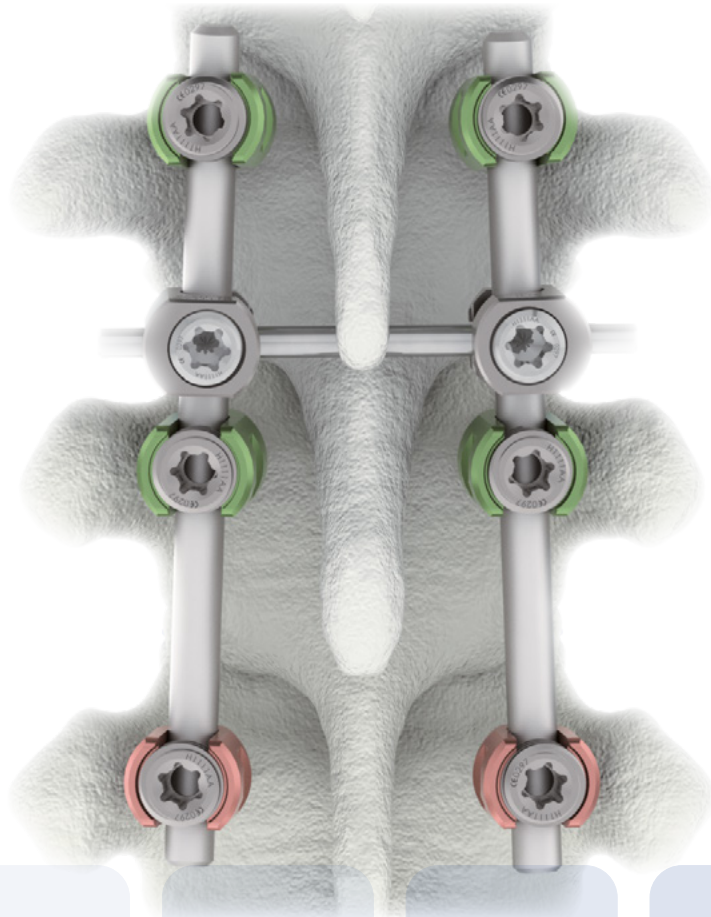




VENUS[®] nano

Spinal Fixation System for pediatric patients
and adults of small stature

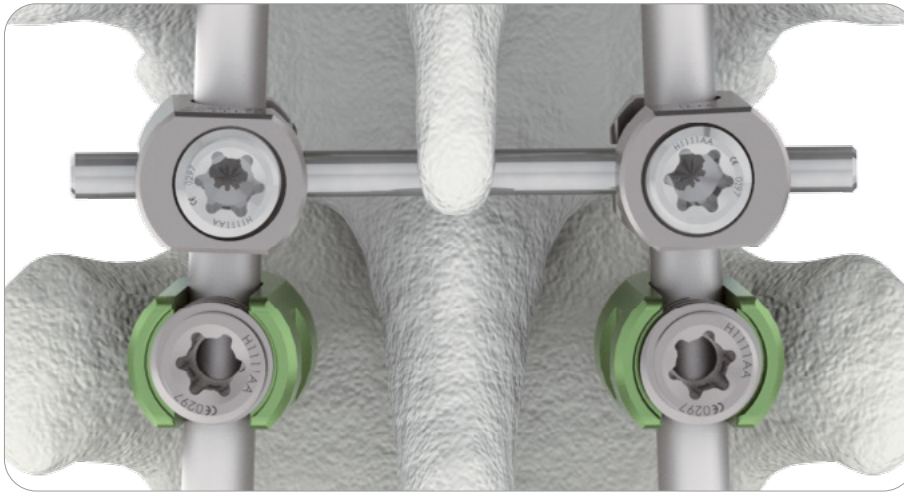
Brochure & Surgical Technique



Content

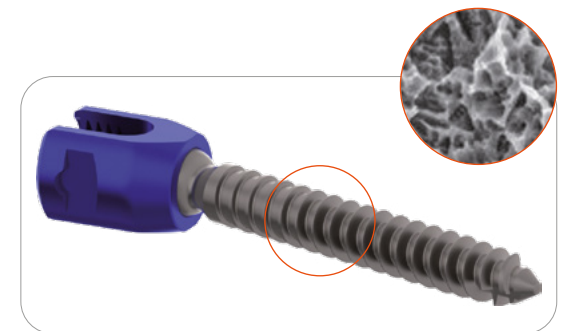
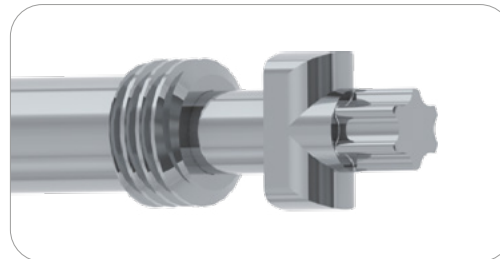
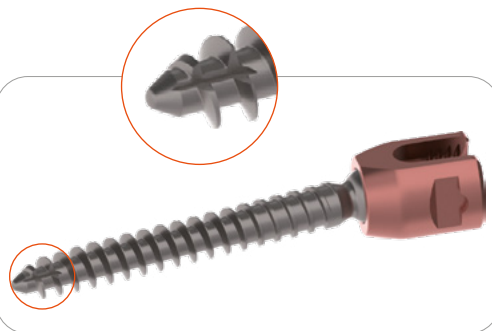
System	03
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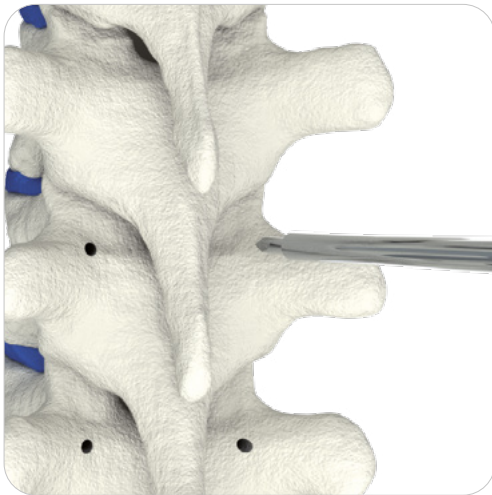


Implants for primary fusion and revision surgery

