iwet

Surgical implants
for animals

Surgical Technique
for Locking plates

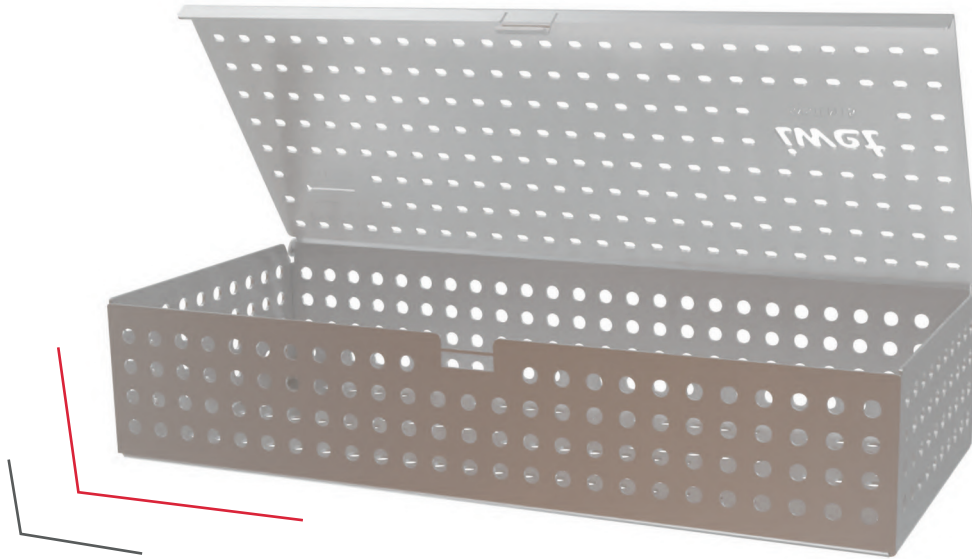# Instrument set
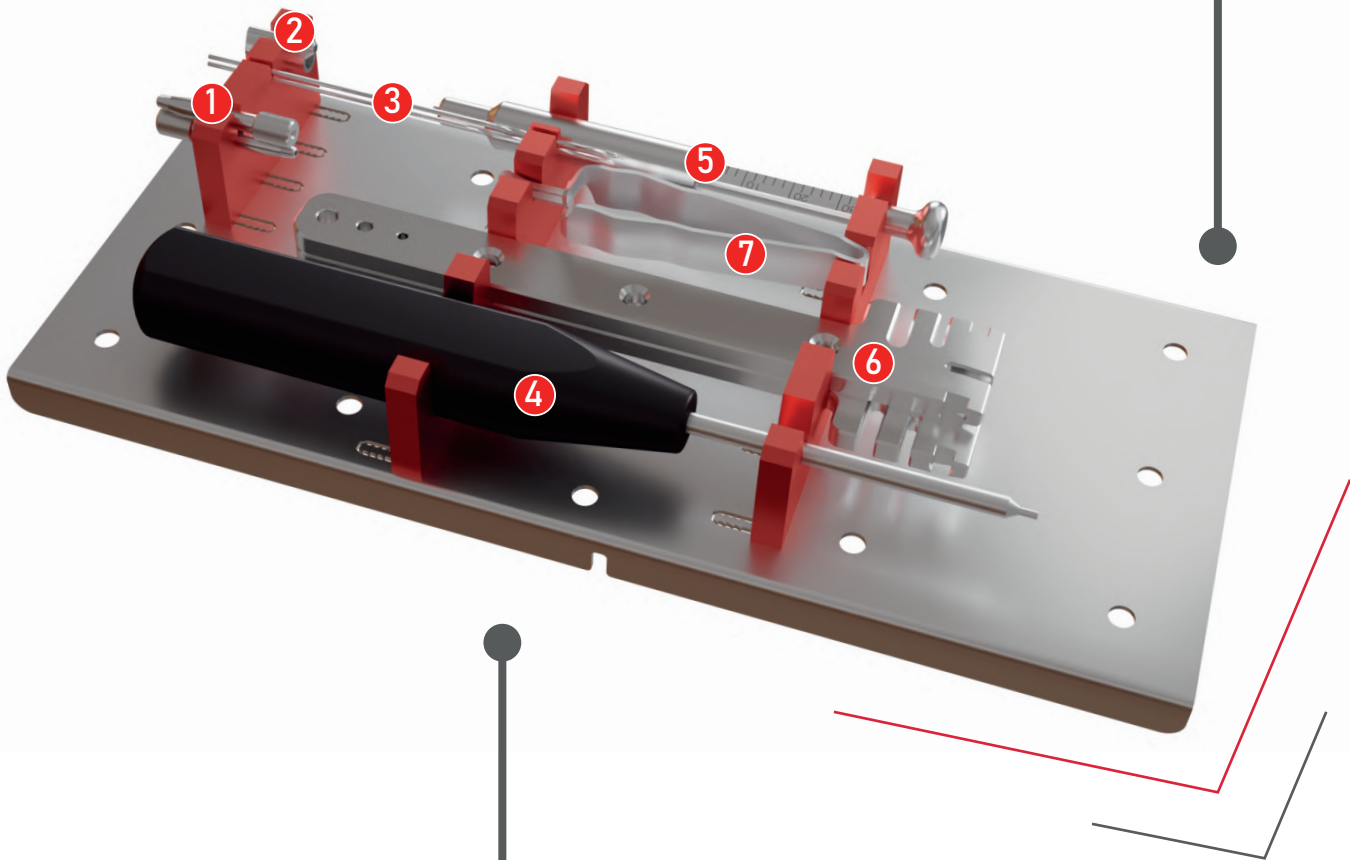
1.	Drill sleeve Ø1,1 for locking screws x2	IN.02.1001.1115
2.	Drill sleeve Ø1,1 for compression screws	IN.02.1002.11
3.	Drill bit Ø1,1x90	CD.1.1.90
4.	Screwdriver HEX 1,3	IN.01.1000.17.13
5.	Depth gauge	MG.01.04
6.	Universal bending iron x2	IN.01.1000.32
7.	Tweezers for screws	IN.01.1000.18

Sterilization tray for plates SYSTEM 1,5
IZ.01.1004.4
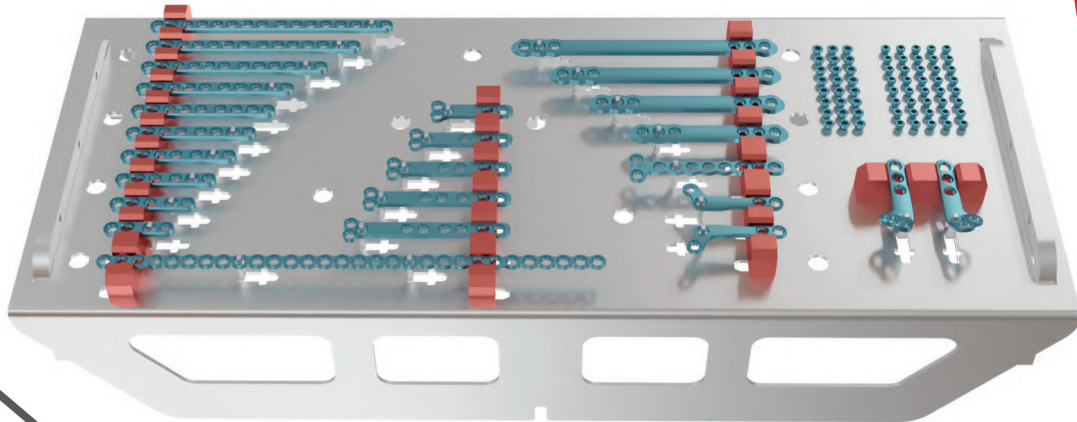
Instrument set

