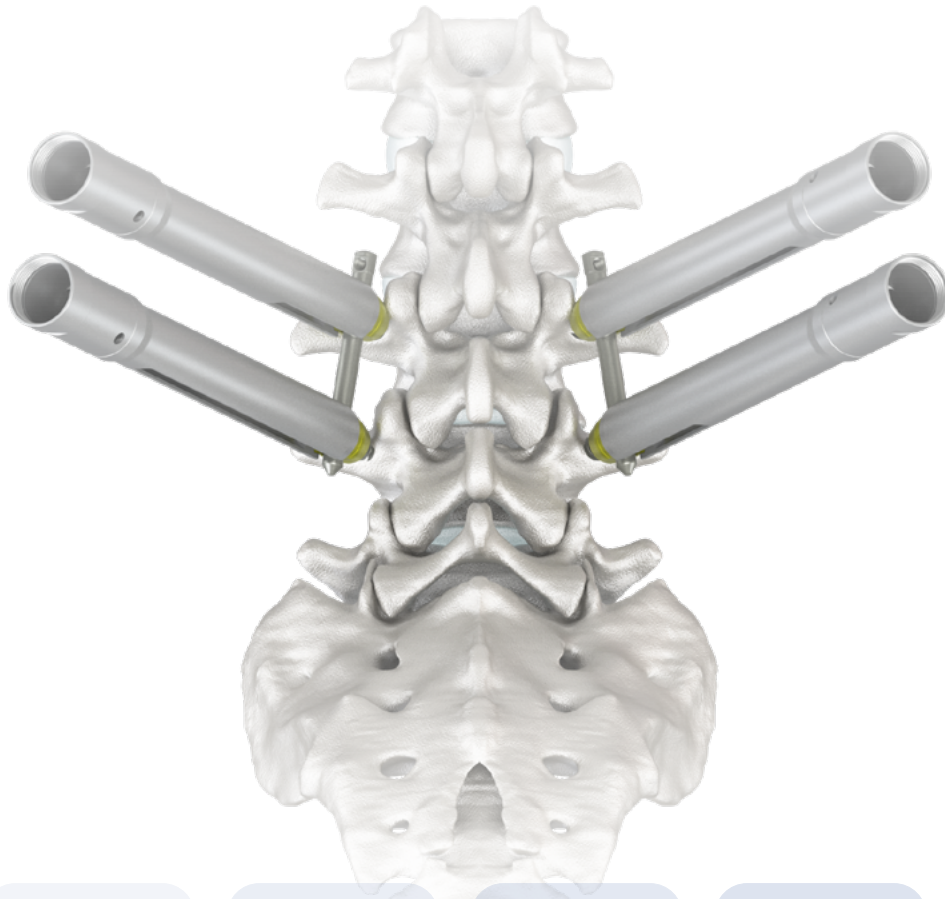




# VENUS<sup>®</sup>mini 2.0

Minimally Invasive Fixation

Brochure & Surgical Technique



## Content

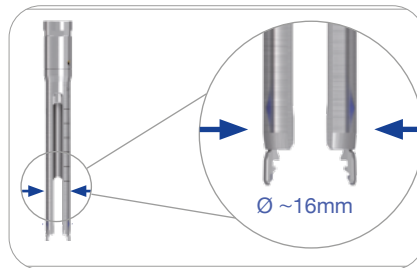
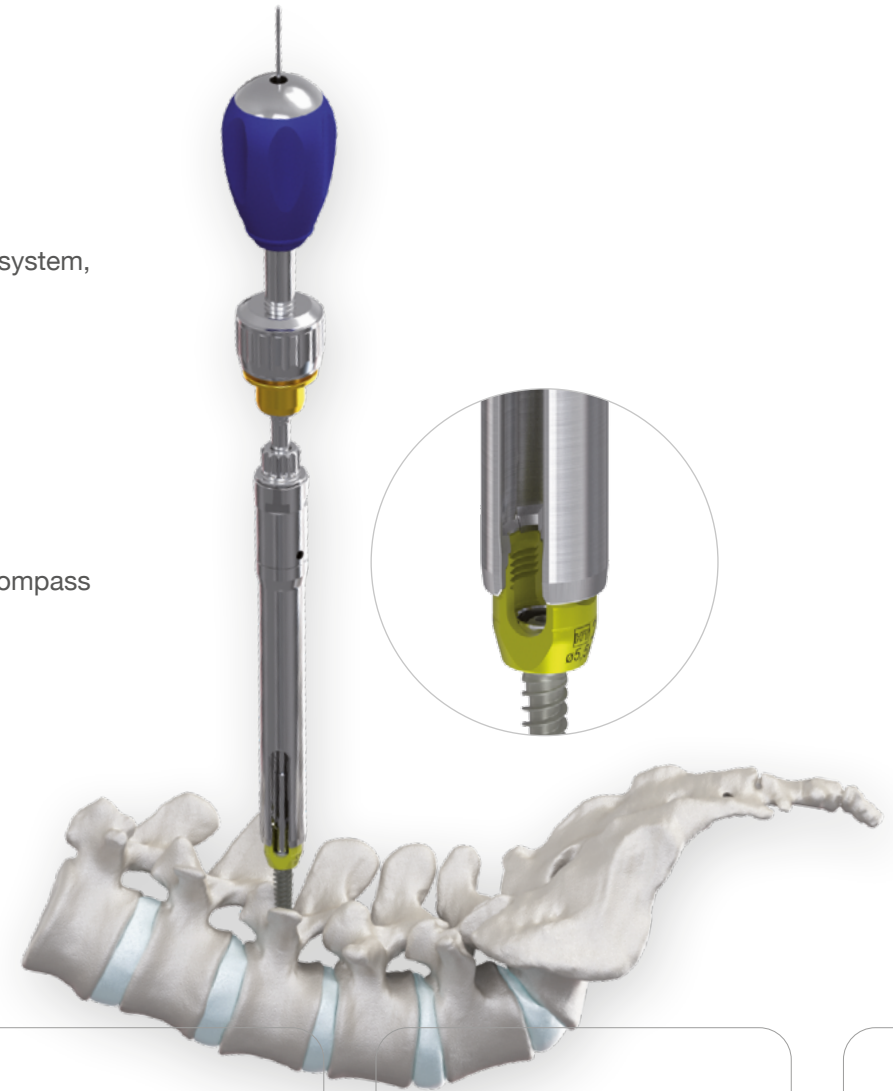
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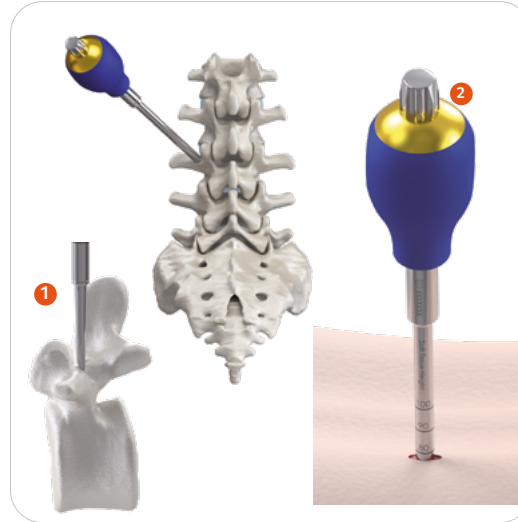
The VENUS®mini 2.0 System is a minimally invasive thoracolumbar fixation system, compatible with all VENUS® cannulated and fenestrated screws.

**The following advantages of the VENUS®mini 2.0 system for the patient and the hospital staff**

- Improved rod positioning by using an inlaid Rod Pusher
- Simplified attachment of the pedicle screws to the percutaneous towers
- Exclusion of incorrect screw assembly on percutaneous towers
- Simplified determination of the required rod length by using the MIS Rod Compass
- Extension kit VENUS®mini 2.0 Fracture



## Preparation



### Preparing the pedicle using the Cannulated Awl

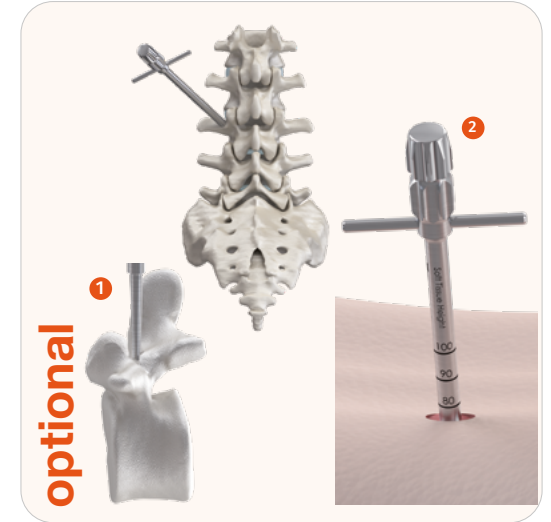
After the point of incision is determined, a longitudinal incision approx. 2 cm in length is made through the skin and fascia. The Cannulated Awl 30 is inserted into the incision until the tip rests on the bony anatomy of the target segment. The pedicle entry point is established by gentle hammering. In the case of the Cannulated Awl 30, the tip of the awl should be driven into the stop. In the case of the optionally available Cannulated Awl without stop, the depth of insertion can be varied as desired, but must be monitored by X-ray. Once the selected awl is positioned securely in the pedicle, the trocar wire is then removed by turning the handle counterclockwise and pulling it off.

#### Caution:

The trocar wire must be tightened completely during the insertion of the Cannulated Awl.

#### Note:

When the tip of the Cannulated Awl is resting on the bony structures (1), the thickness of the soft tissue coverage can be determined using the length markings found on the outside of the instrument (2). This serves as a guide to help reduce the intensity of X-ray exposure during the attachment of the screws.