The VENUS[®] nano Spinal Fixation System is a follow-on product of the VENUS[®] system and has been developed for use in the thoracic, lumbar and iliosacral spinal region in pediatric patients and adults of small stature. Its main areas of application are stabilisations in the thoracic and lumbar spine.

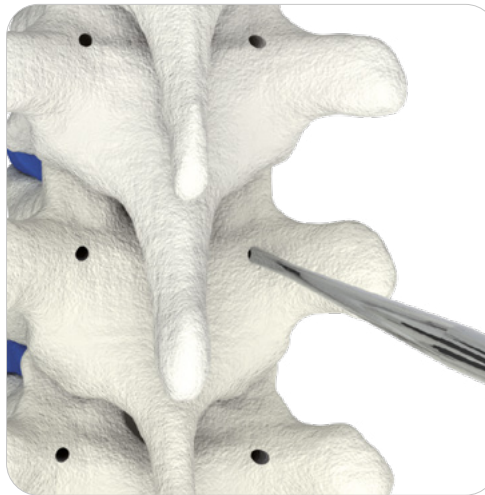


Surgical technique



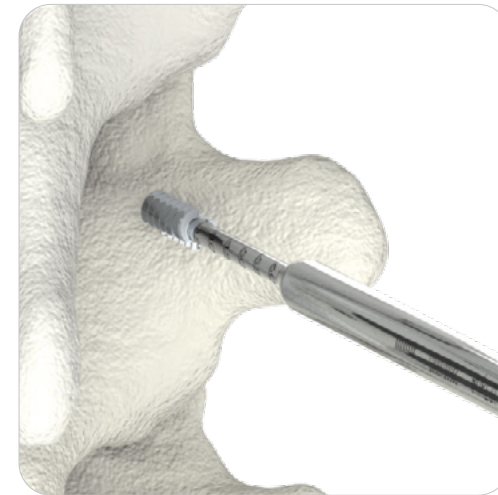
Preparing the pedicle

Set the pedicle insertion point. Open the pedicle canal using the LP Awl.