Sterilization tray for instruments
IZ.01.1003.3

1. Drill sleeve Ø1,5 for locking screws x2   IN.02.1001.15
2. Drill sleeve Ø1,1 for Ø1,5 locking screws   IN.02.1001.11
3. Drill sleeve Ø1,5 for compression screws   IN.02.1002.15
4. Drill bit Ø1,1x90   CD.1.1.90
5. Drill bit Ø1,5x100   CD.1.5.100
6. Screwdriver HEX 1,5   IN.01.1000.17.15
7. Depth gauge   MG.01.04
8. Universal bending iron x2   IN.01.1000.32
9. Tweezers for screws   IN.01.1000.18
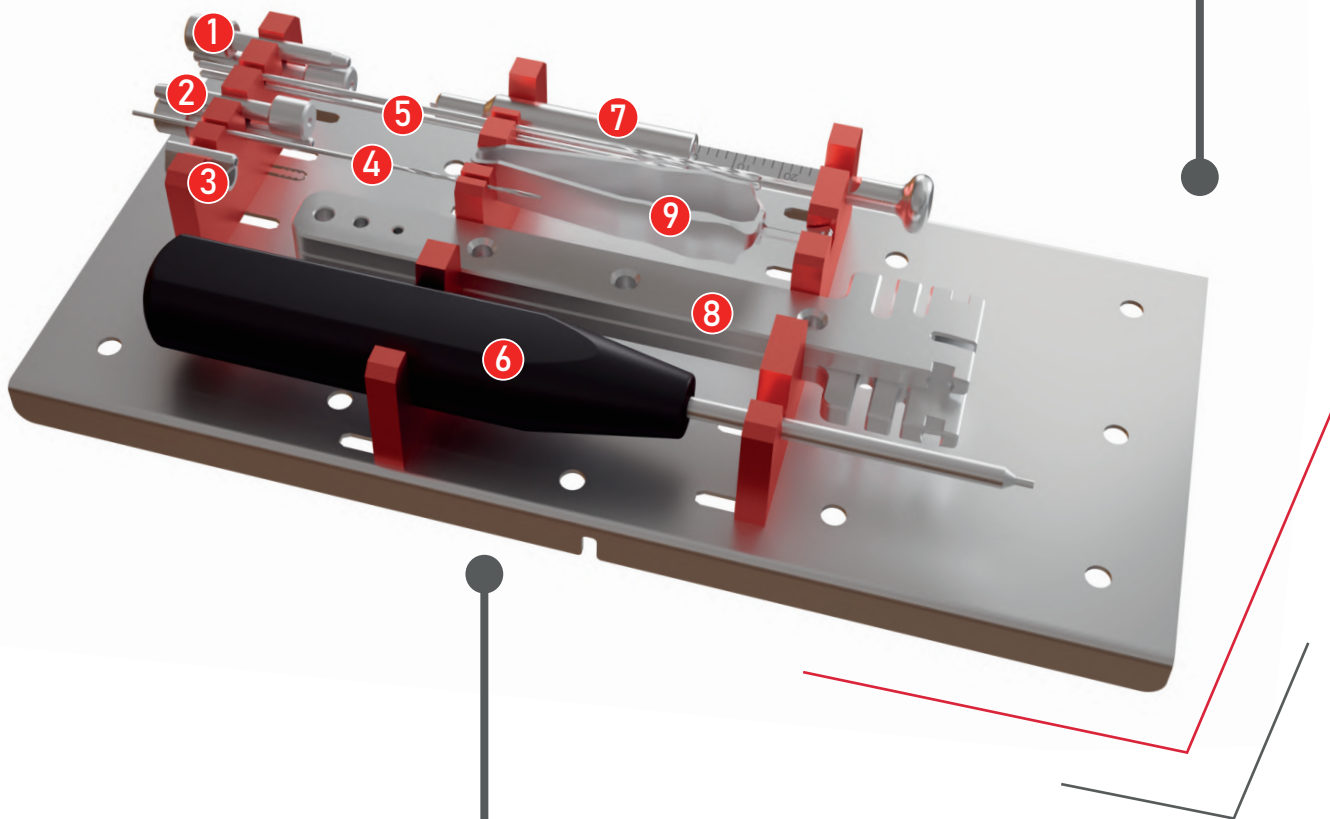
Sterilization container
IZ.01.1003.1

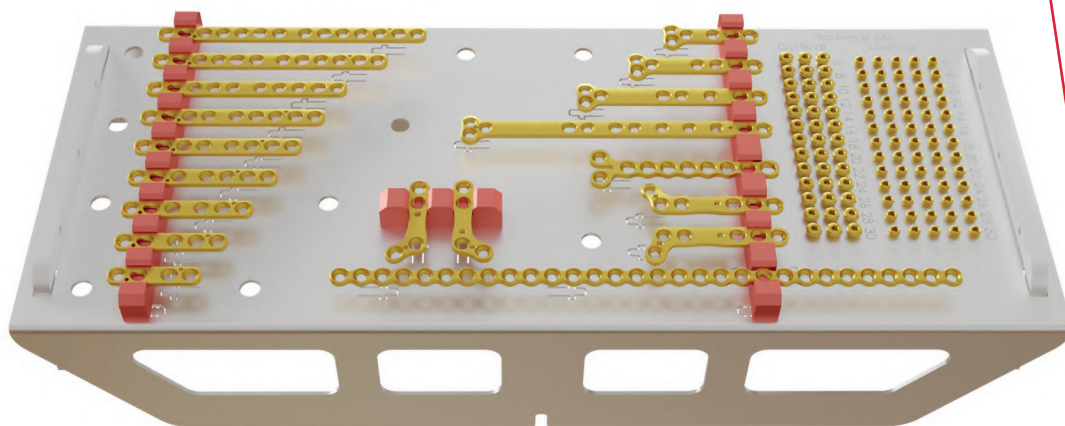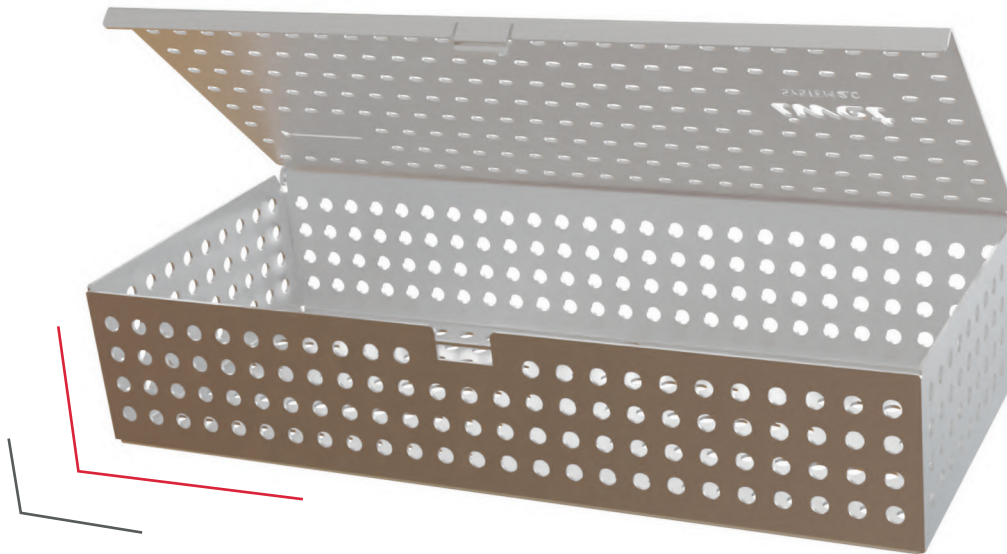Sterilization tray for plates SYSTEM 2,0
IZ.O1.1003.4

Instrument set

Sterilization tray for instruments
IZ.01.1000.3

1. Drill sleeve Ø1,8 for locking screws x2   IN.02.1001.18
2. Drill sleeve Ø1,8 for compression screws IN.02.1002.18
3. Drill bit Ø1,8x115   CD.1.8.115
4. Depth Gauge   MG.01.05
5. Tweezers for screws   IN.01.1000.18
6. Universal bending iron x2   IN.01.1000.33
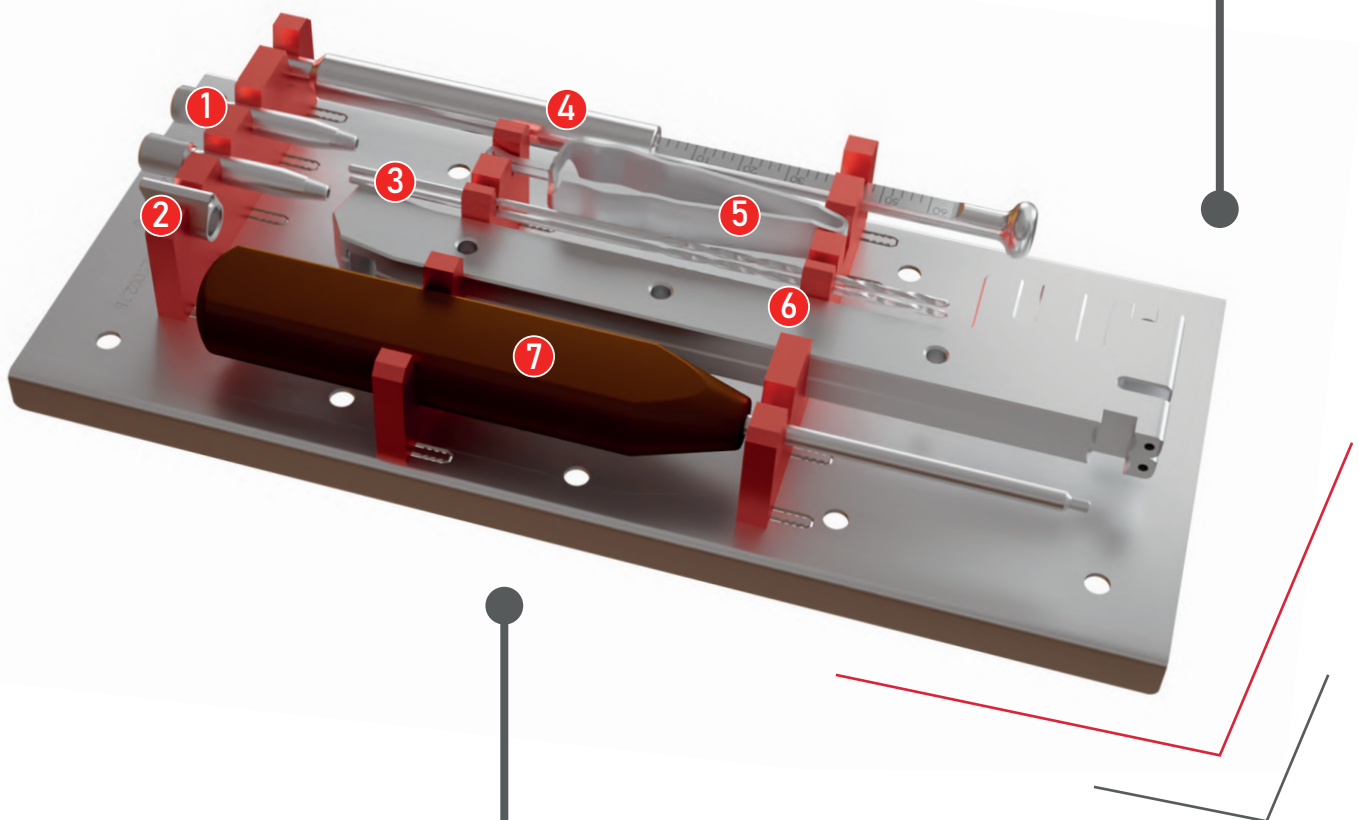7. Screwdriver HEX 2,0   IN.01.1000.17.20