### Preparing the pedicle using the Cannulated Awl compact

After the point of incision is determined, a longitudinal incision approx. 2 cm in length is made through the skin and fascia. The Cannulated Awl compact is inserted into the incision until the tip rests on the bony anatomy of the target segment. The pedicle entry point is established by gentle hammering. The tip of the awl should be driven into the stop. Once the awl is positioned securely in the pedicle, the trocar wire is then removed by turning the handle counterclockwise and pulling it off.

#### Caution:

The trocar wire must be tightened completely during the insertion of the Cannulated Awl.

#### Note:

When the tip of the Cannulated Awl is resting on the bony structures (1), the thickness of the soft tissue coverage can be determined using the length markings found on the outside of the instrument (2). This serves as a guide to help reduce the intensity of X-ray exposure during the attachment of the screws.

## Preparation



### Positioning of the K-Wire

The K-Wire is inserted into the Cannulated Awl 30 and advanced through the tip of the awl to ensure adequate fixing in the spongiosa. Once the K-Wire has been positioned at the desired depth, the awl is then carefully removed, during which the K-Wire is held firmly in place.

#### Note:

As a rule, all K-Wires should be positioned before insertion of the pedicle screws.

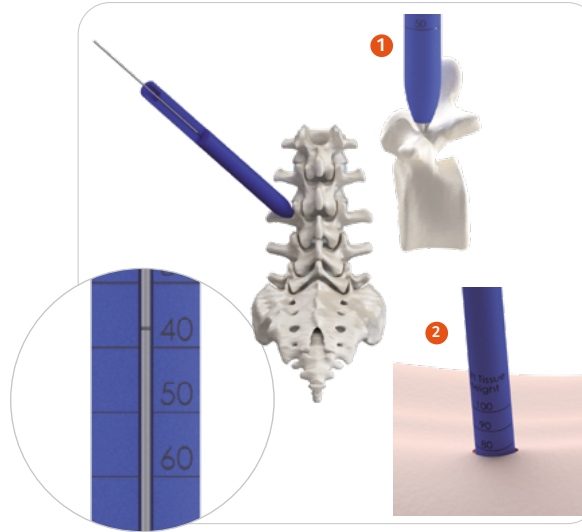
There are 2 different types of K-Wires available:

- K-Wire ø 1.3 mm for all ø 4.8 mm screws
- K-Wire ø 1.7 mm for all other screws

The position markings located on the K-Wire should point in the distal direction. This is also the case when using a Cannulated Awl compact.

#### Caution:

Bent or flexed K-Wires must be disposed of.



### Dilating and determining the screw length

In order to gently expand the tissue, the MIS Tissue Dilator is advanced over the K-Wire until its tip touches the pedicle (1). On the scale of the MIS Tissue Dilator, the screw length to be used can be determined by reading the penetration depth marked on the guide wire. The MIS Tissue Dilator is then removed. Meanwhile, the K-Wire must be held firmly in place.

#### Note:

The exact position can be checked on an X-ray image via the integrated metal tip in the MIS Tissue Dilator.

#### Note:

When the tip of the MIS Tissue Dilator is resting on the bony structures (1), the thickness of the soft tissue coverage can be determined using the length markings found on the outside of the instrument (2). This serves as a guide to help reduce the intensity of X-ray exposure during the attachment of the screws.



### Description of the ratchet function

All cannulated handles have a ratchet function. 3 ratchet modes can be set by turning the adjusting screw.

Adjusting screw "L" position (1)

- counterclockwise ratchet function / screwing in

Adjusting screw central "." (2)

- locked handle / screwing and unscrewing **WITHOUT** ratchet function

Adjusting screw "R" position (3)

- clockwise ratchet function / unscrewing

## Preparation

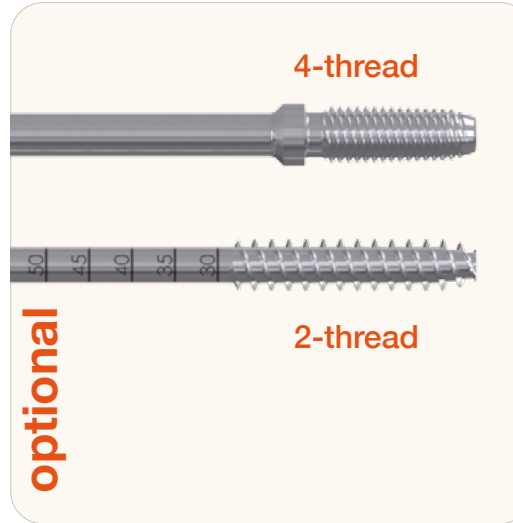


### Tapping

Push the MIS Protective Sleeve over the K-Wire. Once the desired screw diameter has been selected, the Cannulated 6T Tap labeled with the corresponding pedicle screw diameter is attached to a cannulated handle. The Cannulated 6T Tap is screwed into the pedicle over the K-Wire and through the MIS Protective Sleeve. Ensure that the K-Wire is not inadvertently pushed forward during tapping. Lateral imaging is required to ensure correct alignment. The Cannulated 6T Tap will only be screwed into the tip of the K-Wire. While removing the Cannulated 6T Tap, ensure that the K-Wire is not removed.

#### Note:

The Cannulated 6T Tap is in its outer and core diameter smaller than the pedicle screw. This ensures an adequate press fit.

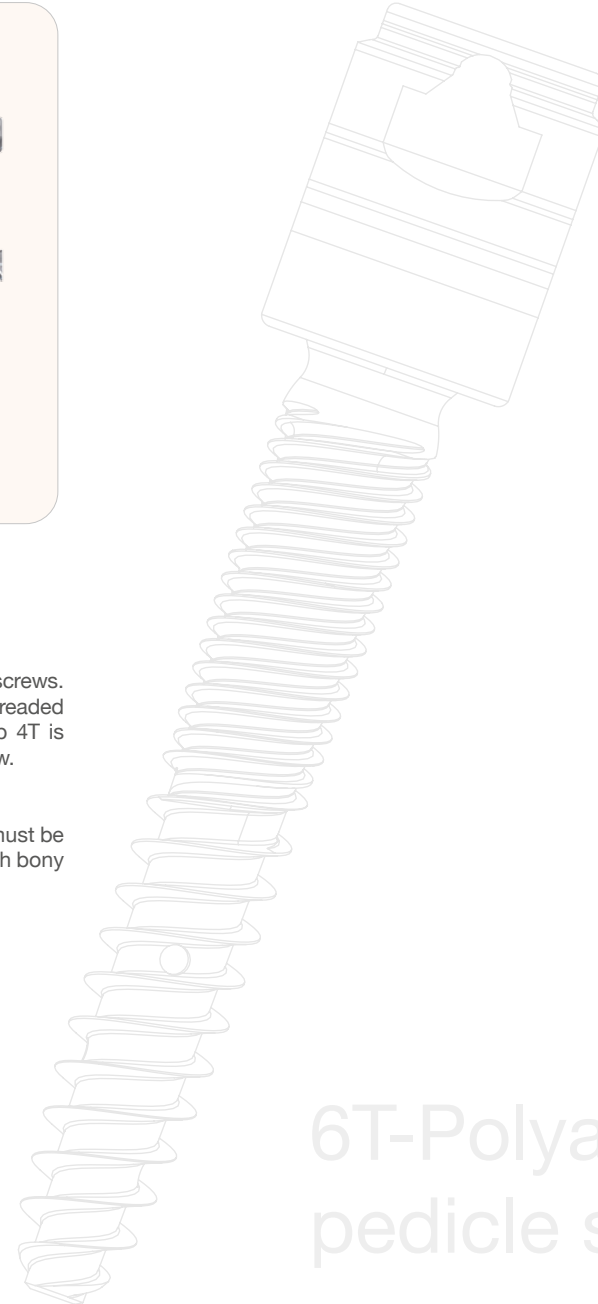


### Tapping 6T screws

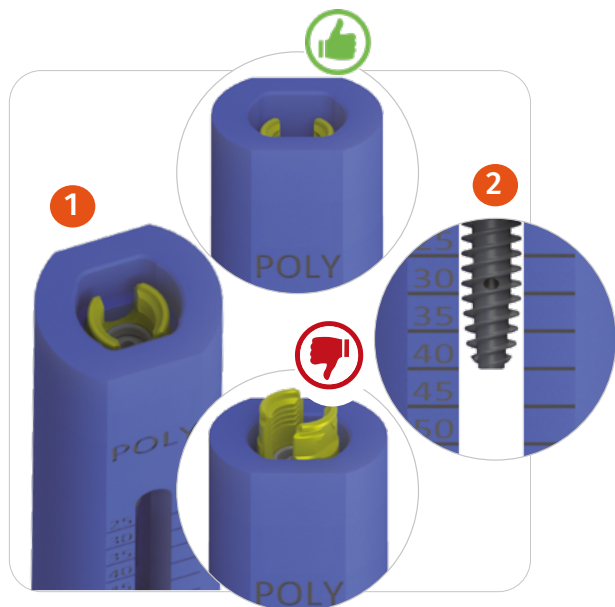
Two different types of taps are available for the 6T screws. The Cannulated 6T Tap is intended for the two-threaded section of the screw and the Cannulated 6T Tap 4T is intended for the four-threaded section of the screw.

#### Caution:

When using the Cannulated 6T Tap 4T, the stop must be observed. As soon as this comes into contact with bony structures, the tap must be unscrewed again.