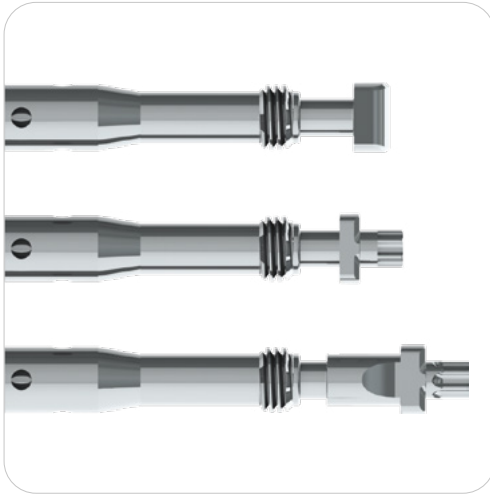
Awling and probing

The pedicle canal is awled. Using light pressure, the Pedicle Probe 2.5mm is advanced into the pedicle canal carefully in half rotations.



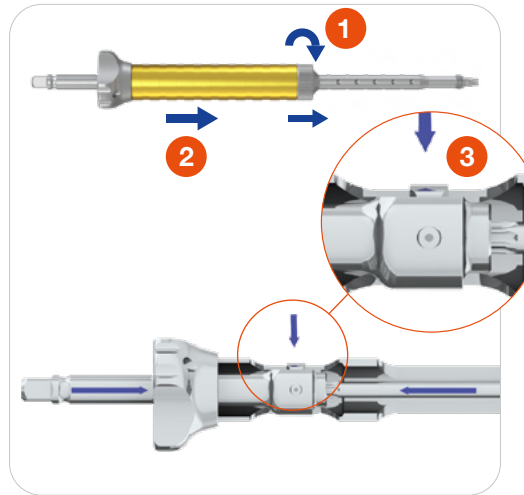
Tapping

All pedicle screws are self-tapping. However, we recommend using the LP Taps in cases with a dense bone structure. These are available for all screw diameters.



Assembly of the screwdriver I

There are various screw driver shafts available for inserting the screws (LP Shaft Monoaxial Screw Driver, LP Shaft Polyaxial Screw Driver). Depending on the type of screw, insert the inner screwdriver shaft into the LP Mono/Polyaxial Screw Driver.



Assembly of the screwdriver II

First remove the locking screw by fully unscrewing it (1). Afterwards the golden outer sleeve can be removed to access the locking adapter (2). By pressing the release button (see above) the shaft can be exchanged as needed. Afterwards reattach the golden outer sleeve and secure it with the locking screw.

Note:

When attaching the golden outer sleeve and the corresponding locking screw, the orientation of the parts is not significant as they can be reinstalled in both orientations.

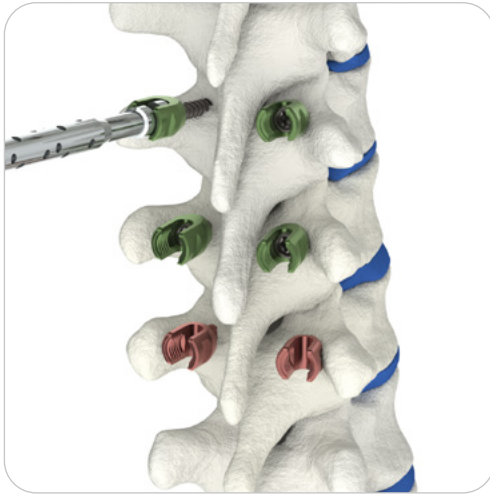


Mounting of the pedicle screws

Connect the outer guide of the LP Mono/Polyaxial Screw Driver to the screw head by screwing the outer thread into the screw head.

Note:

When fitting the screws (poly/reduction), it must be ensured that the hexalobular head bolt is fitted properly in the recess of the screw.



Insert the pedicle screws

Monoaxial screw LP:

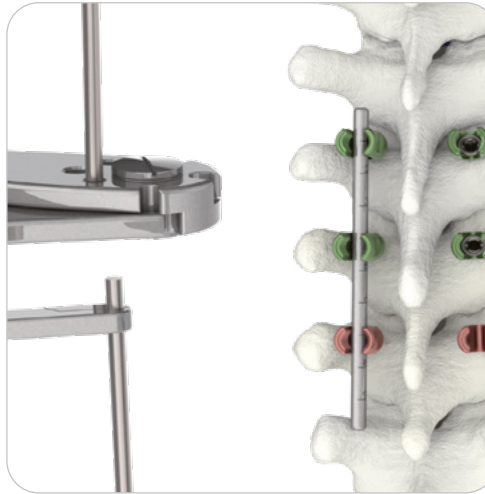
The tip of the LP Mono/Polyaxial Screw Driver clicks into the screw head and secures the screw. The screw is screwed into the pedicle canal.