Sterilization container
IZ.01.1000.1

Sterilization tray for plates SYSTEM 2,4
IZ.01.1000.4

Instrument set

Sterilization tray for instruments
IZ.01.1001.3
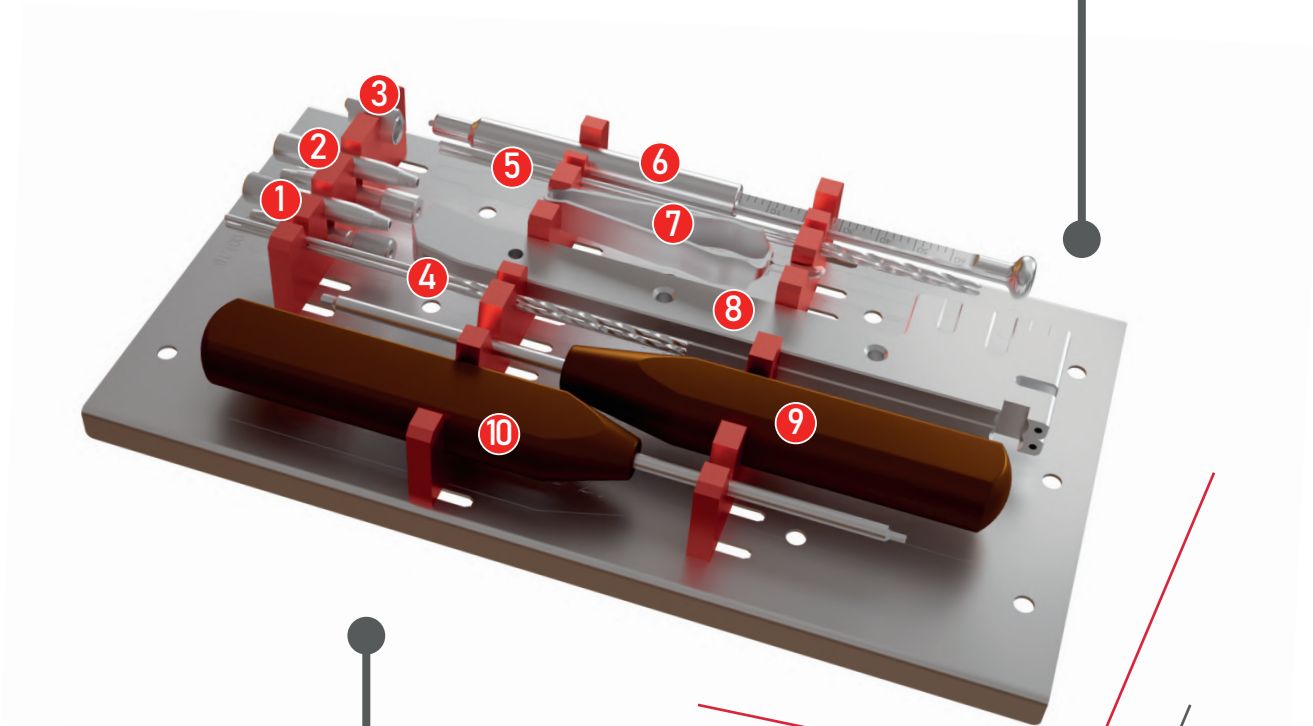
1.	Drlill sleeve Ø1,8 for locking screws x2	IN.02.1001.18
2.	Drill sleeve Ø2,0 for locking screws x2	IN.02.1001.20
3.	Drill sleeve Ø2,0 for compression screws	IN.02.1002.20
4.	Drill bit Ø1,8x115	CD.1.8.115
5.	Drill bit Ø2,0x150	CD.2.0.150
6.	Depth gauge	MG.01.05
7.	Tweezers for screws	IN.01.1000.18
8.	Universal bending iron x2	IN.01.1000.33
9.	Screwdriver HEX 2,5	IN.01.1000.17.25
10.	Screwdriver HEX 2,0	IN.01.1000.17.20

Sterilization container
IZ.01.1001.1
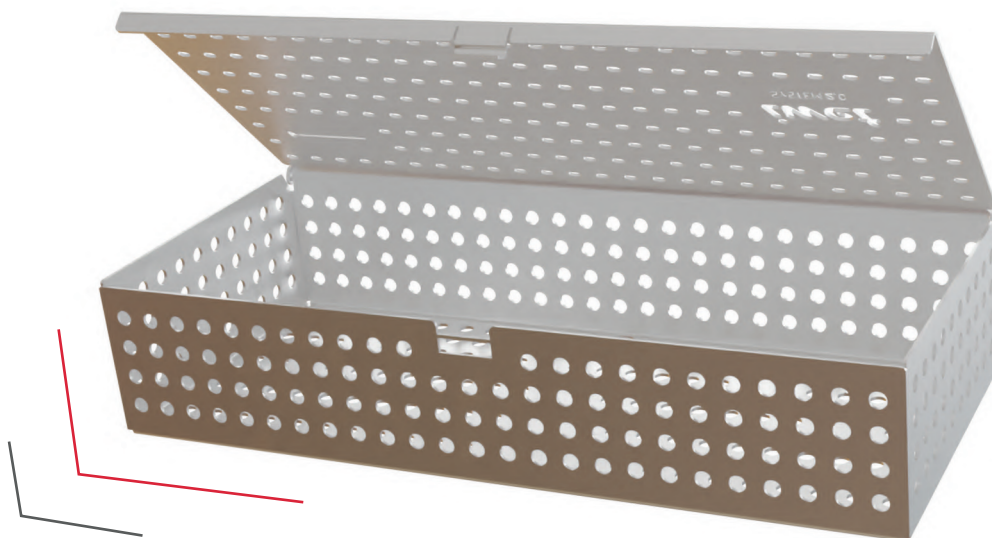
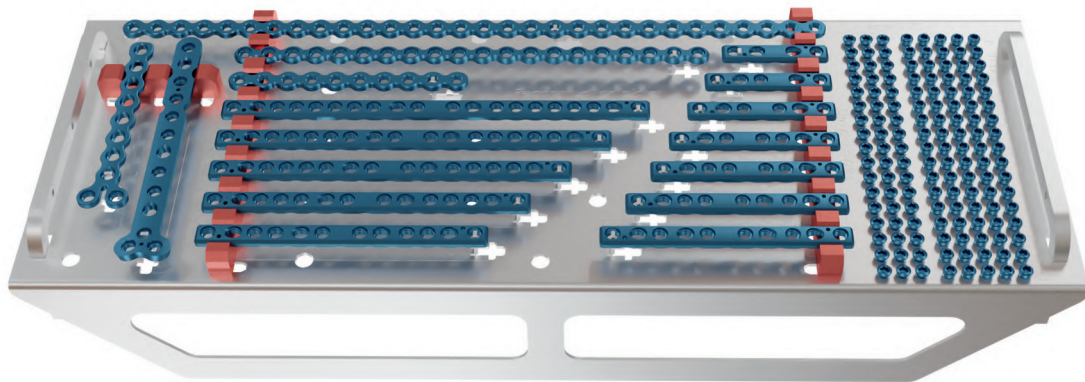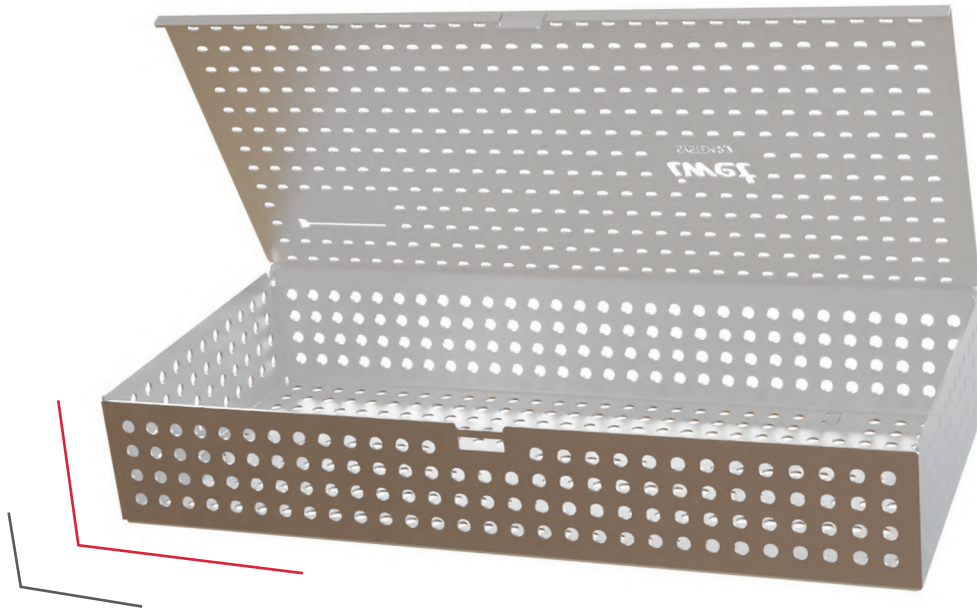Sterilization tray for plates SYSTEM 2,7
IZ.01.1001.4