## How to use the MIS Tower

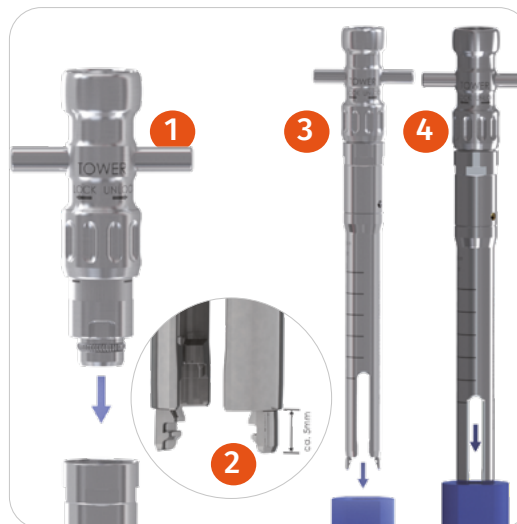


### Attachment of the polyaxial screw / insertion into the MIS Assembling Tool

The selected polyaxial screw is inserted into the opening of MIS Assembling Tool that is marked with „POLY“. The polyaxial screw must be fully inserted into the deep recess of MIS Assembling Tool (1). If necessary, rotate the screw a little bit until it fully drops into the recess.

#### Note:

The MIS Assembling Tool is only compatible with screws with a diameter of up to Ø 7.2 mm. Using the length markings on the MIS Assembling Tool it is possible to determine the length of the screw taken out of the tray.

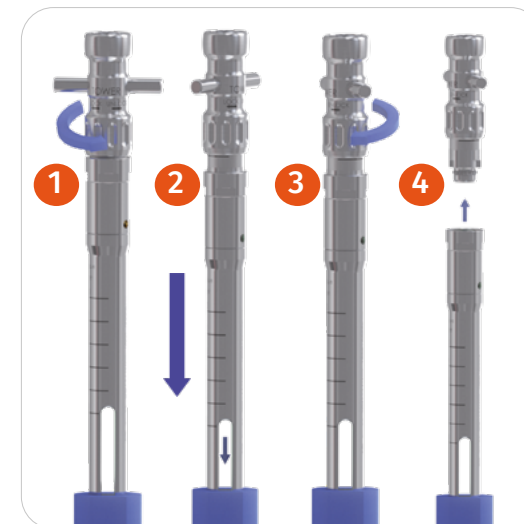


### Attachment of the polyaxial screw / MIS Multitool / MIS Tower

The MIS Multitool must be correctly positioned on the MIS Tower. The annular spring area must point towards the MIS Tower. It must be ensured that the MIS Multitool perceptibly locks into the MIS Interior Clamp of the MIS Tower (1). Before attaching the screw, the correct position of the MIS Interior Clamp and MIS Tower must be ensured. If the MIS Interior Clamp does not protrude by 5 mm (2), unlock the MIS Interior Clamp by using the MIS Multitool („unlock“ position) and push forward. Then lock the position of the MIS Tower and MIS Interior Clamp once again („lock“ position of MIS Multitool). In the locked position, the MIS Interior Clamp cannot be pushed axially within the MIS Tower. The correct position can be checked by simply applying axial pressure to the MIS Interior Clamp. This should not be movable when it is in locked position. The MIS Tower is now inserted vertically into the MIS Assembling Tool (3) and locked on the head of the polyaxial screw by pushing downwards, resulting in a noticeable click (4).

#### Note:

While mounting the MIS Tower, it must be ensured that the locking mechanism is placed in the „lock“ position (max. position reached by turning MIS Multitool clockwise).



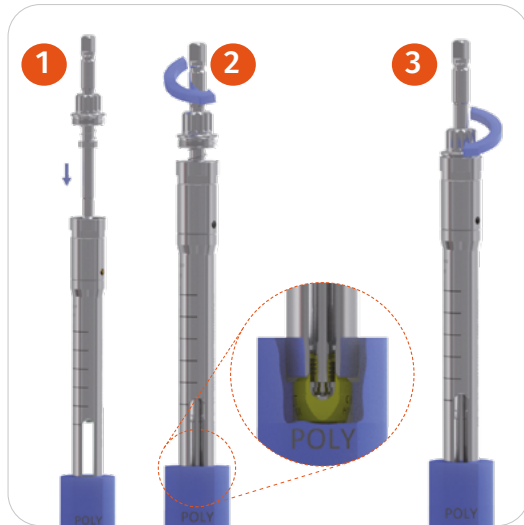
### Attachment of the polyaxial screw / locking the screw to the MIS Tower

Now place the locking mechanism into the „unlock“ position by turning the MIS Multitool counterclockwise (1). The MIS Tower can then be pushed downwards (2). The MIS Multitool must be turned to the „lock“ position and tightened by hand in order to lock the polyaxial screw to the MIS Tower (3). The MIS Multitool can then be pulled upwards and withdrawn from the MIS Tower (4).

#### Note:

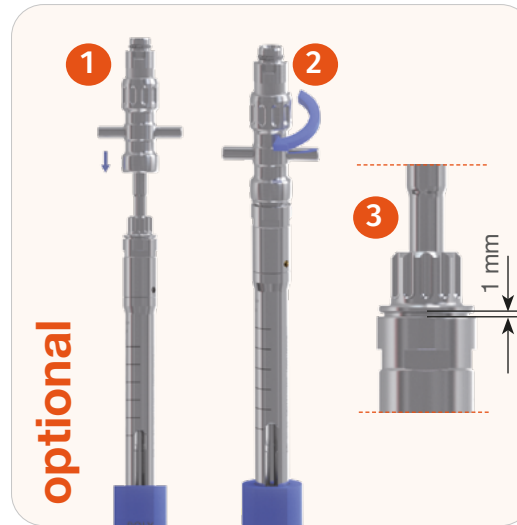
If the MIS Multitool cannot be turned and the pedicle screw cannot be locked, the setup of the MIS Tower must be checked and corrected, if required.

## How to use the MIS Tower



### Assembly of the MIS Polyaxial Screw Driver

The MIS Polyaxial Screw Driver is inserted into the MIS Tower from above (1) and mounted onto the hexagonal section of the polyaxial screw using gentle pressure and slight rotation (2). The connecting screw of the MIS Polyaxial Screw Driver is now screwed clockwise into the MIS Tower (3).



### Assembly of the MIS Polyaxial Screw Driver

The MIS Multitool can be used to tighten the MIS Polyaxial Screw Driver. To do so, attach the MIS Multitool to the MIS Polyaxial Screw Driver (1) and tighten the connecting screw (2). Then the desired cannulated handle can be mounted onto the coupling of the MIS Polyaxial Screw Driver.

#### Note:

The MIS Multitool must be rotated by 180° before mounting. The annular spring points away from the MIS Tower.

#### Note:

When the MIS Polyaxial Screw Driver and pedicle screw are correctly assembled, there is a gap of approx. 1 mm between the MIS Tower and the connecting screw of the MIS Polyaxial Screw Driver (3).



### Attachment of the polyaxial screw / locking the screw to the MIS Tower

The pedicle screw is now implanted through the placed K-Wire and under observation via imaging technology.

#### Note:

The length markings located on the outside of the MIS Tower can be used as a guide to gauge the screwing depth for the pedicle screw. The thickness of the soft tissue is used as reference value. It is previously determined during setting the pedicle entry point and preparation of the pedicle / dilation. This allows the reduction of X-ray check intensity during the insertion of the pedicle screw.

#### Caution:

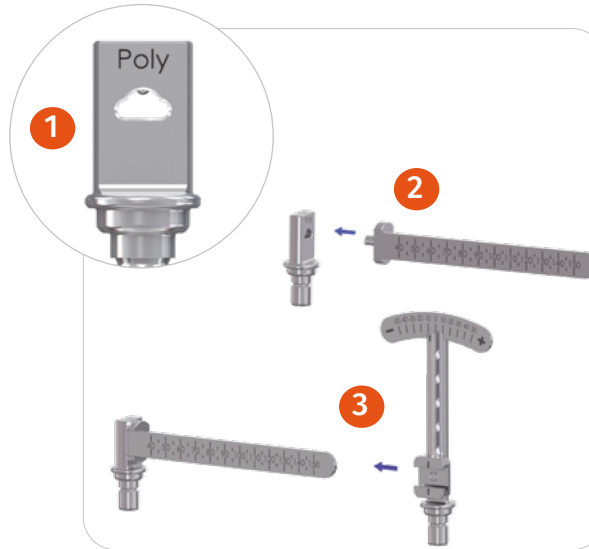
The K-Wire must be held in position to ensure that it is not pushed forwards while the screw is inserted! Lateral imaging is recommended throughout the procedure. Afterwards, the correct implant and the correct screw length must be verified using the image converter. It is important to check whether the polyaxiality of the screw head is restricted by the depth at which the pedicle screw is inserted. To do so, gently move the tower in a circular motion, checking for freedom of movement. The other pedicle screws are implanted following identical procedure.

## How to use the MIS Tower



### Loosening the MIS Polyaxial Screw Driver

Following the implantation, the MIS Polyaxial Screw Driver can be loosened and removed by rotating the connecting screw counterclockwise (1). Where greater force is required to loosen the connecting screw, the MIS Multitool can be mounted (with the annular spring pointing away from the MIS Tower). In order to stabilize the MIS Tower, the Key Deformity Tower can be inserted into one of the side holes of the MIS Tower (2).



### Assembling the MIS Rod Compass

To measure the rod length, the MIS Rod Compass Holder Poly (1) must be mounted onto the MIS Rod Compass Ruler (2). Then the MIS Rod Compass Pointer is pushed onto the Ruler (3).

#### Note:

Once assembled correctly, the MIS Rod Compass Holder Poly cannot be rotated on the MIS Rod Compass Ruler.



### Determining the rod length

To determine the rod length, both MIS Rod Compass Holder are inserted into the furthest cranial and the furthest caudal MIS Tower. The rod length can now be determined. To do so, the value on the "Ruler" is read off ((1) or (2)) and either added (3) or subtracted (4) to the value displayed on the subscale.