Note:

It has to be ensured that the recess in the screw head is oriented cranial/caudal in order to successfully insert the rod.

Polyaxial screw LP:

First, insert the tip of the LP Mono/Polyaxial Screw Driver (inner shaft) into the screw head and attach it to the outer hexagon of the screw shaft. Then connect the outer guide to the screw head by screwing it into the inner thread of the screw head.



Determine the rod length

Determine the rod length. A phantom rod is contained in the instruments to make it easier to set the rod length.

Widen the Rod Cutter so that the rod holders stay open. Depending on the relative diameter, slide the rod through the appropriate holder. With pressure, shorten the rod to the intended point.



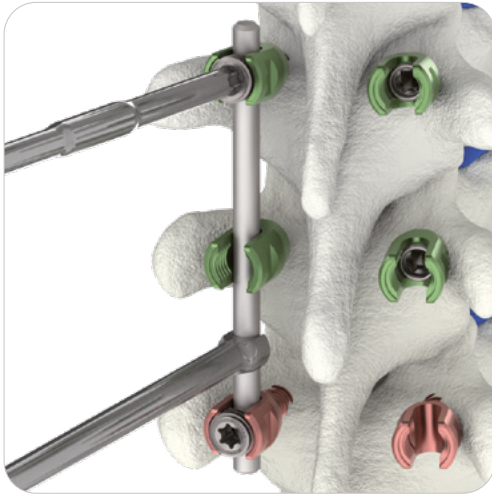
Adjust the rod

Insert the rod into the screw heads using the LP Rod Inserter and, if necessary, with the help of your fingertips. The rod is bent to the corresponding radius with the LP Rod Bender.

Note:

The rod should be adjusted in a way that it protrudes slightly beyond the screw heads on both ends.

It must be ensured that the rod is seated in the screw head as deep and straight as possible to ensure bilateral contact with the LP Set Screw.

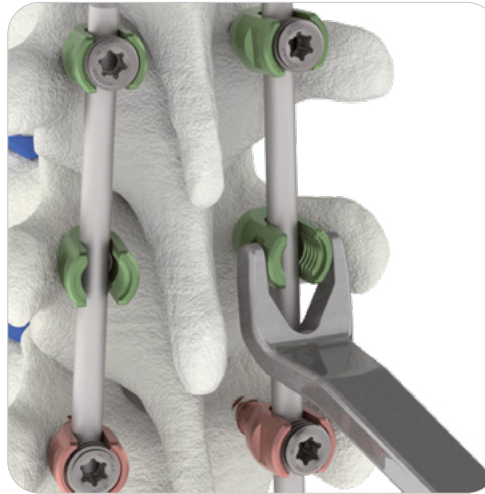


Inserting the rod

Fix the rod in the screw head with the LP Set Screw using the LP Set Screw Inserter. To prevent cross-threading while screwing in the LP Set Screw, first screw in a counterclockwise direction until you clearly feel the thread “click into” the screw head. Then continue to screw in the LP Set Screw.

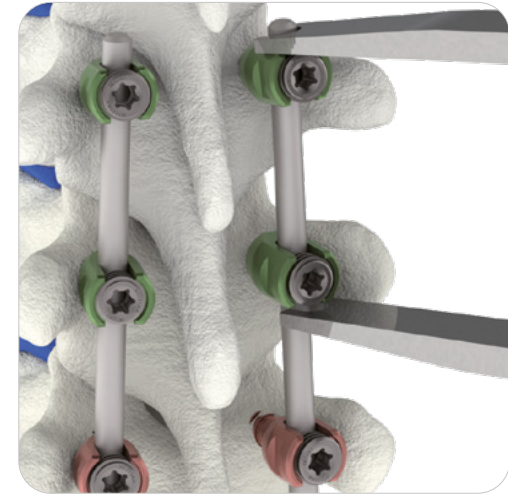
Caution!