Instrument set

Sterilization tray for instruments
IZ.01.1002.3
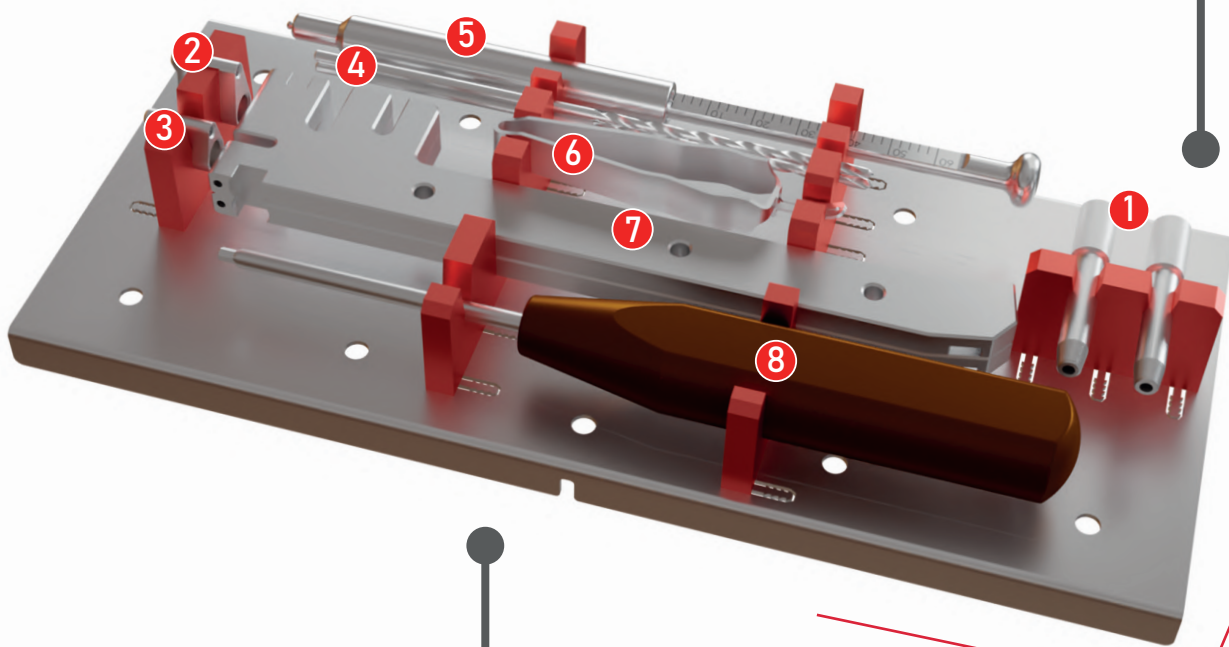
1. Drill sleeve Ø2,5 for locking screws x2   IN.02.1001.25
2. Drill sleeve Ø2,5 for compression screw   IN.02.1002.25108
   (10,8mm hole spacing plates)
3. Drill sleeve Ø2,5 for compression screw   IN.02.1002.2568
   (6,8mm hole spacing plates)
4. Drill bit Ø2,5x150   CD.2.5.150
5. Depth gauge   MG.01.05
6. Tweezers for screws   IN.01.1000.18
7. Universal bending iron x2   IN.01.1000.33
8. Screwdriver HEX 2,5   IN.01.1000.17.25

Sterilization container
IZ.01.1002.1

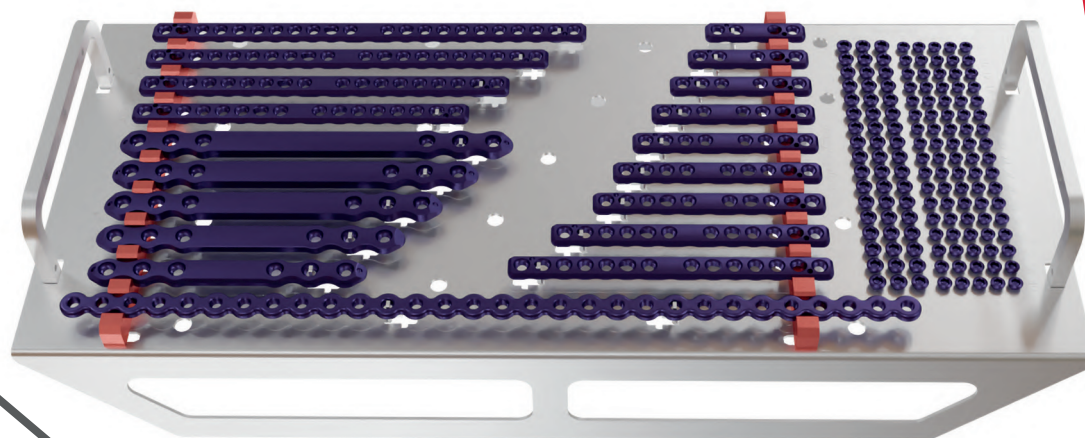
Sterilization trays for plates SYSTEM 3,5
IZ.01.1002.2
IZ.01.1002.4

Instrument set

Sterilization tray for instruments
IZ.01.1005.4
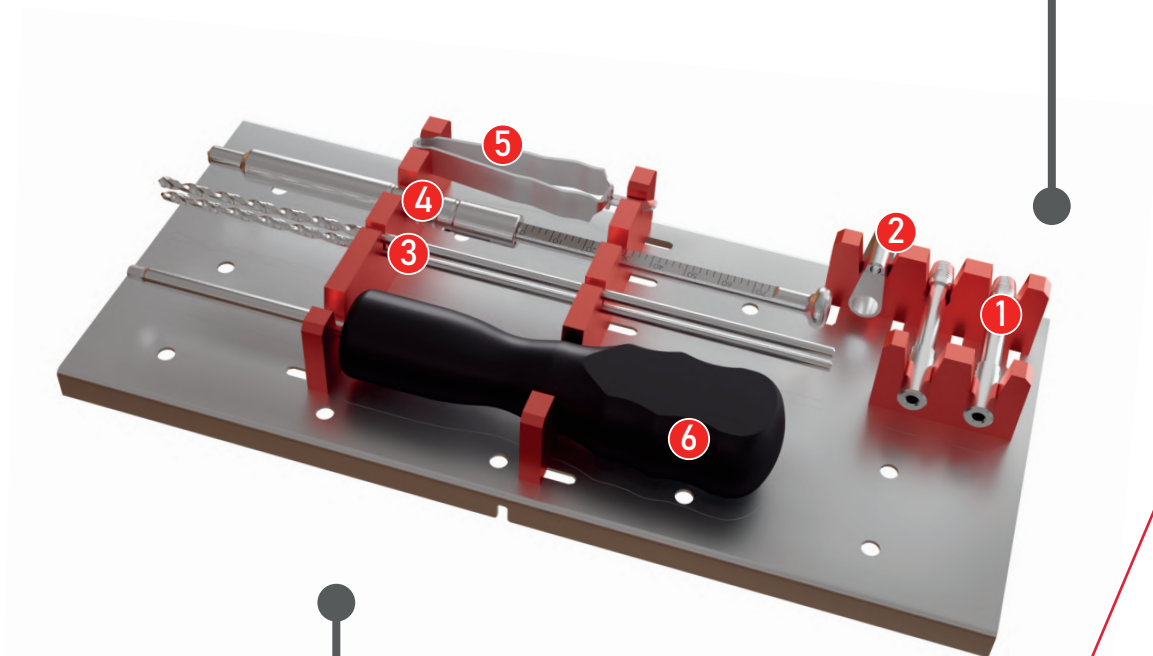
1. Drill Sleeve Ø3,2 for locking screws x2   IN.02.1001.32
2. Drill Sleeve Ø3,2 for compression screws   IN.02.1002.32
3. Drill bit Ø3,2x200   CD.3.2.200
4. Depth gauge   MG.01.06
5. Tweezers for screws   IN.01.1000.18
6. Screwdriver HEX 3,5   IN.01T.1000.17.35

