the hole of the targeter.

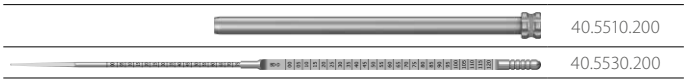




30 Insert drill guide 7/3.5 **[40.5511.200]** in the left protective guide 9/7. Using a drilling machine and a drill with scale 3.5/350 **[40.5339.002]**, drill a hole via the drill guide in the bone that passes through its both cortices. The scale on the drill indicates the length of the locking element.

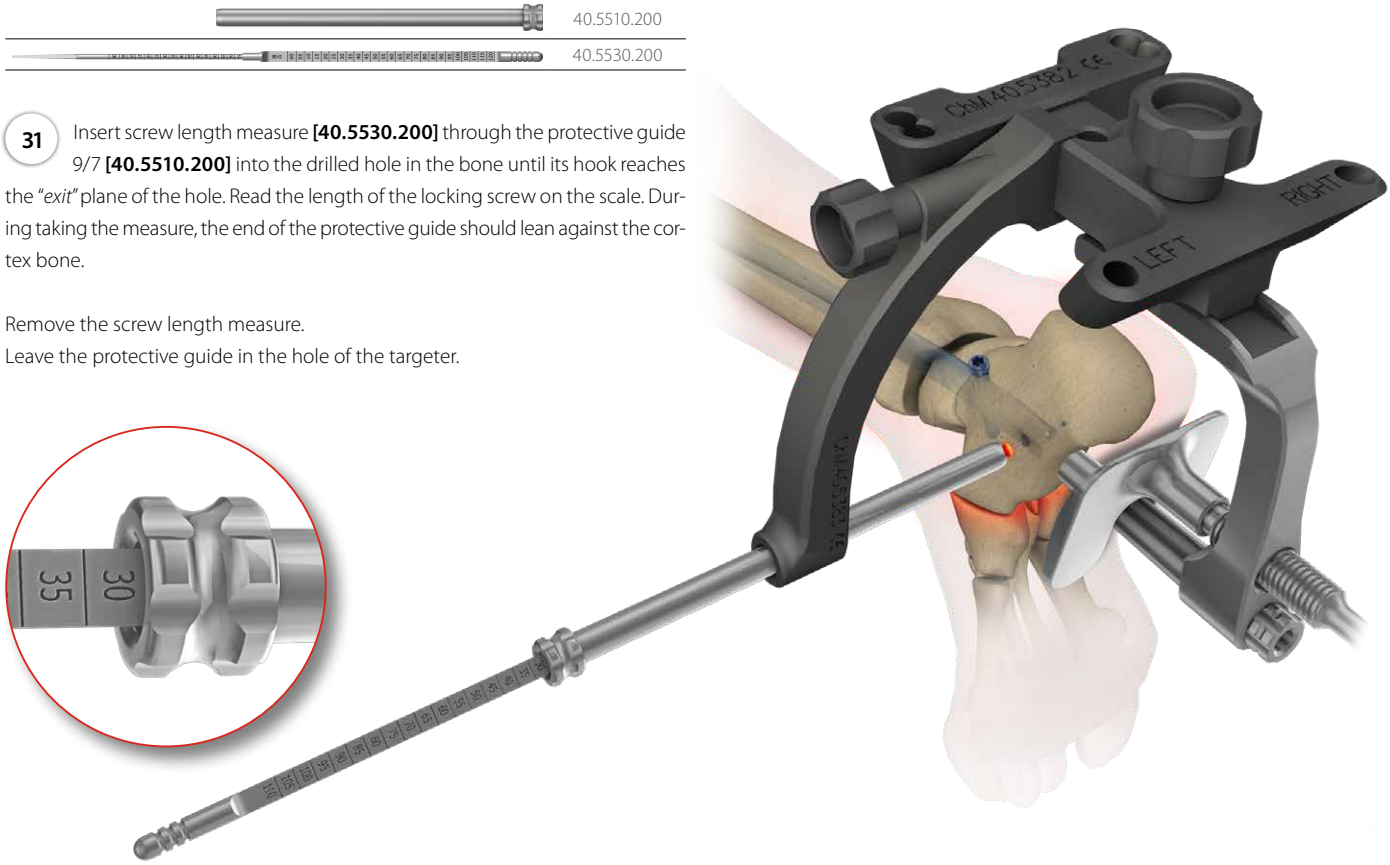
Remove the drill and drill guide.
Leave the protective guide in the hole of the targeter.