#### Caution:

Ensure that the MIS Rod Compass is mounted to the MIS Towers until it reaches the stop. Also push down on the MIS Rod Compass, if required.

#### Example calculation:

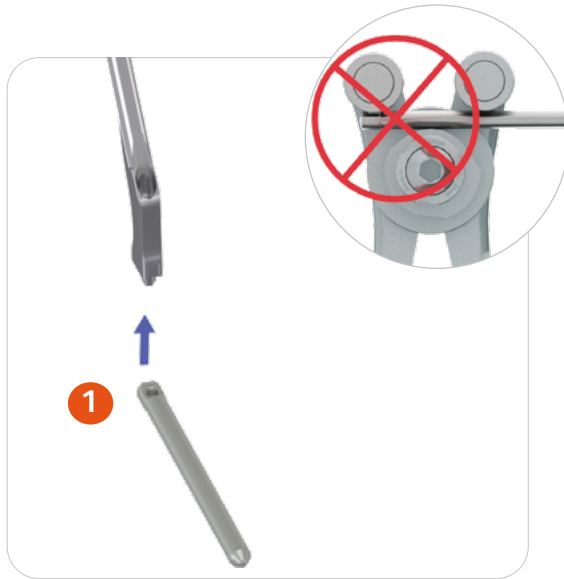
Using the representations above:

- Addition: 50 mm (1) + 40 mm (3)  
= rod length 90 mm
- Subtraction: 110 mm (2) - 20 mm (4)  
= rod length 90 mm

#### Note:

For multi-segmental constructions originating in the sacrum, there may be deviations in the readings during the rod length measurement depending on the curvature of the spine and the number of segments requiring reinforcement. In this case, several individual shorter distances should be measured and the individual lengths added together.

## How to use the MIS Tower



### Locking the rod on MIS Rod Holder I

Attach the selected rod to the MIS Rod Holder. In doing so, ensure that the longitudinal marking on the rod points upwards (1).

#### Note:

Bend the rods with the Rod Bender to fit the corresponding radius. The bending radius can also be set on the instrument by adjusting the bending roll. Insert the rod in the screw heads using the MIS Rod Holder, if necessary with manual support.

Do not bend a rod at one point only in one direction. Bending the rod at the same point to the other direction afterwards will weaken the rod notably or damage it.



### Locking the rod on MIS Rod Holder II

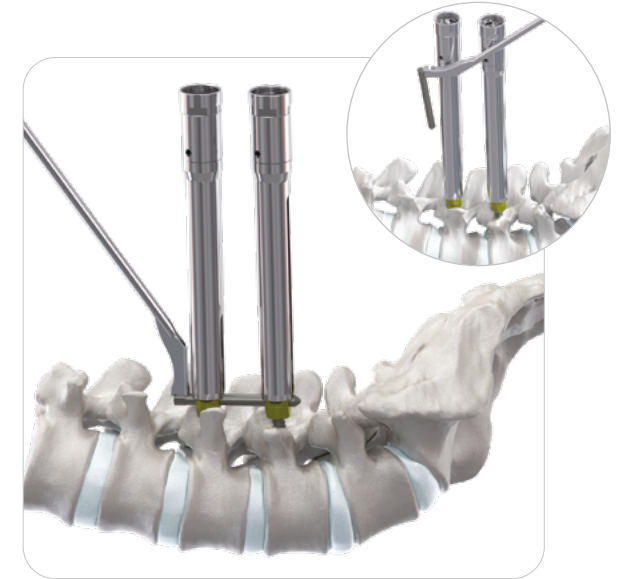
The rod is screwed on the MIS Rod Holder with the aid of the MIS ML2 Locking Screw Driver.

#### Caution:

The fixation screw must be tightened sufficiently to ensure that the rod is securely positioned on the MIS Rod Holder.

#### Caution:

It is advised that the fixation screw is secured once again during rod insertion over several segments or for rod insertions requiring a high degree of force. If the connection between the instrument and the implant is loosened, then the fixation screw may break. In this event, the rod must be replaced.



### Inserting the rod

To insert the rod, position the MIS Rod Holder vertically next to the MIS Tower so that the tip of the rod points downwards. Then insert the rod in a vertical position to below the fascia. By straightening the MIS Rod Holder, the rod can be inserted and then guided through into the MIS Tower of the following segment. During this process, the rod must be guided between the muscles, thus avoiding any trauma. The holder element of the MIS Rod Holder must be parallel to the MIS Tower once it is in its final position. Check the correct positioning of the rod using the image converter. While doing so, ensure that the rod tip protrudes by at least 3 mm and the rod end by at least 7 mm over the head of the screw.

#### Note:

It is possible to check whether the rod is correctly inserted by rotating the MIS Tower. It is not possible to freely rotate the MIS Tower once the rod is correctly positioned.

## How to use the MIS Tower



### Fitting the MIS Setscrew

The MIS Set Screw Inserter 2.0 is mounted onto a MIS Setscrew. By screwing the inner threaded rod of the MIS Set Screw Inserter 2.0 into the MIS Setscrew, this becomes secured to the MIS Set Screw Inserter 2.0. Then the desired handle can be mounted onto the MIS Set Screw Inserter 2.0.

#### Caution:

Only tighten the threaded rod by hand, as otherwise complications can arise when loosening the MIS Setscrew afterwards.



### Inserting the MIS Setscrew

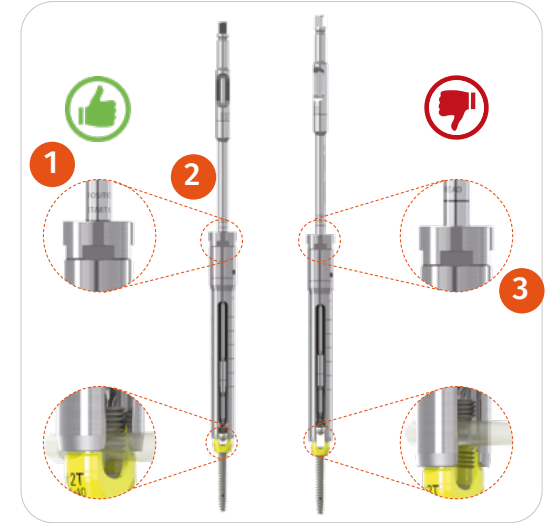
The MIS Set Screw Inserter 2.0 is guided into the MIS Tower with the fitted MIS Setscrew until it sits on the rod. The MIS Setscrew can then be screwed in.

#### Caution:

Only tighten the MIS Setscrew gently. For the final torque, use the MIS Setscrew Driver.

#### Note:

It is recommended to affix the MIS Setscrew on the side of the MIS Rod Holder first.



### Marking for the MIS Tower

The marking line beneath the label “POSITION SETSCREW START OF THREAD” is for checking the position of the MIS Setscrew in the MIS Tower / in the screw head. The marking should make it clear whether the MIS Setscrew has been inserted deep enough in order to be tightened.

If this marking comes to the height of the upper outside edge of the MIS Tower or if this is slightly lower in the MIS Tower (1), then the position of the MIS Setscrew is correct. The MIS Setscrew can then be tightened without tension (2).

If the marking clearly lies above the MIS Tower, the MIS Setscrew cannot be tightened (3) as the rod is situated above the pedicle screw.

The following steps can be taken to allow the MIS Setscrew to be secured:

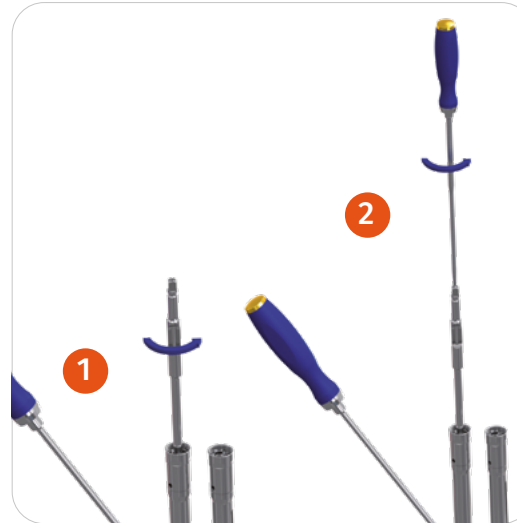
- Removal of any tissue or foreign material in the screw head or in the MIS Tower
- Use the MIS Rod Pusher 2.0 or the MIS Rod Driver to push the rod downwards.

## How to use the MIS Tower



### Using the MIS Rod Pusher 2.0

If the rod is not yet completely inside the screw head of the pedicle screw, the rod can be pushed downwards with the aid of the MIS Rod Pusher 2.0. To do so, insert the MIS Rod Pusher 2.0 into a MIS Tower and push towards the pedicle screw. In doing so, ensure that the u-shaped recess at the tip of the MIS Rod Pusher 2.0 encloses the rod. This allows the mounted MIS Setscrew to be used in an adjacent MIS Tower. The MIS Rod Pusher 2.0 is then removed and this pedicle screw is also fitted with a MIS Setscrew.



### Removal of the MIS Set Screw Insert 2.0

To remove the MIS Set Screw Insert 2.0, the threaded rod must first be loosened by turning counterclockwise (1). If the connection between the threaded rod and the MIS Setscrew is very tight, the MIS ML2 Locking Screw Driver can be introduced into the MIS Set Screw Insert 2.0 from the rear (2) and the threaded rod loosened. Then the MIS Set Screw Insert 2.0 can be removed.

#### Note:

This procedure is repeated for each individual pedicle screw.