Sterilization container
IZ.01.1005.1
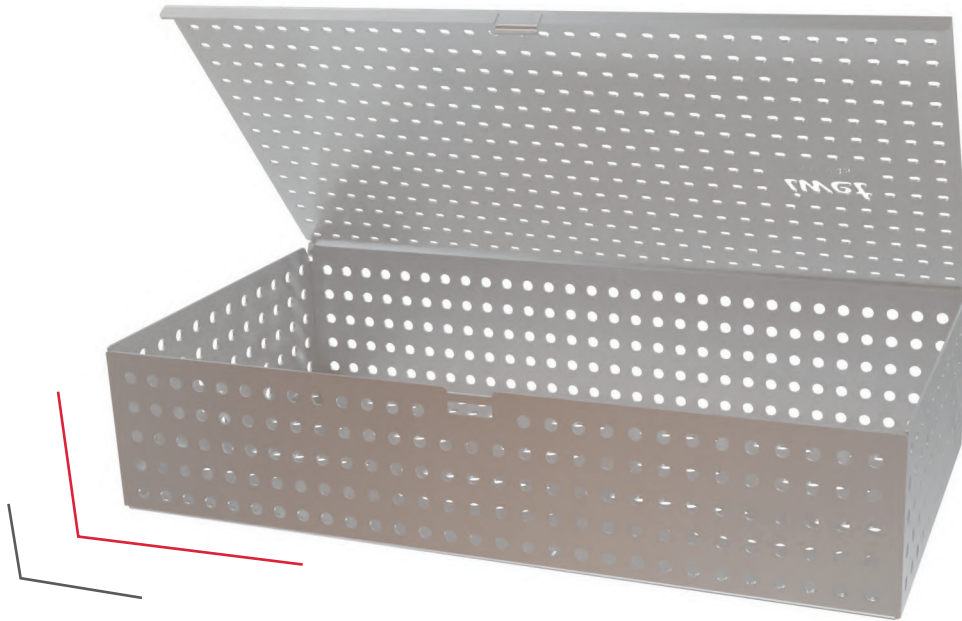
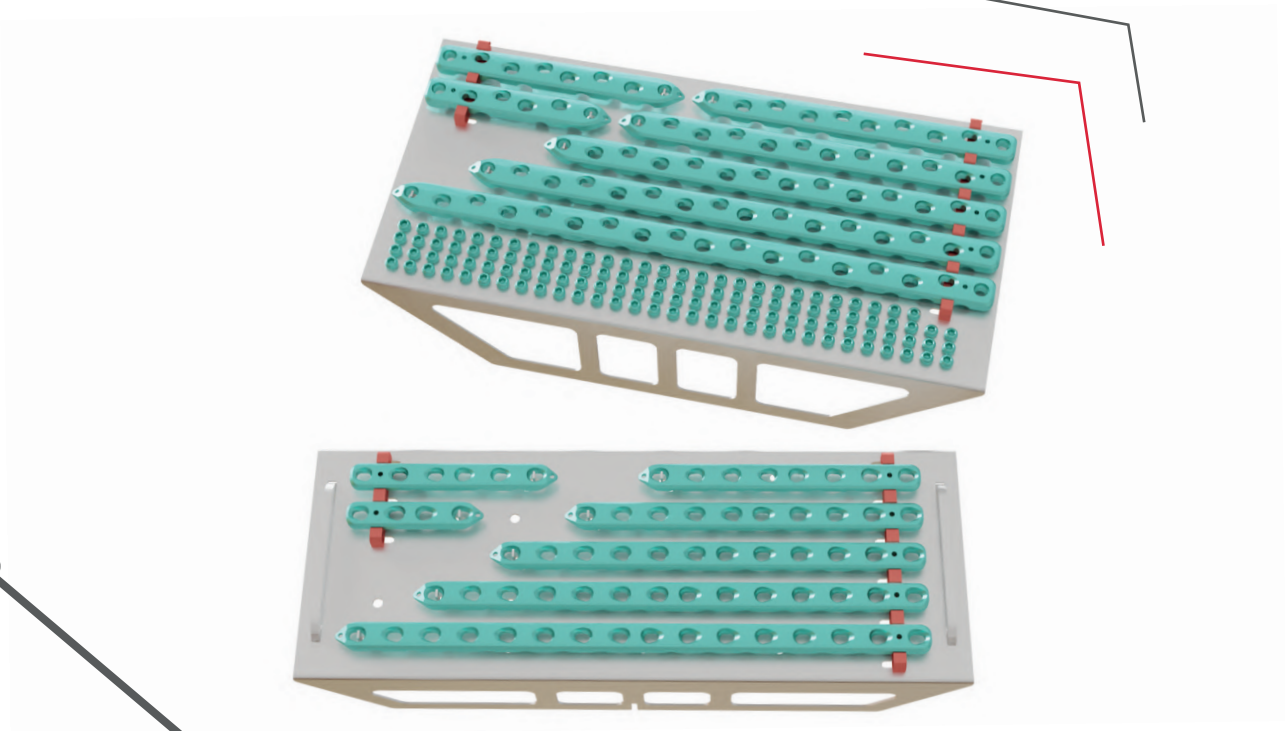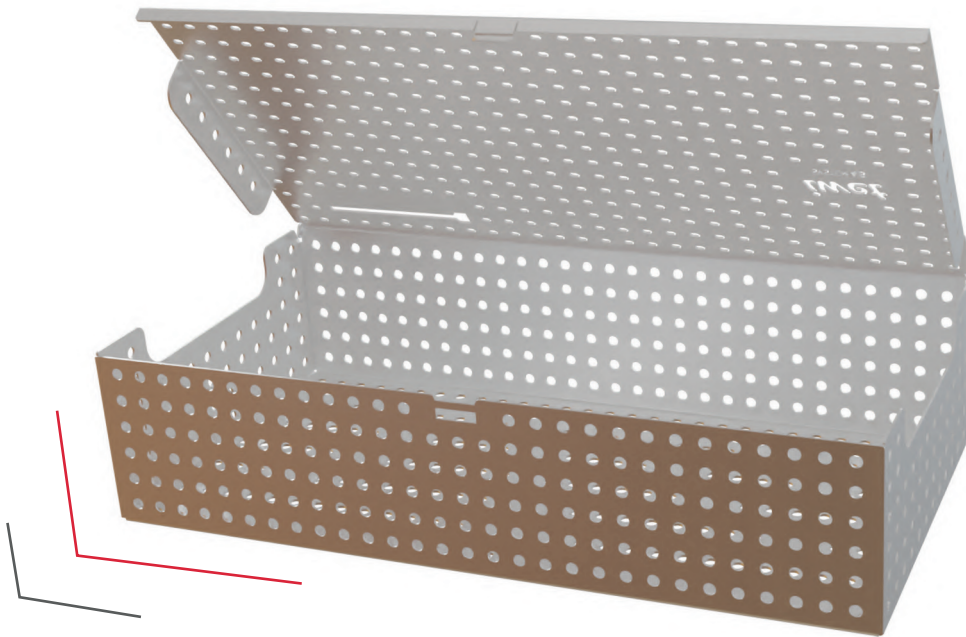Sterilization trays for plates SYSTEM 4,5
IZ.01.1005.2
IZ.01.1005.3

Locking plates are used for bone osteosynthesis, reconstruction of broken bones, they can also be used for corrective orthopedic procedures, including TPO, TPLO / CBLO or corrective osteotomy.

Locking plates SYSTEM 1,5 are intended mainly for treatment of long bone fractures in very small animals up to 4 kg, metacarpal or metatarsal fractures in animals from 4 to 10 kg , fractures of the mandible / jaw in animals up to 10 kg and fractures of ulna in animals up to 7kg.