Control drilling using the real-time X-Ray imaging system.



31 Insert screw length measure **[40.5530.200]** through the protective guide 9/7 **[40.5510.200]** into the drilled hole in the bone until its hook reaches the "*exit*" plane of the hole. Read the length of the locking screw on the scale. During taking the measure, the end of the protective guide should lean against the cortex bone.

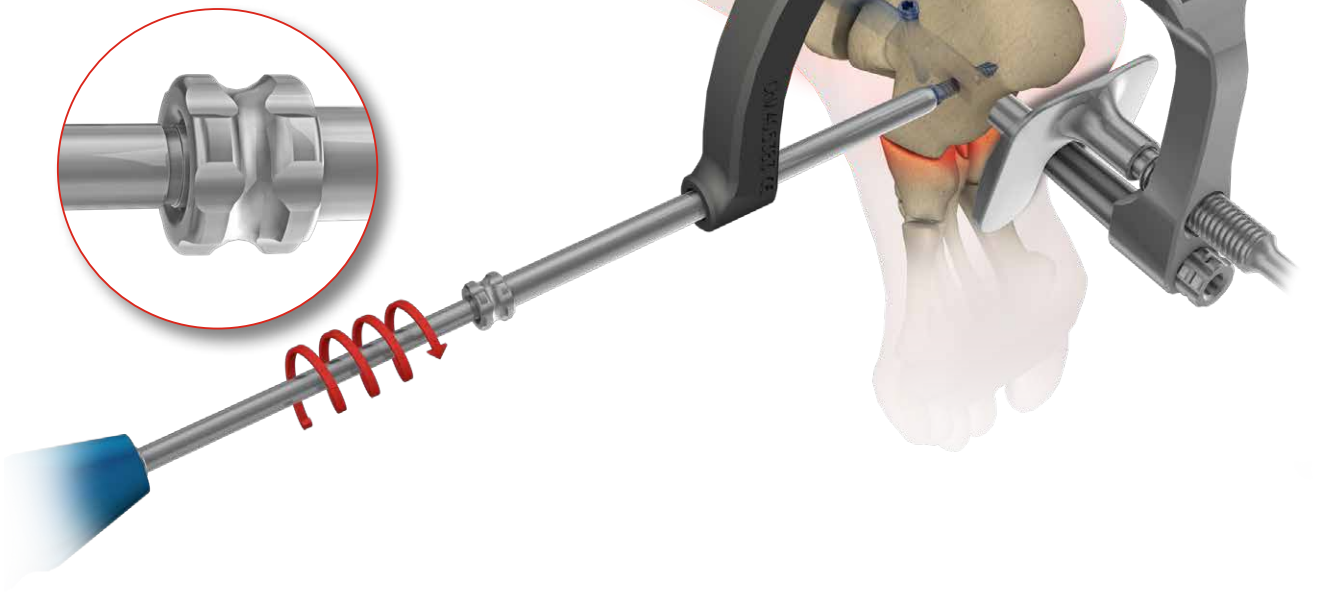
Remove the screw length measure.
Leave the protective guide in the hole of the targeter.




40.5575.400


40.5510.200

32 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the protective guide 9/7 **[40.5510.200]** and screw in the locking screw in the drilled hole until its head reaches the cortex bone (*the groove on the screwdriver shaft matches the end plane of the protective guide*).



40.5382.000

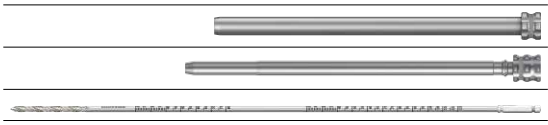

40.5510.200


40.5534.100

33 Insert protective guide 9/7 **[40.5510.200]** and trocar 6.5 **[40.5534.100]** into the hole of proximal targeter **[40.5534.100]**.
Mark on the skin the entry points and perform soft tissue incision passing through these points about 1.5cm in length.