### Tightening the MIS Setscrew

The MIS Setscrew Driver is inserted into the Torque Driver - 12. The MIS Counter Handle is pushed onto the MIS Tower according to the orientation of the guiding surfaces (1). The pre-mounted MIS Setscrew Driver can then be fed through the MIS Counter Handle (2) and the MIS Setscrew can be tightened with torque applied in a clockwise direction. After taking out the MIS Setscrew Driver, the MIS Counter Handle can be removed again. The same procedure is carried out for all other MIS Setscrews.

#### Caution:

The full torque of 12 Nm is reached once you hear a clicking sound in the Torque Driver - 12. In order to achieve maximum stability, the final torque may only be applied with the Torque Driver - 12 once all repositioning and correction maneuvers have been completed. If the tightening of a MIS Setscrew with torque is necessary before this, these MIS Setscrews must be tightened again as described.

## Reposition



### Removing the MIS Counter Handle

After removing the Torque Driver - 12, pull the MIS Counter Handle away from the MIS Tower.



### Removing the MIS Rod Holder

Before the MIS Rod Holder is removed, a final check must be made to ensure the correct positioning of the rods. While doing so, the rod tip should protrude at least 3 mm and the rod end at least 7 mm over the head of the screw. The MIS Rod Holder is loosened from the rod with the help of the MIS ML2 Locking Screw Driver. MIS ML2 Locking Screw Driver must be noticeably locked in the torx of the connecting screw.

#### Caution:

In order to remove the MIS Rod Holder, the fixing screw must be completely loosened so that the instrument can be taken off the implant without the use of force. If the instrument is subject to force and the fixing screw is not completely loosened, it is possible that the screw on the MIS Rod Holder may break. In this case, the rod must be replaced.



### Removing the MIS Tower I

To remove the MIS Tower, insert the MIS Multitool into the MIS Tower until it noticeably locks into place and loosen the locking mechanism with a ¼ turn of the MIS Multitool in a counterclockwise direction (1). The exterior sleeve of the MIS Tower must then be pulled back to the stop (2).



### Removing the MIS Tower II

Now tilt the MIS Tower slightly in a medial or lateral direction while rotating 90° and pulling it away in a distal direction (1). Then the MIS Tower can be removed from the wound.

Then secure the MIS Interior Clamp and MIS Tower once again by turning the MIS Multitool a ¼ turn in a clockwise direction (2) and pull the MIS Multitool away in a distal direction (3). The other MIS Tower are then loosened from the pedicle screws in the same way.

## Repositioning / subsequent reattachment of the Tower in situ

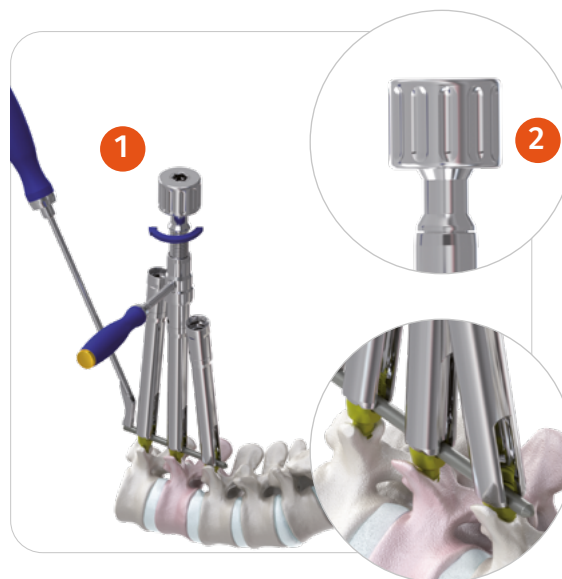


### Repositioning preparation

The MIS Counter Handle is pushed onto the MIS Tower according to the orientation of the guiding surfaces (1). The MIS Rod Driver is then inserted into the MIS Counter Handle (2).

**Note:**

Pay attention to the orientation of the MIS Rod Driver shaft in relation to the geometry of the MIS Counter Handle (3).

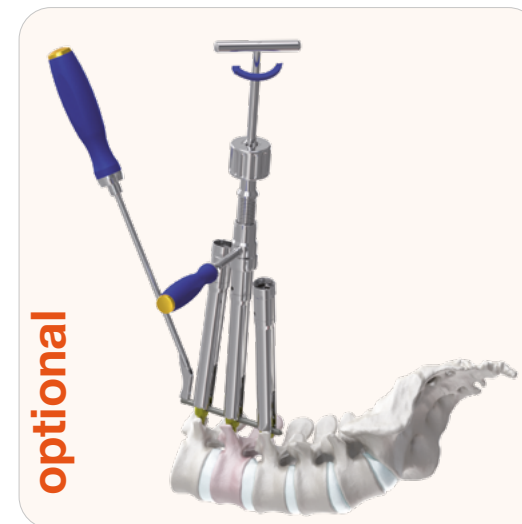


### Carrying out repositioning

Now the repositioning manoeuvre may be carried out by turning the handle of the MIS Rod Driver clockwise (1).

**Note:**

The rod is completely situated in the screw head if there is no gap between the handle piece of the MIS Rod Driver and the MIS Tower (2).



### Using the Key Deformity Tower

If the force required for repositioning cannot be applied by using the handle of the MIS Rod Driver, the Key Deformity Tower may also be used.



### Fitting the MIS Setscrew

The MIS Set Screw Inserter 2.0 is mounted onto a MIS Setscrew. By screwing the inner threaded rod of the MIS Set Screw Inserter 2.0 into the MIS Setscrew, this becomes secured to the MIS Set Screw Inserter 2.0. Then the desired handle can be mounted onto the MIS Set Screw Inserter 2.0.

**Caution:**

Only tighten the threaded rod by hand, as otherwise complications can arise when loosening the MIS Setscrew afterwards.



### Inserting the MIS Setscrew

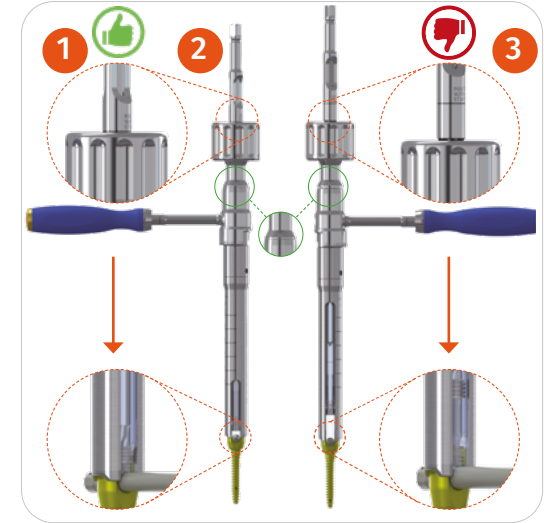
The MIS Set Screw Inserter 2.0 is guided into the MIS Tower through the MIS Rod Driver with the fitted MIS Setscrew until it sits on the rod. The MIS Setscrew can then be screwed in.

**Caution:**

Only tighten the MIS Setscrew gently. For the final torque, use the MIS Set Screw Driver.

**Note:**

It is recommended to affix the MIS Setscrew on the side of the MIS Rod Holder first.



### Marking for the use of the MIS Rod Driver and MIS Counter Handle

**Caution:**

Before using the MIS Set Screw Inserter 2.0, the MIS Rod Driver must be screwed into a terminal position as the rod is then situated inside the screw head.

The marking line beneath the label “POSITION SETSCREW WITH ROD DRIVER START OF THREAD” serves to check the position of the MIS Setscrew in the MIS Tower / in the screw head. The marking should make it clear whether the MIS Setscrew has been inserted deep enough in order to be screwed into the thread of the screw head. If this marking comes to the height of the upper outside edge of the MIS Rod Driver handle piece or if this is slightly lower in the MIS Rod Driver (1), then the position of the MIS Setscrew is correct. The MIS Setscrew can be tightened without tension into the screw head (2).

If the marking is clearly above the MIS Rod Driver handle piece, the MIS Setscrew cannot be screwed in (3) as the MIS Setscrew is still positioned above the rod, which is situated in the pedicle screw.

In order to screw in the MIS Setscrew, ensure that any material has been removed from the screw head and/or MIS Tower.



### Removal of the MIS Set Screw Inserter 2.0

Once the MIS Setscrew is inserted, the handle is removed from the MIS Set Screw Inserter 2.0 and the connection between this and the implanted MIS Setscrew can be loosened by using the MIS ML2 Locking Screw Driver (1). Then the MIS Set Screw Inserter 2.0 can be pulled out (2).



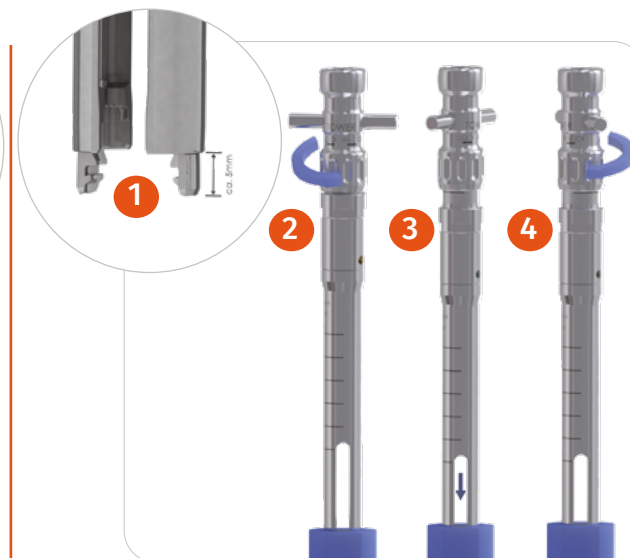
### Final torque tightening

#### Caution:

Before the final torque tightening of the MIS Setscrew, the MIS Rod Driver must be loosened. To do so, unscrew the MIS Rod Driver in an counterclockwise direction (1). The MIS Setscrew Driver is inserted into the Torque Driver - 12. The pre-mounted Torque Driver - 12 can then be fed through the MIS Rod Driver and the MIS Setscrew can be pulled tight with torque applied in a clockwise direction (2). After the final tightening, the Torque Driver - 12, the MIS Rod Driver and the MIS Counter Handle can be removed.