Be sure to only screw in the LP Set Screw loosely; the final torque is applied using the LP Setscrew Driver.



Rod insertion (using the LP Rocker)

Position the LP Rocker on the screw head by inserting the fork ends into the lateral grooves of the screw head. Crank the rocker shaft until it lies on the rod. Then continue to crank it carefully, making visual and, if necessary, X-ray checks until the rod and the screw head are interlocked. Insert the LP Set Screws and fix the rod in the screw head.



Compression / Distraction

Position the LP Compressor or LP Distractor on the screw heads and carry out the compression or distraction procedure until the desired position has been achieved. Insert the LP Set Screws using the LP Set Screw Inserter to ensure the compression or distraction result. Tighten using the LP Setscrew Driver.

Note:

The LP Set Screws must not be fully tightened during this manoeuvre. If necessary, loosen the LP Set Screws carefully using the LP Setscrew Driver.



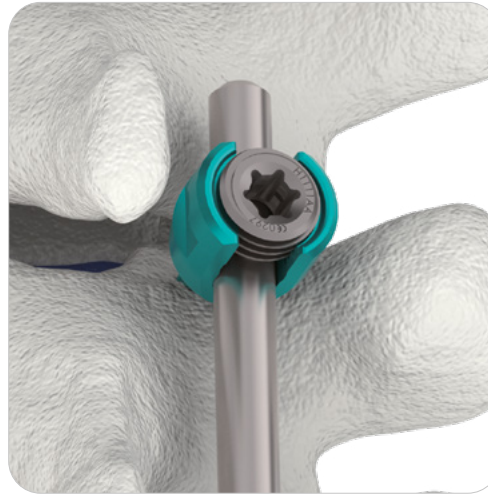
Inserting the rod for reduction / reposition

Insert the rod into the screwheads using the LP Rod Inserter and if required with help of fingertips. If necessary, further bend the rod to the appropriate radius as described in the previous step and/or use the LP Rod Pusher or LP Rocker to place the rod into position.

In specific situations, it might be indicated to use reduction screws. Insert the screws the same way as the standard pedicle screws using the LP Mono/Polyaxial Screw Driver with the LP Shaft Reduction Screw Driver.

Note:

The insertion of the rod must be performed without pressure, in order to avoid the early collapse of the long sides.

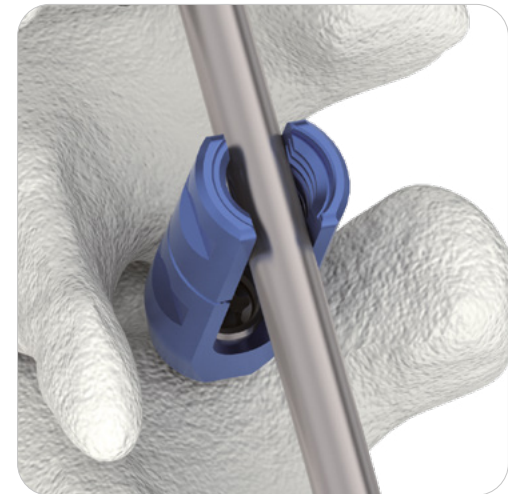


Fixing of the rod

Once the rod is correctly positioned in the screw head, fix the rod in the screw head with the LP Set Screw using the LP Set Screw Inserter. To prevent cross-threading while screwing in the LP Set Screw, first screw in a counter-clockwise direction until you clearly feel the thread “click into” the screw head. Then continue to screw in the LP Set Screw. The segment with the reduction screw remains without a LP Set Screw initially.

Caution!

Be sure to only screw in the LP Set Screw loosely; the final torque is applied using the LP Set Screw Driver.



Reduction / Reposition

In order to reposition the segment with as little stress as possible, the rod must be inserted at least at the posterior end of the reduction screw. If necessary, use the LP Rocker to push the rod into the screw head.

Note:

To protect the screw flanks against breaking off prematurely: Attach the LP Long Head Sleeve and simultaneously guide it along the screw head while inserting the LP Set Screw. Carefully tighten the LP Set Screw under visual control and X-ray control, until the rod is fully inserted in the screwhead.