Insert the protective guide with trocar in that incision so that its end is placed as close to the cortical bone as possible. Using trocar, mark the entry point for the drill.

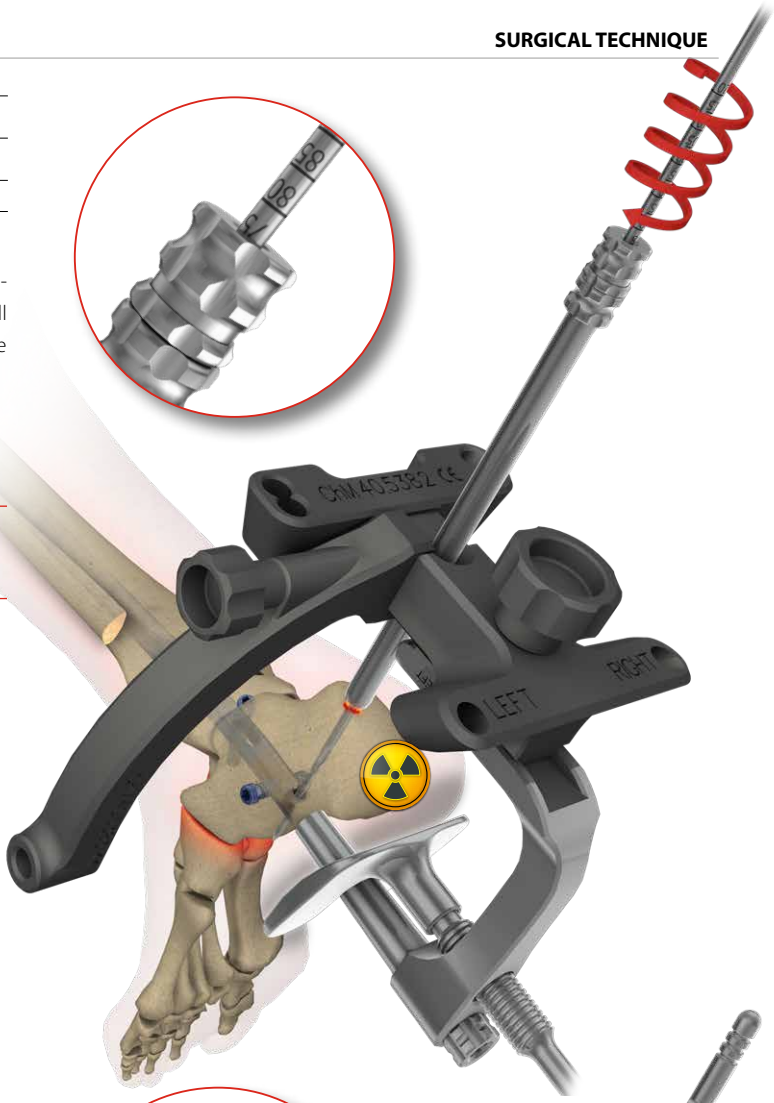
Remove the trocar.
Leave the protective guide in the hole of the targeter.

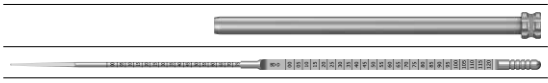


34 Insert drill guide 7/3.5 **[40.5511.200]** in the left protective guide 9/7. Using a drilling machine and a drill with scale 3.5/350 **[40.5339.002]**, drill a hole via the drill guide in the bone that passes through its both cortices. The scale on the drill indicates the length of the locking element.

Remove the drill and drill guide.
Leave the protective guide in the hole of the targeter.