#### Caution:

The full torque of 12 Nm is reached when you hear a clicking sound in the Torque Driver - 12. In order to achieve maximum stability, the final torque may only be applied with the Torque Driver - 12 once all repositioning and correction manoeuvres have been completed.



### Preparation of the MIS Tower

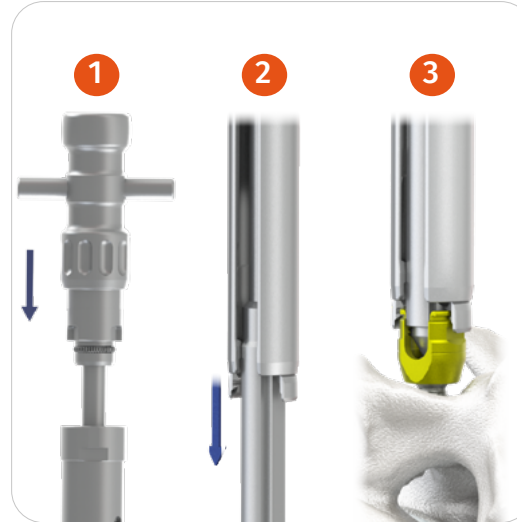
If a subsequent reattachment of the MIS Tower is necessary in the event of revision surgery or if the MIS Tower is accidentally loosened from the head of the pedicle screw during the above-mentioned manoeuvre, it can be subsequently reconnected to the implant using a MIS Tower Reassembler. The correct assembly of the MIS Interior Clamp and the MIS Tower must be ensured. The proximal end of the MIS Interior Clamp should protrude 5 mm out of the MIS Tower (1). Where the MIS Interior Clamp does not protrude by 5 mm, unlock the MIS Interior Clamp by using the MIS Multitool ("unlock" position) (2) and push forward (3). Then secure the position of the MIS Tower and MIS Interior Clamp once again ("lock" position) (4). In the locked position, the MIS Interior Clamp cannot be pushed axially into the MIS Tower. The correct assembly, positioning and locking, can be checked by simply applying axial pressure to the MIS Interior Clamp.

## Subsequent installation of the MIS Tower



### Attachement of the MIS Tower Reassembler

Guide the proximal end of the MIS Tower Reassembler into the screw head of the previously inserted screw. The noses of the MIS Tower Reassembler must latch into the geometry for the rod attachment of the screw head. In order to aid in positioning the MIS Tower Reassembler in the screw head, a K-Wire can also be used as a guide by positioning it in the cannula of the pedicle screw before affixing the MIS Tower Reassembler.



### Attachement of the MIS Tower

At the start, the MIS Multitool must be correctly aligned on the MIS Tower. The annular spring area must point towards the MIS Tower. Make sure that the MIS Multitool noticeably locks into the MIS Interior Clamp (1). Then the MIS Tower is guided with the assembled MIS Multitool via the previously inserted MIS Tower Reassembler in the direction of the screw head of the pedicle screw until it noticeably locks into place on the screw head with a click. When affixing the MIS Tower on the MIS Tower Reassembler, ensure that the slot for the rod on the MIS Tower is correctly aligned with regard to the guide geometry on the MIS Tower Reassembler (2). The correct positioning of the MIS Tower Reassembler in the screw head must be ensured throughout the entire manoeuvre (where necessary by means of gentle axial pressure on the instrument from above).



### Locking the MIS Tower

The locking of the MIS Tower takes place in an identical manner to assembly ex-situ. Turn the locking mechanism of the MIS Tower into the "unlock" position by turning the MIS Multitool counter-clockwise (1). The MIS Tower can then be pushed downwards (2). The MIS Multitool must be turned to the "lock" position and tightened by hand in order to secure the pedicle screw to the MIS Tower (3). The MIS Multitool can then be pulled upwards (4). Pull on the MIS Tower to check whether this is secured correctly on the screw. The MIS Tower may not be allowed to move in a distal direction. After successful assembly of the MIS Tower on the pedicle screw, the MIS Tower Reassembler and the optional K-Wire can be removed upwards from the MIS Tower (5).

## Augmentation



### Inserting the Cementadapter CPS I

The Cementadapter CPS is applied over the guide wire located on the Cementadapter Inserter and locked into the instrument attachment by applying gentle pressure. The assembled Cementadapter Inserter is fed through the MIS Tower into the pedicle screw. Turn the Cementadapter Inserter a half rotation to the left and screw the Cementadapter CPS in fully until it reaches the final position in the pedicle screw head and tighten until resistance is perceived.

#### Note:

To allow exact insertion of the Cementadapter CPS, it is necessary that the screw head and the screw shaft are aligned in a precise axial orientation when using polyaxial screws. You must be able to screw in the Cementadapter CPS without using force.

If the polyaxial screw head cannot be aligned easily, the freedom of movement can be restored by rotating the MIS Tower carefully. Otherwise, the screw depth of the pedicle screw needs to be corrected.



### Inserting the Cementadapter CPS II

#### Caution:

Never use the Cementadapter Inserter for alignment since the guide wire may bend and the Cementadapter CPS cannot be positioned correctly! If a Cementadapter CPS is attached to polyaxial pedicle screws, any tilting movement of the MIS Tower must be avoided, otherwise deformations can occur in the sealing area of the Cementadapter CPS, which may cause leakage.



### Filling the Bone Filler

Mix the bone cement according to the manufacturer's instructions for use and fill the Bone Filler using a syringe.

#### Recommendation:

Use a moderate- to high-viscose bone cement with a quick curing time.

## Augmentation



### Attachement of the Bone Filler

The filled Bone Filler is brought through the MIS Tower and screwed onto the Cementadapter CPS clockwise by hand.



### Cement injection

When injecting the cement using the Bone Filler, a predefined amount (1.5 ccm) is applied. Make sure that the injection is carried out evenly and do not apply excessive pressure, to ensure an even distribution of the cement and to prevent it from flowing back. Only one Bone Filler may be used for each Cementadapter CPS and screw. Premature removal of the Bone Filler or screwing it into the Cementadapter CPS a second time and/or screwing the Cementadapter CPS onto the screw a second time may result in unwanted cement discharge in the region of the polyaxial screw head.

#### **Note:**

Once the cement has been applied, an X-ray scan is required to monitor the volume of injected cement.



### Removing the Cementadapter CPS

The Bone Filler is removed and the Cementadapter CPS is unscrewed using the Cementadapter Extractor. To do so, insert the Cementadapter Extractor into the MIS Tower and mount it onto the Cementadapter CPS.

#### **Note:**

The Cementadapter CPS is only intended for single use. To prevent rotation of the polyaxial head during removal of the Cementadapter CPS, the MIS Tower can be held in place.

## 2T Cannulated Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                      |       |
|-------------------------|---------------------|----------------------------------|-------|
| 4000014825              | 4000014825-S        | 2T Cannulated Screw Ø 4.8 x 25mm | Ø 4.8 |
| 4000014830              | 4000014830-S        | 2T Cannulated Screw Ø 4.8 x 30mm |       |
| 4000014835              | 4000014835-S        | 2T Cannulated Screw Ø 4.8 x 35mm |       |
| 4000014840              | 4000014840-S        | 2T Cannulated Screw Ø 4.8 x 40mm |       |
| 4000014845              | 4000014845-S        | 2T Cannulated Screw Ø 4.8 x 45mm |       |
| 4000015525              | 4000015525-S        | 2T Cannulated Screw Ø 5.5 x 25mm | Ø 5.5 |
| 4000015530              | 4000015530-S        | 2T Cannulated Screw Ø 5.5 x 30mm |       |
| 4000016525              | 4000016525-S        | 2T Cannulated Screw Ø 6.5 x 25mm | Ø 6.5 |
| 4000016530              | 4000016530-S        | 2T Cannulated Screw Ø 6.5 x 30mm |       |
| 4000017235              | 4000017235-S        | 2T Cannulated Screw Ø 7.2 x 35mm | Ø 7.2 |

## 2T Fenestrated Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                    |       |
|-------------------------|---------------------|--------------------------------|-------|
| 4000045535              | 4000045535-S        | 2T Fenestrated Screw Ø5.5x35mm | Ø 5.5 |
| 4000045540              | 4000045540-S        | 2T Fenestrated Screw Ø5.5x40mm |       |
| 4000045545              | 4000045545-S        | 2T Fenestrated Screw Ø5.5x45mm |       |
| 4000045550              | 4000045550-S        | 2T Fenestrated Screw Ø5.5x50mm |       |
| 4000045555              | 4000045555-S        | 2T Fenestrated Screw Ø5.5x55mm |       |
| 4000046535              | 4000046535-S        | 2T Fenestrated Screw Ø6.5x35mm | Ø 6.5 |
| 4000046540              | 4000046540-S        | 2T Fenestrated Screw Ø6.5x40mm |       |
| 4000046545              | 4000046545-S        | 2T Fenestrated Screw Ø6.5x45mm |       |
| 4000046550              | 4000046550-S        | 2T Fenestrated Screw Ø6.5x50mm |       |
| 4000046555              | 4000046555-S        | 2T Fenestrated Screw Ø6.5x55mm |       |
| 4000047240              | 4000047240-S        | 2T Fenestrated Screw Ø7.2x40mm | Ø 7.2 |
| 4000047245              | 4000047245-S        | 2T Fenestrated Screw Ø7.2x45mm |       |
| 4000047250              | 4000047250-S        | 2T Fenestrated Screw Ø7.2x50mm |       |
| 4000047255              | 4000047255-S        | 2T Fenestrated Screw Ø7.2x55mm |       |