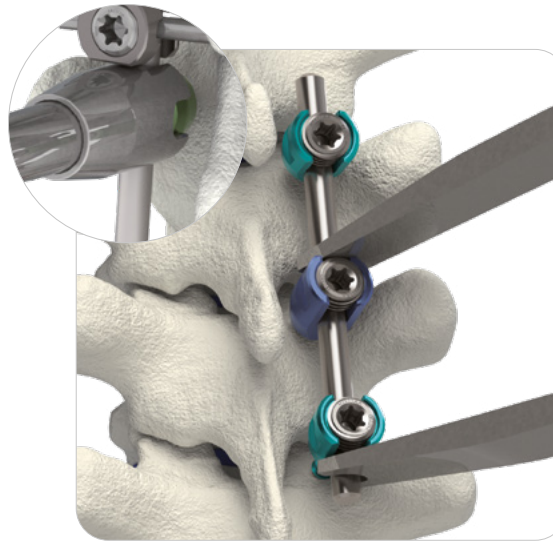


Removing of the flanks

Insert the LP Reduction Crown Breaker over the flanks to remove them. The flanks break after several lever movements (medial-lateral) at the designated breaking point. The LP Reduction Crown Breaker is designed so that the fragment remains inside the instrument. The screwhead design avoids a burr formation at the break-off points.

Note:

The broken flanks are discarded. Care must be taken to ensure that no residue remains in situ after breaking-off the flanks.

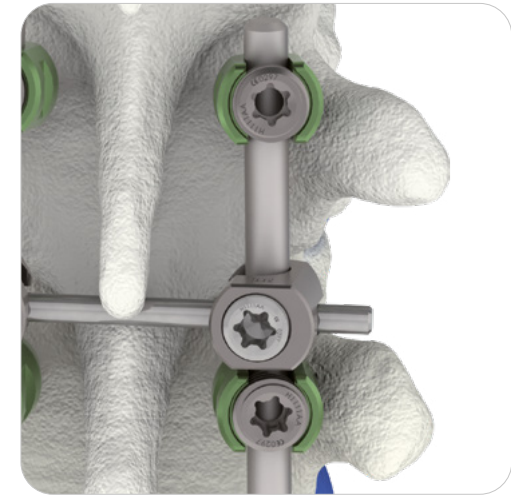


Compression / Distraction

Position the LP Compressor or LP Distractor on the screw heads and carry out the compression or distraction procedure until the desired position has been achieved. To ensure the compression or distraction result, tighten with the LP Set Screw Driver.

Note:

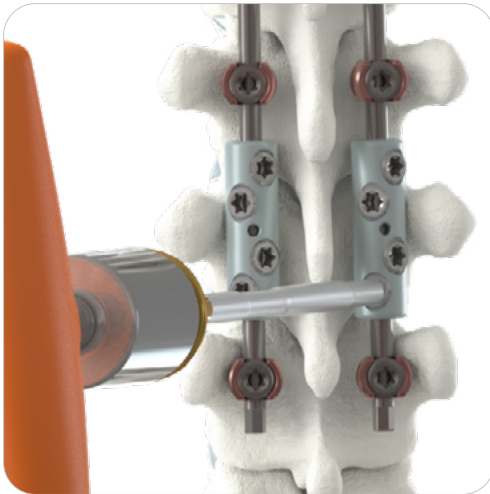
The LP Set Screws must not be fully tightened during this manoeuvre. If necessary, loosen the set screws carefully using the LP Set Screw Driver.



LP Transverse Connector

Attach a LP Transverse Connector Hook Ø4.5 with the help of the LP TC Inserter. Connect the second hook with the LP Transverse Connector Rod which is inserted via the LP TC Rod Holder and attach it to the opposite rod. Align the elements and connect the LP Transverse Connector Hook Ø4.5 using the LP Transverse Connector Rod.

Tighten the fixing screw of the LP Transverse Connector Hook Ø4.5 all the way into the LP Transverse Connector Hook Ø4.5 using the LP Set Screw Driver.



LP Inline Rod Connector

To extend an existing construction, a LP Inline Rod Connector can be used. They are guided on the protruding end of the reclined rod of the existing construction. When mounting a LP Inline Rod Connector, please observe that the ends of both rods must be fixed with 2 fixing screws each in order to ensure sufficient stability of the construction. The rod protrusion of the reclined rod must be at least 18 mm. All fixing screws of the connector are tightened with a torque of 10 Nm by the combination of the LP Set Screw Driver and the Torque Driver-10. The resulting torque is absorbed onto the next adjacent screw by using the LP Counter Holder.