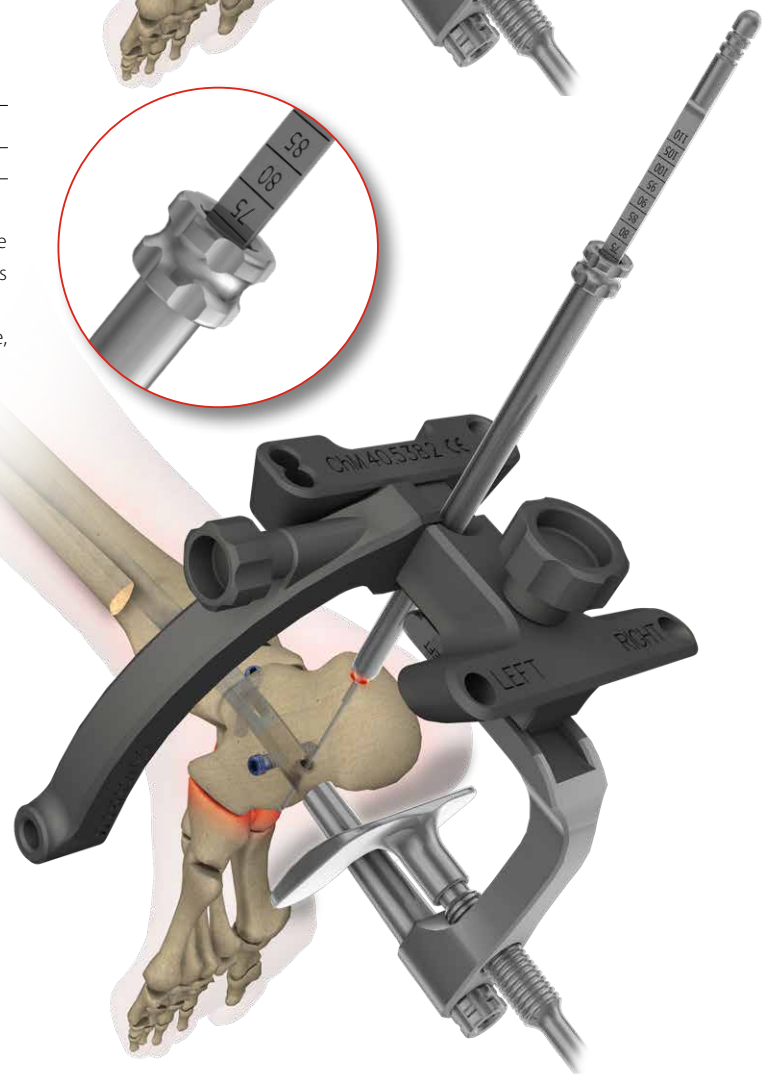
Control drilling using the real-time X-Ray imaging system.