## 2T Fenestrated Revision Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                  |        |
|-------------------------|---------------------|------------------------------|--------|
| 4000068545              | 4000068545-S        | 2T Fen. Rev. Screw 8,5x45mm  | Ø 8.5  |
| 4000068550              | 4000068550-S        | 2T Fen. Rev. Screw 8,5x50mm  |        |
| 4000068555              | 4000068555-S        | 2T Fen. Rev. Screw 8,5x55mm  |        |
| 4000069545              | 4000069545-S        | 2T Fen. Rev. Screw 9,5x45mm  | Ø 9.5  |
| 4000069550              | 4000069550-S        | 2T Fen. Rev. Screw 9,5x50mm  |        |
| 4000069555              | 4000069555-S        | 2T Fen. Rev. Screw 9,5x55mm  |        |
| 4000061045              | 4000061045-S        | 2T Fen. Rev. Screw 10,5x45mm | Ø 10.5 |
| 4000061050              | 4000061050-S        | 2T Fen. Rev. Screw 10,5x50mm |        |
| 4000061055              | 4000061055-S        | 2T Fen. Rev. Screw 10,5x55mm |        |

## 2T Fenestrated Iliac Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                                     |       |
|-------------------------|---------------------|-------------------------------------------------|-------|
| 1006127270              | 1006127270-S        | Fenestrated Iliac Screw Ø 7.2mm x 70mm sterile  | Ø 7.2 |
| 1006127280              | 1006127280-S        | Fenestrated Iliac Screw Ø 7.2mm x 80mm sterile  |       |
| 1006127290              | 1006127290-S        | Fenestrated Iliac Screw Ø 7.2mm x 90mm sterile  |       |
| 10061272100             | 10061272100-S       | Fenestrated Iliac Screw Ø 7.2mm x 100mm sterile |       |
| 1006128570              | 1006128570-S        | Fenestrated Iliac Screw Ø 8.5mm x 70mm sterile  | Ø 8.5 |
| 1006128580              | 1006128580-S        | Fenestrated Iliac Screw Ø 8.5mm x 80mm sterile  |       |
| 1006128590              | 1006128590-S        | Fenestrated Iliac Screw Ø 8.5mm x 90mm sterile  |       |
| 10061285100             | 10061285100-S       | Fenestrated Iliac Screw Ø 8.5mm x 100mm sterile |       |

### Notice

When ordering all kind of sterile implants, add "sterile" to the end of the article description!  
Example: **XX XXX XXXXXXXX Screw Ø5.5x40mm sterile**  
Or use our current order forms.

## 6T Fenestrated Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                        |       |
|-------------------------|---------------------|------------------------------------|-------|
| 1010045540              | 1010045540-S        | Fenestrated 6T Screw Ø 5.5 x 40 mm | Ø 5.5 |
| 1010045545              | 1010045545-S        | Fenestrated 6T Screw Ø 5.5 x 45 mm |       |
| 1010045550              | 1010045550-S        | Fenestrated 6T Screw Ø 5.5 x 50 mm |       |
| 1010045555              | 1010045555-S        | Fenestrated 6T Screw Ø 5.5 x 55 mm |       |
| 1010046540              | 1010046540-S        | Fenestrated 6T Screw Ø 6.5 x 40 mm | Ø 6.5 |
| 1010046545              | 1010046545-S        | Fenestrated 6T Screw Ø 6.5 x 45 mm |       |
| 1010046550              | 1010046550-S        | Fenestrated 6T Screw Ø 6.5 x 50 mm |       |
| 1010046555              | 1010046555-S        | Fenestrated 6T Screw Ø 6.5 x 55 mm |       |
| 1010047240              | 1010047240-S        | Fenestrated 6T Screw Ø 7.2 x 40 mm | Ø 7.2 |
| 1010047245              | 1010047245-S        | Fenestrated 6T Screw Ø 7.2 x 45 mm |       |
| 1010047250              | 1010047250-S        | Fenestrated 6T Screw Ø 7.2 x 50 mm |       |
| 1010047255              | 1010047255-S        | Fenestrated 6T Screw Ø 7.2 x 55 mm |       |
| 1010047260              | 1010047260-S        | Fenestrated 6T Screw Ø 7.2 x 60 mm |       |

## 6T Cannulated Revision Screws

| Item no.<br>non-sterile | Item no.<br>sterile | Description                              |       |
|-------------------------|---------------------|------------------------------------------|-------|
| 1006098535              | 1006098535-S        | Cannulated Revision 6T Ø 8.5 mm x 35 mm  | Ø 8.5 |
| 1006098540              | 1006098540-S        | Cannulated Revision 6T Ø 8.5 mm x 40 mm  |       |
| 1006098545              | 1006098545-S        | Cannulated Revision 6T Ø 8.5 mm x 45 mm  |       |
| 1006098550              | 1006098550-S        | Cannulated Revision 6T Ø 8.5 mm x 50 mm  |       |
| 1006098555              | 1006098555-S        | Cannulated Revision 6T Ø 8.5 mm x 55 mm  |       |
| 1006098560              | 1006098560-S        | Cannulated Revision 6T Ø 8.5 mm x 60 mm  |       |
| 1006098570              | 1006098570-S        | Cannulated Revision 6T Ø 8.5 mm x 70 mm  |       |
| 1006098580              | 1006098580-S        | Cannulated Revision 6T Ø 8.5 mm x 80 mm  |       |
| 1006098590              | 1006098590-S        | Cannulated Revision 6T Ø 8.5 mm x 90 mm  |       |
| 10060985100             | 10060985100-S       | Cannulated Revision 6T Ø 8.5 mm x 100 mm |       |

### Notice

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 Example: **XX XXX XXXXXXXX Screw Ø5.5x40mm sterile**  
 Or use our current order forms.

## Implants

### Straight Rods

| Item no.<br>non-sterile | Item no.<br>sterile | Description                          |
|-------------------------|---------------------|--------------------------------------|
| VL-RM2-5-40             | VL-RM2-5-40-S       | Rod Mini2 Ø 5.5 mm x 40 mm           |
| VL-RM2-5-45             | VL-RM2-5-45-S       | Rod Mini2 Ø 5.5 mm x 45 mm           |
| VL-RM2-5-50             | VL-RM2-5-50-S       | Rod Mini2 Ø 5.5 mm x 50 mm           |
| VL-RM2-5-60             | VL-RM2-5-60-S       | Rod Mini2 Ø 5.5 mm x 60 mm           |
| VL-RM2-5-70             | VL-RM2-5-70-S       | Rod Mini2 Ø 5.5 mm x 70 mm           |
| VL-RM2-5-80             | VL-RM2-5-80-S       | Rod Mini2 Ø 5.5 mm x 80 mm           |
| VL-RM2-5-90             | VL-RM2-5-90-S       | Rod Mini2 Ø 5.5 mm x 90 mm           |
| VL-RM2-5-100            | VL-RM2-5-100-S      | Rod Mini2 Ø 5.5 mm x 100 mm          |
| VL-RM2-5-110            | VL-RM2-5-110-S      | Rod Mini2 Ø 5.5 mm x 110 mm          |
| VL-RM2-5-130            | VL-RM2-5-130-S      | Rod Mini2 Ø 5.5 mm x 130 mm          |
| VL-RM2-5-150            | VL-RM2-5-150-S      | Rod Mini2 Ø 5.5 mm x 150 mm          |
| VL-RM2-5-170            | VL-RM2-5-170-S      | Rod Mini2 Ø 5.5 mm x 170 mm          |
| VL-RM2-5-190            | VL-RM2-5-190-S      | Rod Mini2 Ø 5.5 mm x 190 mm          |
| VL-RM2-5-210            | VL-RM2-5-210-S      | Rod Mini2 Ø 5.5 mm x 210 mm optional |
| VL-RM2-5-230            | VL-RM2-5-230-S      | Rod Mini2 Ø 5.5 mm x 230 mm optional |
| VL-RM2-5-250            | VL-RM2-5-250-S      | Rod Mini2 Ø 5.5 mm x 250 mm optional |
| VL-RM2-5-270            | VL-RM2-5-270-S      | Rod Mini2 Ø 5.5 mm x 270 mm optional |
| VL-RM2-5-300            | VL-RM2-5-300-S      | Rod Mini2 Ø 5.5 mm x 300 mm optional |



### Curved Rods

| Item no.<br>non-sterile | Item no.<br>sterile | Description                         |
|-------------------------|---------------------|-------------------------------------|
| VL-RMC2-5-40            | VL-RMC2-5-40-S      | Rod Mini Curved 2 Ø 5.5 mm x 40 mm  |
| VL-RMC2-5-45            | VL-RMC2-5-45-S      | Rod Mini Curved 2 Ø 5.5 mm x 45 mm  |
| VL-RMC2-5-50            | VL-RMC2-5-50-S      | Rod Mini Curved 2 Ø 5.5 mm x 50 mm  |
| VL-RMC2-5-60            | VL-RMC2-5-60-S      | Rod Mini Curved 2 Ø 5.5 mm x 60 mm  |
| VL-RMC2-5-70            | VL-RMC2-5-70-S      | Rod Mini Curved 2 Ø 5.5 mm x 70 mm  |
| VL-RMC2-5-80            | VL-RMC2-5-80-S      | Rod Mini Curved 2 Ø 5.5 mm x 80 mm  |
| VL-RMC2-5-90            | VL-RMC2-5-90-S      | Rod Mini Curved 2 Ø 5.5 mm x 90 mm  |
| VL-RMC2-5-100           | VL-RMC2-5-100-S     | Rod Mini Curved 2 Ø 5.5 mm x 100 mm |
| VL-RMC2-5-110           | VL-RMC2-5-110-S     | Rod Mini Curved 2 Ø 5.5 mm x 110 mm |



### Setscrew

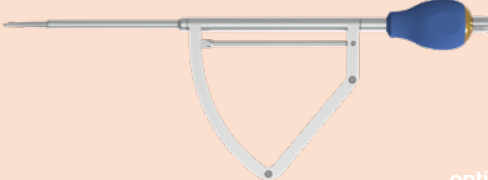
| Item no.<br>non-sterile | Item no.<br>sterile | Description  |
|-------------------------|---------------------|--------------|
| VL-PMS-M3               | VL-PMS-M3-S         | MIS Setscrew |



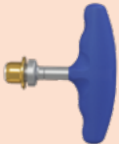
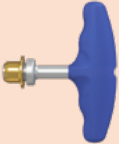
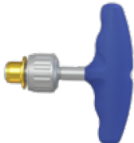
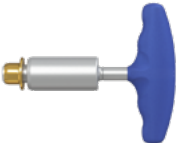
#### Notice

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Example: **XX XXX XXXXXXXX Screw Ø5.5x40mm sterile**  
Or use our current order forms.