Note:

Depending on the anatomy of the patient and the available space condition, it might not be possible to place pedicle screws into a segment. It must be ensured that the fixing screws are slightly loosened before placing the connector.

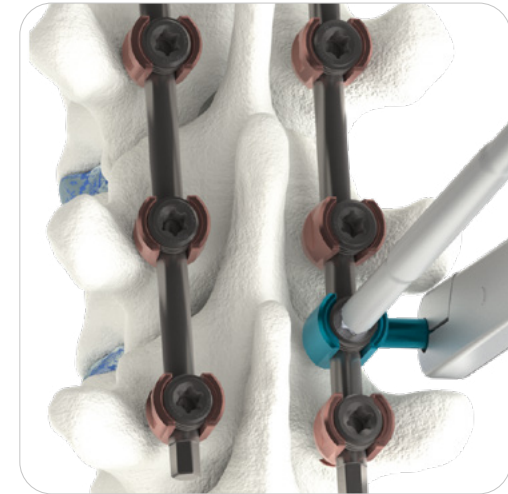


LP Domino Connector

Another option for creating a double rod construction is the use of the LP Domino Connectors. The LP Domino Connector is slid under the primary rod of the construct between the screw heads and fixed with two LP Set Screws. The second implant rod is inserted into the free rod opening of the connector. All fixing screws of the connector are tightened with a torque of 10 Nm by the combination of the LP Setscrew Driver and the Torque Driver-10. The resulting torque is absorbed onto the next adjacent screw by using the LP Counter Holder.

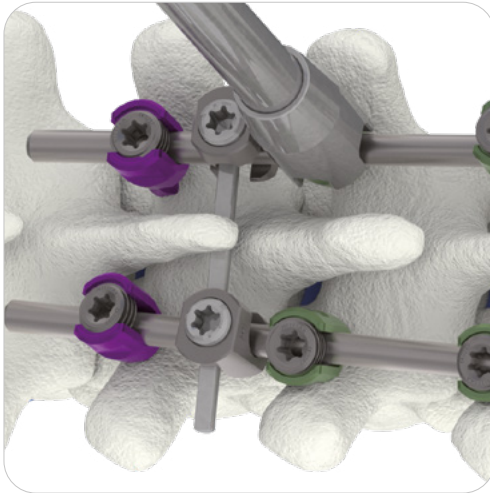
Note:

Depending on the anatomy of the patient and the available space condition, it might not be possible to place pedicle screws into a segment. It must be ensured that each of the two rods is fixed with two of the four fixing screws each. It must be ensured that the fixing screws are slightly loosened before placing the implant.



LP Lateral Connector

Lateral Connectors can be used for offset constructions. The rod intake at the head end of the Lateral Connector is guided onto the reclined rod. The end of the rod can be bent using the Rod Bender prior to inserting the implant, in order to secure an optimal fit. The connector is secured on the rod side with one Setscrew. The torque of 10Nm for the final tightening of the Set screws is absorbed by inserting the LP Counter Holder on the head side of the connector or by insertion over the screw head in which the rod side of the connector is located. Tightening is performed by the combination of the LP Setscrew Driver with the Torque Driver-10, whereby the combined instruments are guided through the fitted LP Counter Holder.

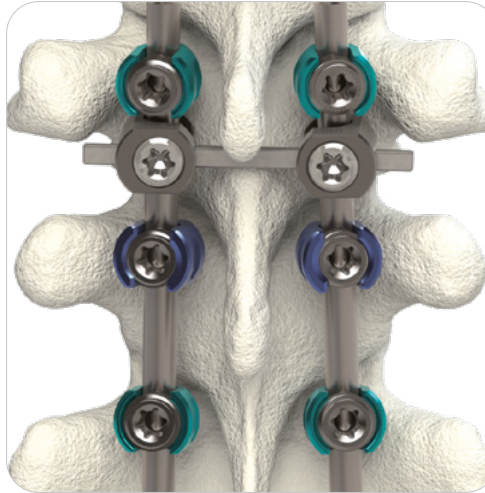


Subsequent Tightening

Slot the LP Torque Driver-10 and the LP Counter Holder into one another. Attach the combined instrument to the screw head. It is also possible to attach the two instruments separately. Tighten the LP Set Screw. Same approach for all other LP Set Screws.