Locking plates SYSTEM 2,0 are intended mainly for treatment of long bone fractures in small animals up to 7 kg, fractures of the scapula in animals from 4 to 11 kg and fractures of the mandible / jaw in animals up to about 22 kg.
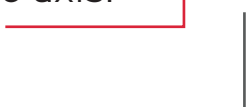
Locking plates SYSTEM 2.4 are intended mainly for treatment of long bone fractures in medium-sized animals weighing from 4 to 12 kg, scapula fractures in animals from 8 to 20 kg and fractures of the mandible / jaw in animals from 12 to 40 kg.

Locking plates SYSTEM 2.7 are intended mainly for treatment of long bone fractures in medium-sized animals weighing from 6 to 25 kg, scapula fractures in animals from 15 to 35 kg and fractures of the mandible / jaw in animals over 25 kg.

Locking plates SYSTEM 3.5 are intended mainly for treatment of long bone fractures in animals weighing 15 to 50 kg, scapula fractures in animals over 30 kg.

Locking plates SYSTEM 4.5 are intended mainly for treatment of long bone fractures in animals weighing over 50 kg or for treatment of fractures in big animals like goats, horses etc.

After recognizing the type of fracture and determining the method of treatment, the appropriate implant for case and patient should be chosen. Before inserting the plate, bone reposition should be done, for this purpose a Kirschner wire can be inserted in intramedullary canal, which in the initial phase of stabilization will help in restoring the bone length and maintaining the axis.

Weight/Waga[kg]

Axis values: 1 2 3 4 5 7 10 12 15 17 20 25 30 35 40 45 50 60 70 80

Metacarpus/Metatarsus — Śródręcze/Śródstopie
- 1.5
- 2.0
- 2.4
- 2.7

Tibia — Kość piszczelowa
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5
- 3.5+
- 4.5

Femur — Kość udowa
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5
- 3.5+
- 4.5

Pelvis/Acetabulum — Miednica/Panewka
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5

Scapula — Łopatka
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5

Mandible/Maxilla — Żuchwa/Szczęka
- 1.5
- 2.0
- 2.4
- 2.7

Humerus — Kość ramienna
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5
- 3.5+
- 4.5

Radius — Kość promieniowa
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5
- 3.5+

Ulna — Kość łokciowa
- 1.5
- 2.0
- 2.4
- 2.7
- 3.5

Locking screw inserting
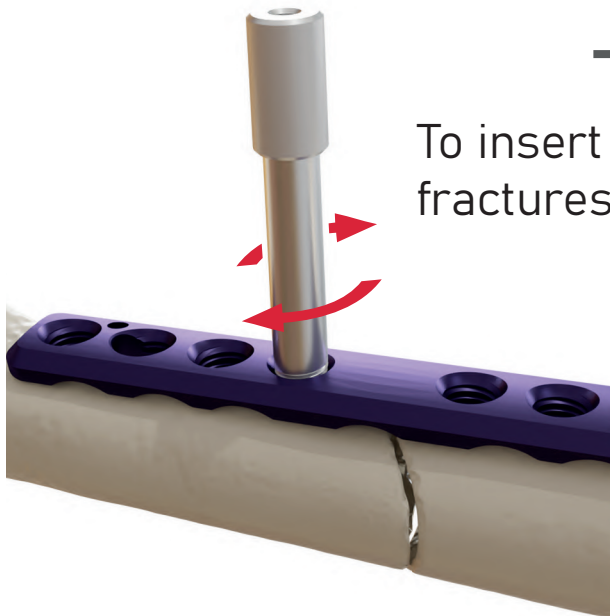
To insert locking screw stabilizing bone fractures, screw in the appropriate drill sleeve for the locking screws in the threaded hole.

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill sleeve	1.1	1.5	1.8	2.0	2.5	3.2

Drill a hole for locking screw by proper drill bit through two layers of cortical bone.

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill bit	1.1	1.5	1.8	2.0	2.5	3.2
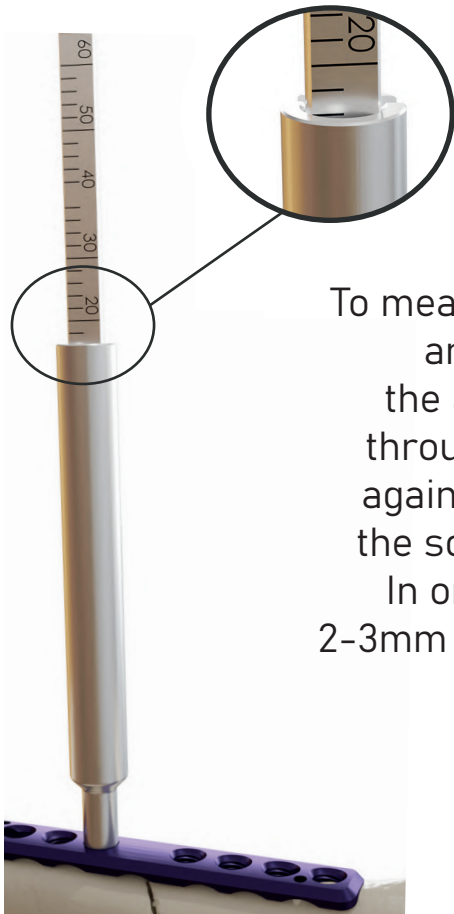
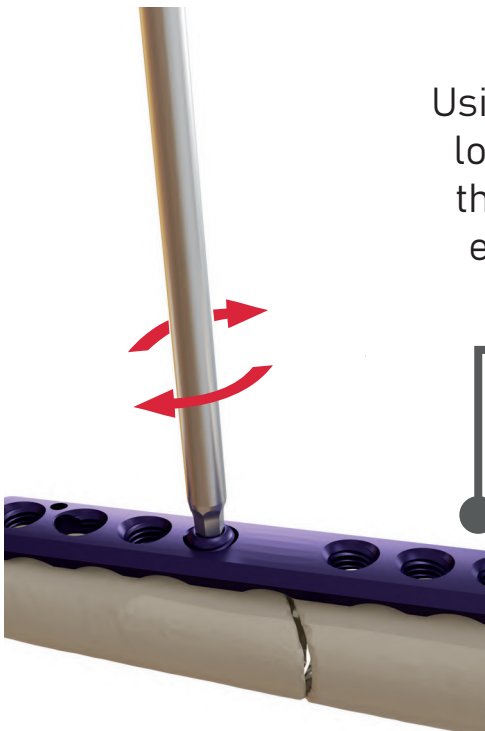To measure the length of the screw, remove the drill bit and the guide sleeve, then in the drilled hole place the appropriate depth gauge. The hook should be led through two cortical bones, so that its bent part rests against the outer side of the second cortex, then from the scale read the bone thickness with the bone plate. In order to ensure maximum fixing, to the result add 2-3mm (measured value is 16mm, add 2-3mm, so screw length should be around 18mm).

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Depth gauge	MG.01.04		MG.01.05			MG.01.06

Using a dedicated screwdriver, screw in the locking screw, remembering not to tighten the screw by force, if the instrument set is equipped with a torque limit screwdriver, it should be used.
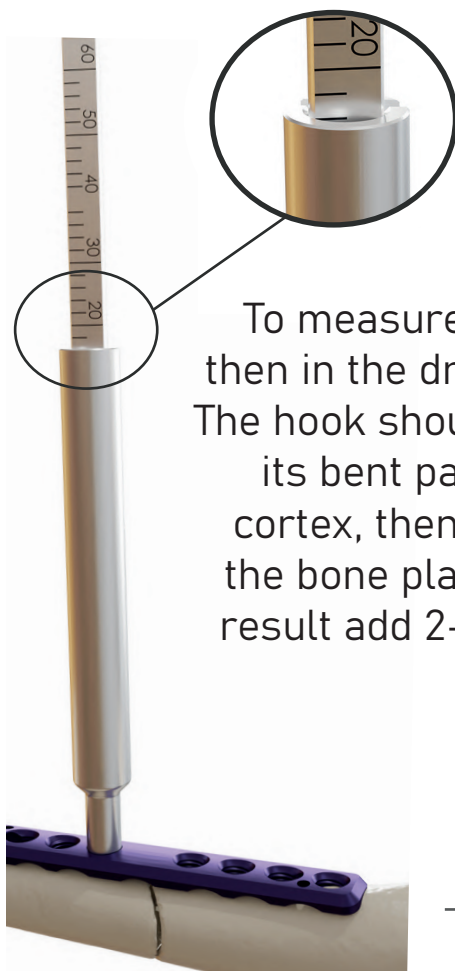
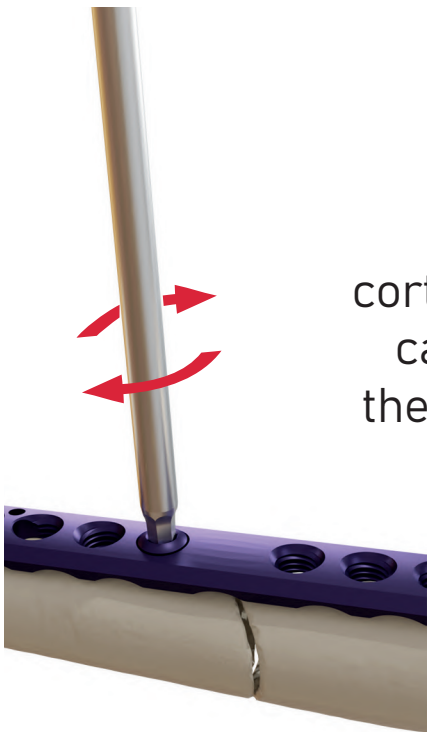| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Screwdriver	HEX 1.3	HEX 1.5	HEX 2.0		HEX 2.5	HEX 3.5
Torque limit	0.3 Nm	0.4 Nm	0.8 Nm		1.5 Nm	4 Nm

Cortical screw inserting

Drill a hole for the cortical screw by proper drill bit through two layers of cortical bone.