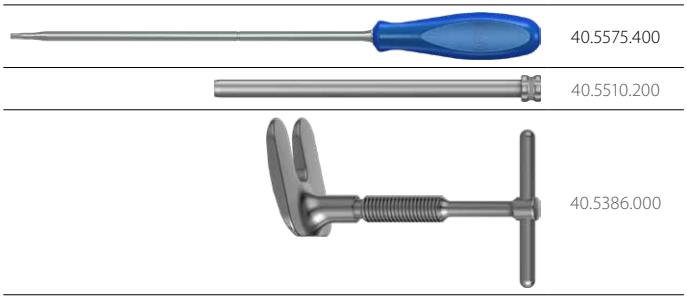


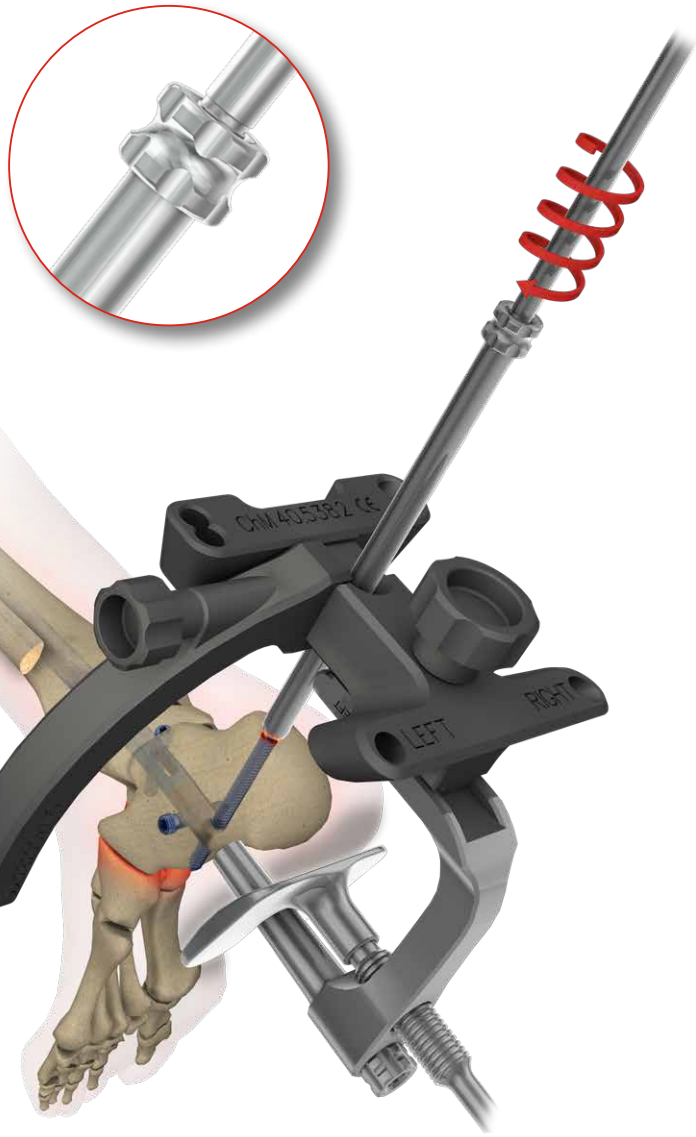


35 Insert screw length measure **[40.5530.200]** through the protective guide 9/7 **[40.5510.200]** into the drilled hole in the bone until its hook reaches the "*exit*" plane of the hole.
Read the length of the locking screw on the scale. During taking the measure, the end of the protective guide should lean against the cortex bone.

Remove the screw length measure.
Leave the protective guide in the hole of the targeter.







36 Insert the tip of the screwdriver T25 **[40.5575.400]** into the socket of a specified locking screw. Insert the system into the protective guide 9/7 **[40.5510.200]** and screw in the locking screw in the drilled hole until its head reaches the cortex bone (*the groove on the screwdriver shaft matches the end plane of the protective guide*).

Remove screwdriver **[40.5575.400]**.
Remove protective guide **[40.5510.200]**.
Remove compression screw **[40.5386]**.