## Instruments

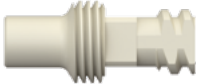
| Item no.    | Description                 |                                                                                               |
|-------------|-----------------------------|-----------------------------------------------------------------------------------------------|
| 1008010002  | MIS Tissue Dilator          |              |
| 1008010001  | MIS Protective Sleeve       |              |
| 33.2513.400 | K-Wire Ø 1,3 x 400 mm round |             |
| 33.2517.400 | K-Wire Ø 1,7 x 400 mm round |  optional   |
| 33.2513.480 | K-Wire Ø 1,3 x 480 mm round |  optional   |
| 33.2517.480 | K-Wire Ø 1,7 x 480 mm round |             |
| 1001010079  | Cannulated Awl 30           |              |
| 1106011101  | Cannulated Awl without stop |  optional |
| 1007010059  | Cannulated Awl compact      |  optional  |
| 1007010052  | Goniometer- Awl             |  optional |

Instruments

| Item no.   | Description                            |                                                                                            |
|------------|----------------------------------------|--------------------------------------------------------------------------------------------|
| 055077     | T-Handle                               |  optional |
| 1006010600 | T-Handle Cannulated                    |  optional |
| 1006010711 | Ratchet-ST T-Handle Can.T30            |           |
| 1006010811 | Ratchet-ST Handle Straight Can. T30    |           |
| 1006010511 | Ratchet-ST Handle Pear Shaped Can. T30 |           |
| 1001012000 | Torque Driver - 12                     |          |

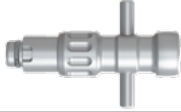
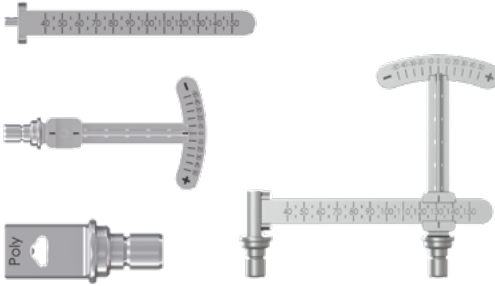


## Instruments

| Item no.     | Description                  |                                                                                      |
|--------------|------------------------------|--------------------------------------------------------------------------------------|
| 4008010008   | MIS Assembling Tool          |     |
| 4008010003   | MIS Polyaxial Screw Driver   |    |
| 4008010009   | MIS Set Screw Inserter 2.0   |    |
| 1008010014   | MIS Setscrew Driver          |    |
| 1008010023   | MIS ML2 Locking Screw Driver |     |
| 4008010005   | MIS Counter Handle           |     |
| 1010030009   | Rescue Screw Driver          |    |
| 1006020600   | Cementadapter CPS            |   |
| 1006020600-S | Cementadapter CPS sterile    |                                                                                      |
| 1006020603   | Bone Filler                  |  |
| 1006020601   | Cementadapter Inserter       |  |
| 1006020602   | Cementadapter Extractor      |  |



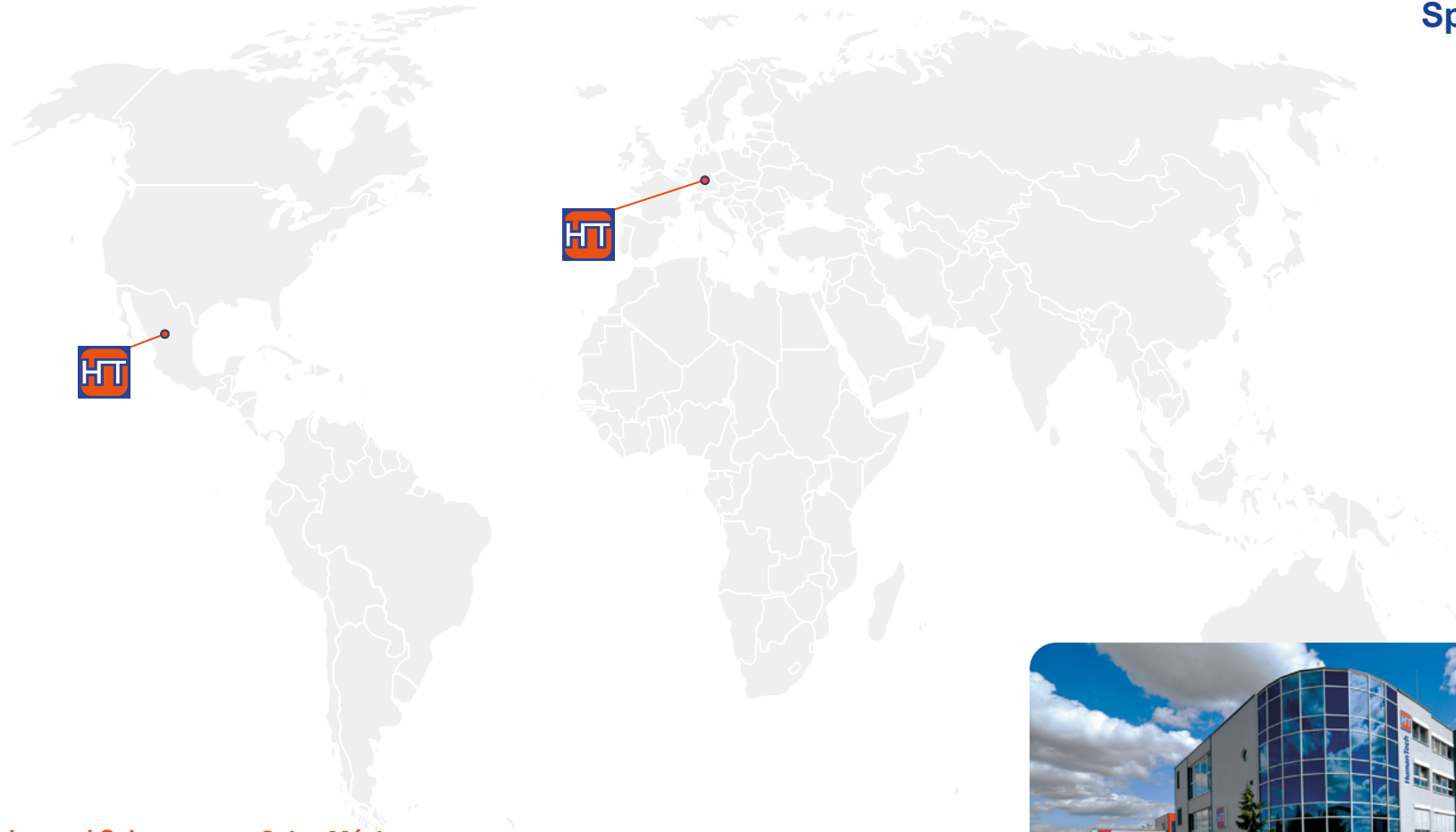
## Instruments

| Item no.                 | Description                         |                                                                                      |
|--------------------------|-------------------------------------|--------------------------------------------------------------------------------------|
| 4008010001<br>4008010016 | MIS Tower and<br>MIS Interior Clamp |    |
| 4008010002               | MIS Multitool                       |     |
| 4008010004               | MIS Rod Driver                      |    |
| 4008010006               | MIS Rod Compass                     |    |
| 1016200000               | Key Deformity Tower                 |    |
| 1001010052               | Rod Inserter                        |   |
| 055069                   | Rod Bender                          |  |



## Instruments

| Item no.                                             | Description                                                                                                                   |                                                                                             |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1008010022                                           | MIS Rod Holder short                                                                                                          |           |
| 1008010024                                           | MIS Rod Holder long                                                                                                           |           |
| 4008010007                                           | MIS Rod Pusher 2.0                                                                                                            |           |
| 1010030015<br>1010030012<br>1010030013<br>1010030014 | <b>Cannulated Taps 6T</b><br>Cannulated 6T Tap 4,8<br>Cannulated 6T Tap 5,5<br>Cannulated 6T Tap 6,5<br>Cannulated 6T Tap 7,2 |           |
| 1010030010                                           | Cannulated 6T Tap 8,5                                                                                                         |  optional |
| 1010030016<br>1010030017<br>1010030018               | <b>Cannulated Taps 6T Fine Thread</b><br>Cannulated 6T Tap 5,5 4T<br>Cannulated 6T Tap 6,5 4T<br>Cannulated 6T Tap 7,2 4T     |           |
| 1010030019<br>1010030011                             | Cannulated 6T Tap 4,8 4T<br>Cannulated 6T Tap 8,5 4T                                                                          |  optional |
| 4008010010                                           | MIS Tower Reassembler 2.0                                                                                                     |           |



## Manufacturing and Sales

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