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill bit	1.1	1.5	1.8	2.0	2.5	3.2

To measure the length of the screw, remove the drill bit, then in the drilled hole place the appropriate depth gauge. The hook should be led through two cortical bones, so that its bent part rests against the outer side of the second cortex, then from the scale read the bone thickness with the bone plate. In order to ensure maximum fixing, to the result add 2–3mm (measured value is 16mm, add 2–3mm, so screw length should be around 18mm).
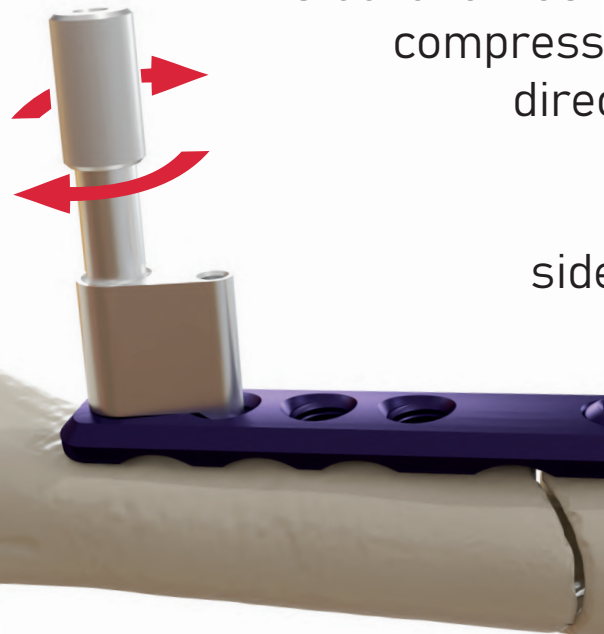
Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Depth gauge	MG.01.04		MG.01.05			MG.01.06

Using a dedicated screwdriver, screw in the cortical screw, remembering that over tightening can lead to damaging the connections between the screw and the bone and breaking the thread.
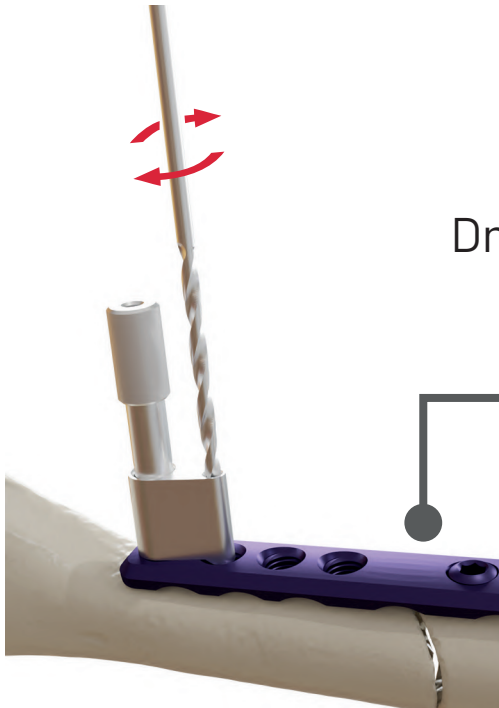
| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Screwdriver	HEX 1.5		HEX 2.0	HEX 2.5		HEX 3.5

Compression by locking screw

To insert the locking screw in the compression position, put the drilling sleeve for compression screws on the drilling sleeve for locking screws. (The pointed side of the compression screw drilling sleeve should be directed towards the plate) Then screw the drilling sleeve in the nearest threaded hole on the compression side of the locking – compression hole.

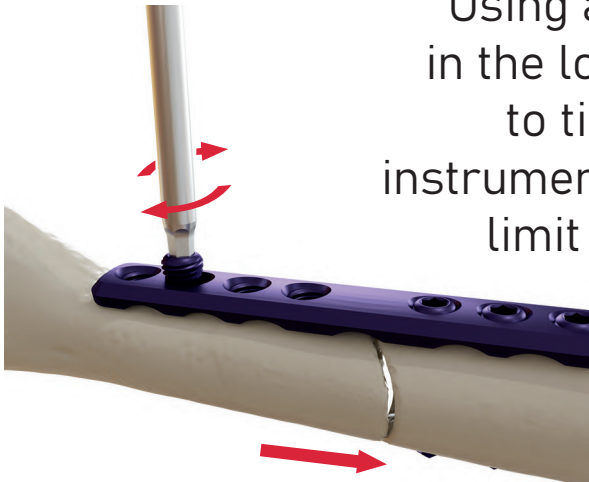| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill sleeve	1.1	1.5	1.8	2.0	2.5	3.2

Drill a hole for the compression screw by drilling by proper drill bit through two layers of cortical bone.

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill bit	1.1	1.5	1.8	2.0	2.5	3.2
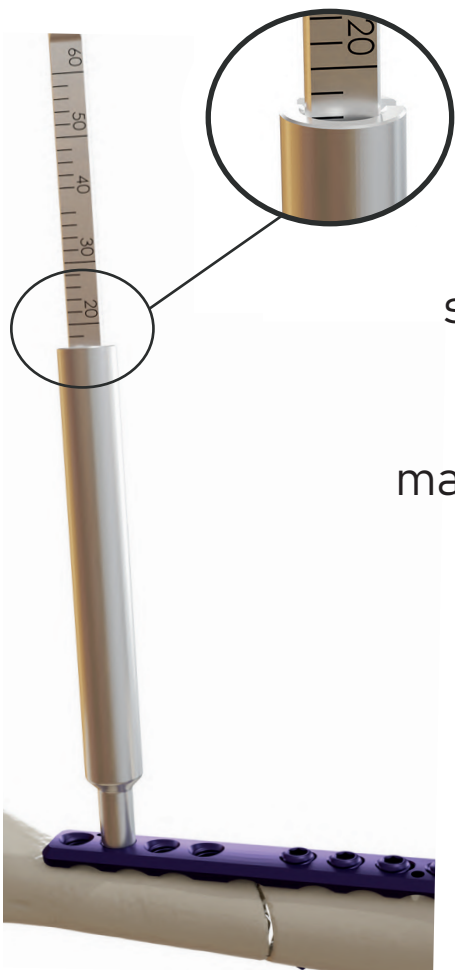
To measure the length of the screw, remove the drill bit and the guide sleeves, then in the drilled hole place the appropriate depth gauge. The hook should be led through two cortical bones, so that its bent part rests against the outer side of the second cortex, then from the scale read the bone thickness with the bone plate. In order to ensure maximum fixing, to the result add 2–3mm (measured value is 16mm, add 2–3mm, so screw length should be around 18mm).

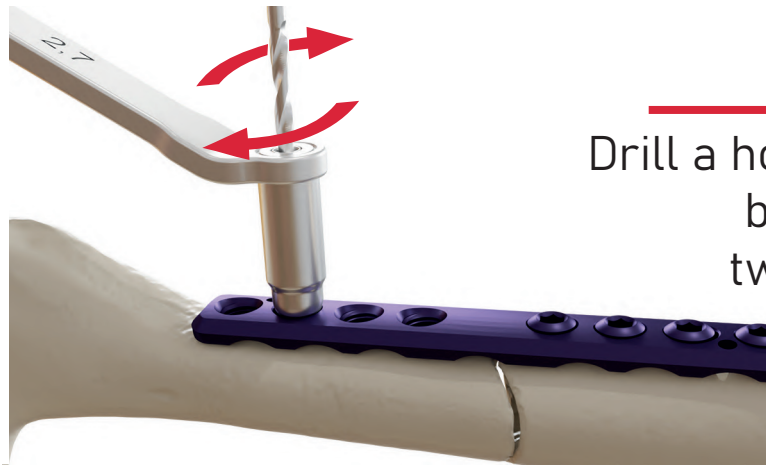| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Depth gauge	MG.01.04		MG.01.05			MG.01.06

Using a dedicated screwdriver, screw in the locking screw, remembering not to tighten the screw by force, if the instrument set is equipped with a torque limit screwdriver, it should be used.

Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Screwdriver	HEX 1.3	HEX 1.5	HEX 2.0	HEX 2.5		HEX 3.5
Torque limit	0.3 Nm	0.4 Nm	0.8 Nm	1.5 Nm		4 Nm

# Compression by cortical screw
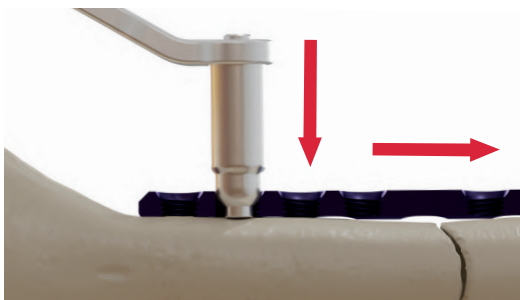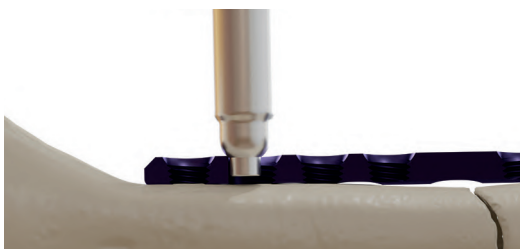
To insert the cortical screw in the compression position insert the compression guide on the outer edge of unthreaded part of the locking-compression hole, without pressing it against the bone and plate. If neutral position is necessary lightly push the guide to the bone, it will move it towards the threaded part of the hole.

Drill a hole for the cortical screw by proper drill bit through two layers of cortical bone.

| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Drill bit	1.1	1.5	1.8	2.0	2.5	3.2
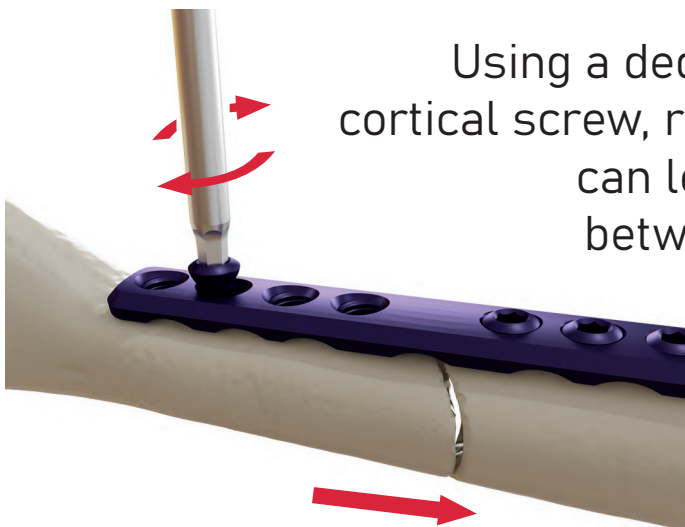
Using a dedicated screwdriver, screw in the cortical screw, remembering that over tightening can lead to damaging the connections between the screw and the bone and breaking the thread.

| Screw diameter	1.5	2.0	2.4	2.7	3.5	4.5
Screwdriver	HEX 1.5	HEX 2.0	HEX 2.5			HEX 3.5

Locking plate principles

It is very important to remember about the correct order in which the bone screws are inserted in one fracture, first cortical screws and after then locking screws.

1   2   1

1   2   1
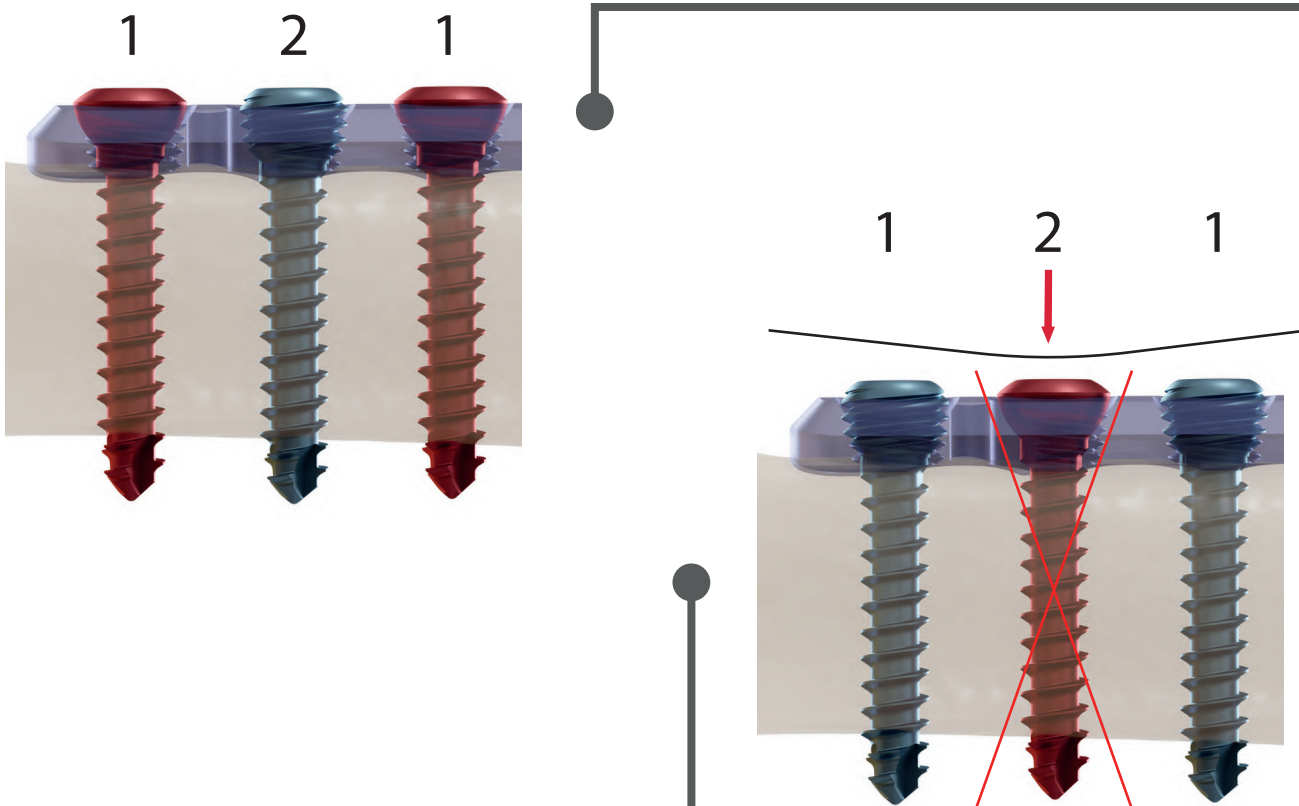
Inserting screws in a different order especially inserting a cortical screw between two locking screws may lead to stress in the plate and neighbouring locking screws, which may result in implant fracture or abnormal healing process.
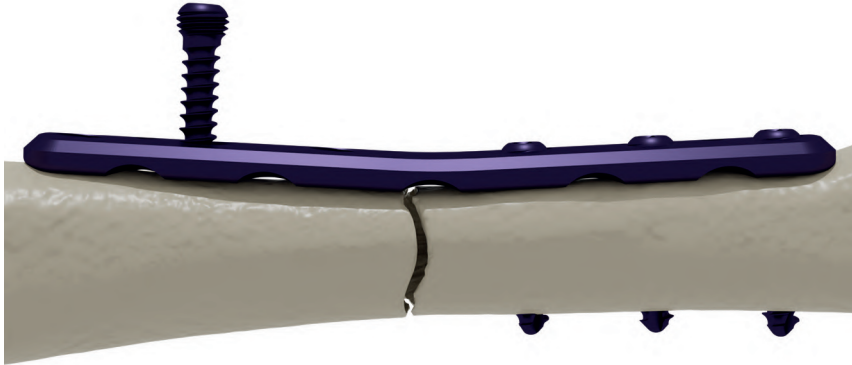
To compress the fracture, firstly fix the plate to one side of the fractured bone with at least two locking or three cortical screws, then insert the locking or cortical screw into the compression hole on the opposite side of the plate.
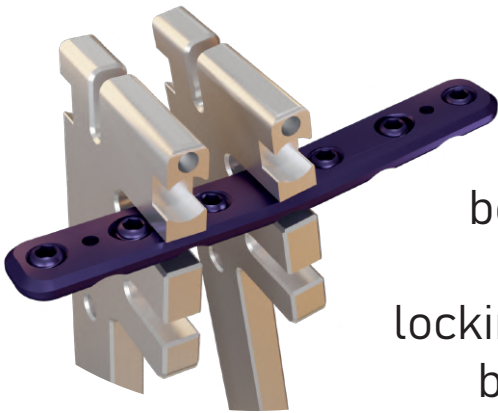
Locking plates should be shaped between holes, if holes are in the the bending zone, fill them with locking screws or threaded plugs before bending the plate in order to prevent holes deformation.

Notes

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