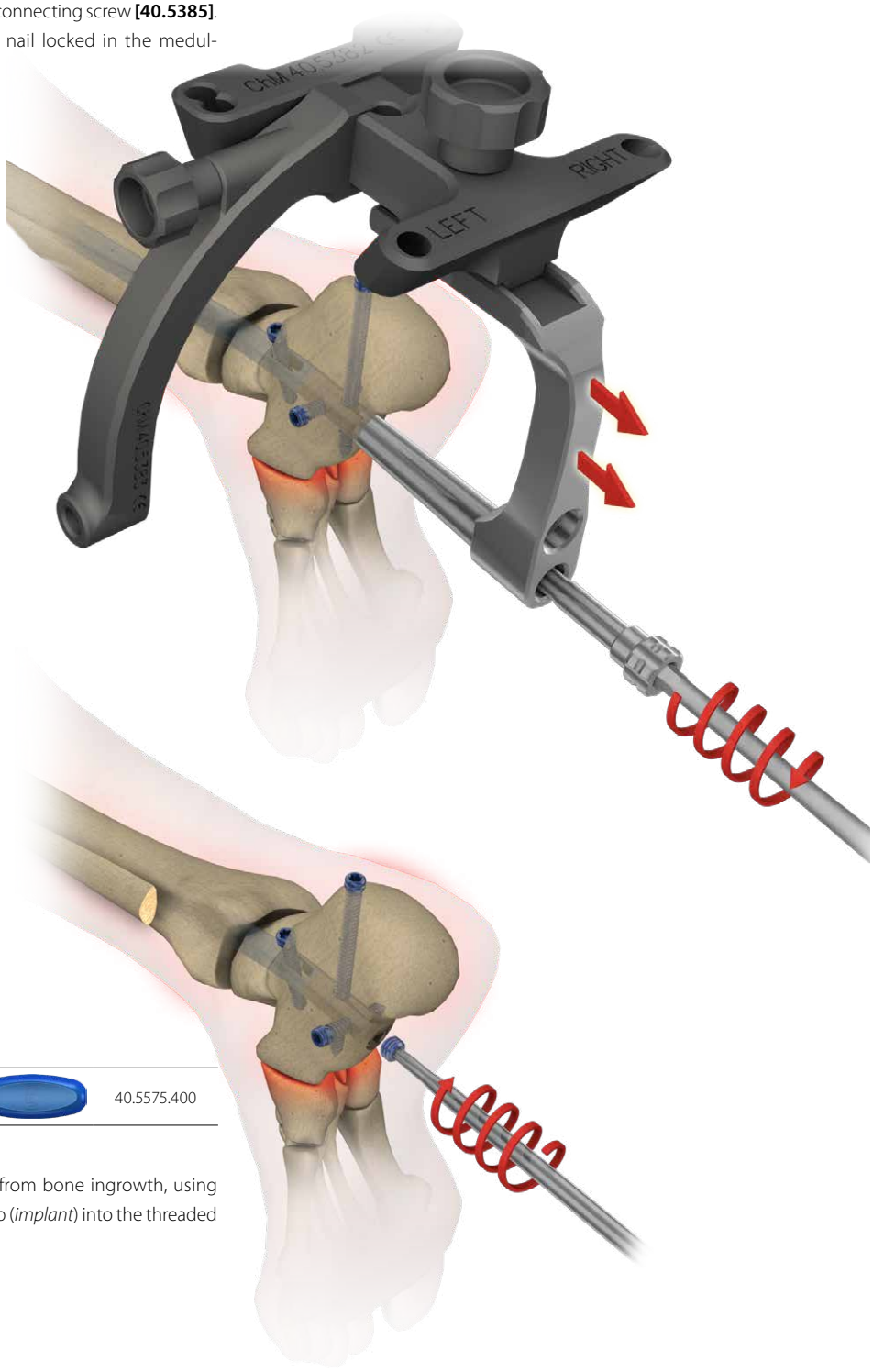
IV.12. END CAP INSERTION

40.5304.000

40.5385.000

40.5301.000

37 Using the wrench S8 **[40.5304]** remove the connecting screw **[40.5385]**. Remove targeter arm **[40.5301]** from the nail locked in the medullary cavity.



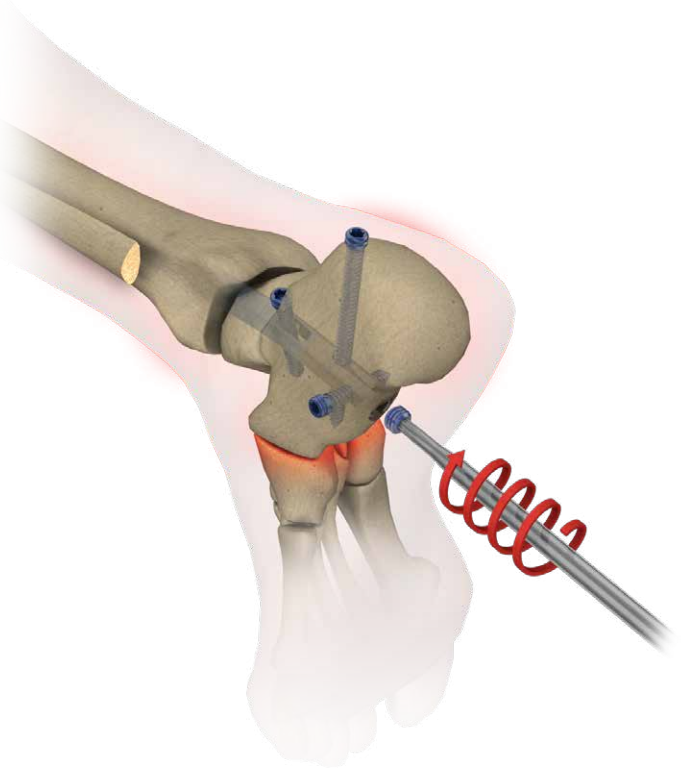
40.5575.400

In order to protect the internal thread of the nail from bone ingrowth, using the screwdriver T25 **[40.5575.400]** insert the end cap (*implant*) into the threaded hole of the nail shaft.

IV.13. NAIL REMOVAL


40.5575.400

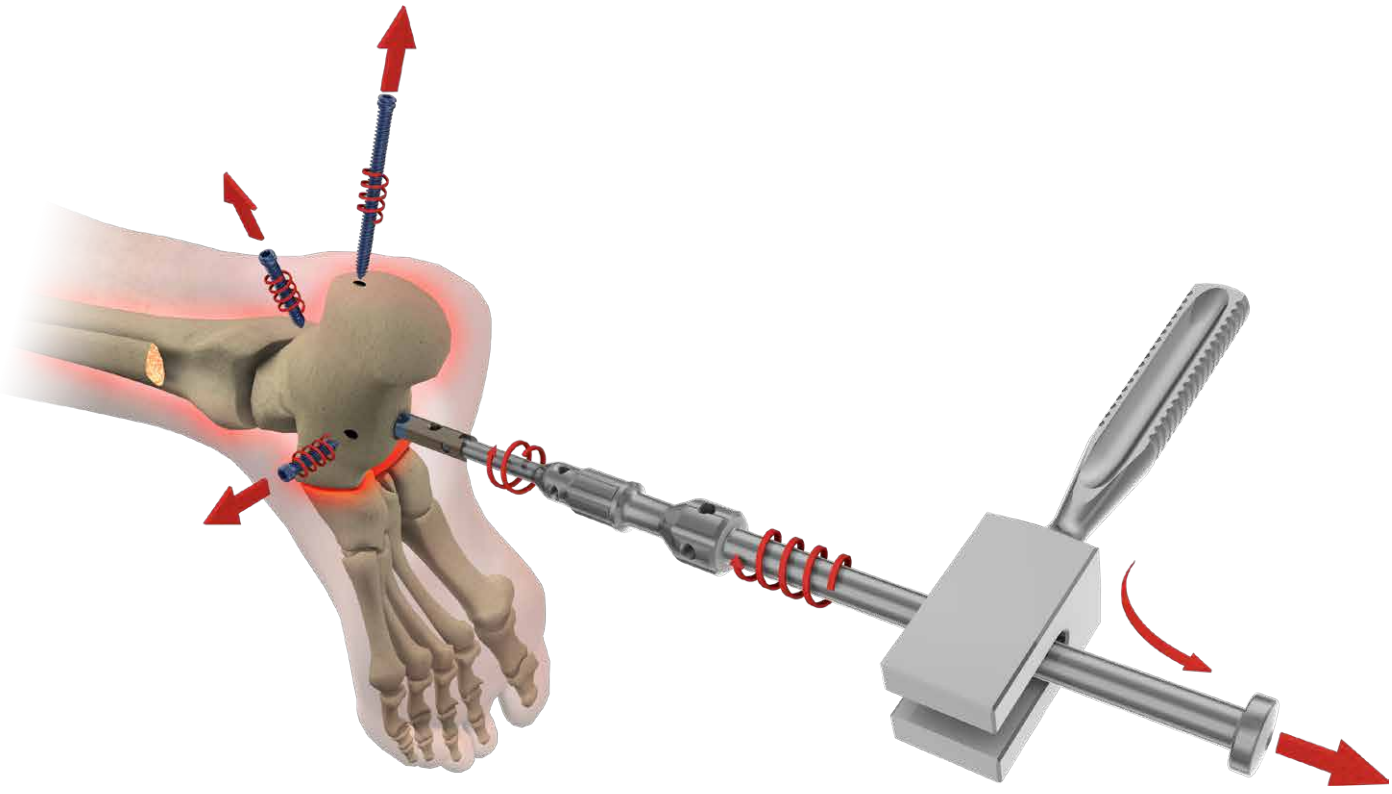
38 Using the screwdriver T25 **[40.5575.400]**, remove the end cap from the nail shaft.




40.5873.000


40.5308.000

39 Attach connector M8x1.25/M14 **[40.5309]** and then impactor-extractor **[40.5308]** to the threased shaft hole of the nail.




40.5575.400

40 Using screwdriver T25 **[40.5575.400]**, remove all locking screws.


40.3667.000

41 Using the mallet **[40.3667]**, remove the tibial nail from the medullary canal.

ChM sp. z o.o.
Lewickie 3b
16-061 Juchnowiec Kościelny
Poland
tel. +48 85 86 86 100
fax +48 85 86 86 101
chm@chm.eu
www.chm.eu

CE 0197