Note:

The full torque of 10 Nm is reached when an audible “click” is heard.



Final Structure

The actual correction process is usually a combination of various manoeuvres or techniques. The advantage of long head screws is that the correction is carried out slowly, and the forces are distributed across several segments. The final structure has the same biomechanical strength as a standard fixation.

Polyaxial Screws

Art.No.	Description	
	Polyaxial Screws LP Ø4 mm	
2200044020	Polyaxial Screw LP Ø4x20mm	
2200044025	Polyaxial Screw LP Ø4x25mm	
2200044030	Polyaxial Screw LP Ø4x30mm	
2200044035	Polyaxial Screw LP Ø4x35mm	
2200044040	Polyaxial Screw LP Ø4x40mm	
2200044045	Polyaxial Screw LP Ø4x45mm	
	Polyaxial Screws LP Ø5 mm	
2200045025	Polyaxial Screw LP Ø5x25mm	
2200045030	Polyaxial Screw LP Ø5x30mm	
2200045035	Polyaxial Screw LP Ø5x35mm	
2200045040	Polyaxial Screw LP Ø5x40mm	
2200045045	Polyaxial Screw LP Ø5x45mm	
2200045050	Polyaxial Screw LP Ø5x50mm	
2200045060	Polyaxial Screw LP Ø5x60mm	
2200045070	Polyaxial Screw LP Ø5x70mm	
	Polyaxial Screws LP Ø5.5 mm	
2200045525	Polyaxial Screw LP Ø5.5x25mm	
2200045530	Polyaxial Screw LP Ø5.5x30mm	
2200045535	Polyaxial Screw LP Ø5.5x35mm	
2200045540	Polyaxial Screw LP Ø5.5x40mm	
2200045545	Polyaxial Screw LP Ø5.5x45mm	
2200045550	Polyaxial Screw LP Ø5.5x50mm	
2200045560	Polyaxial Screw LP Ø5.5x60mm	
2200045570	Polyaxial Screw LP Ø5.5x70mm	



Monoaxial Screws

Art.No.	Description	
	Monoaxial Screws Ø4 mm	
2200064025	Monoaxial Screw LP Ø4x25mm	
2200064030	Monoaxial Screw LP Ø4x30mm	
2200064035	Monoaxial Screw LP Ø4x35mm	
2200064040	Monoaxial Screw LP Ø4x40mm	
2200064045	Monoaxial Screw LP Ø4x45mm	
2200064050	Monoaxial Screw LP Ø4x50mm	
	Monoaxial Screws Ø5 mm	
2200065025	Monoaxial Screw LP Ø5x25mm	
2200065030	Monoaxial Screw LP Ø5x30mm	
2200065035	Monoaxial Screw LP Ø5x35mm	
2200065040	Monoaxial Screw LP Ø5x40mm	
2200065045	Monoaxial Screw LP Ø5x45mm	
2200065050	Monoaxial Screw LP Ø5x50mm	
	Monoaxial Screws Ø5.5 mm	
2200065525	Monoaxial Screw LP Ø5.5x25mm	
2200065530	Monoaxial Screw LP Ø5.5x30mm	
2200065535	Monoaxial Screw LP Ø5.5x35mm	
2200065540	Monoaxial Screw LP Ø5.5x40mm	
2200065545	Monoaxial Screw LP Ø5.5x45mm	
2200065550	Monoaxial Screw LP Ø5.5x50mm	
	Monoaxial Screws Ø6 mm	
2200066025	Monoaxial Screw LP Ø6x25mm	
2200066030	Monoaxial Screw LP Ø6x30mm	
2200066035	Monoaxial Screw LP Ø6x35mm	
2200066040	Monoaxial Screw LP Ø6x40mm	
2200066045	Monoaxial Screw LP Ø6x45mm	
2200066050	Monoaxial Screw LP Ø6x50mm	

Reduction Screws

Art.No.	Description	
	Reduction Screw LP Ø4	
2200054020	Reduction Screw LP Ø4x20mm	
2200054025	Reduction Screw LP Ø4x25mm	
2200054030	Reduction Screw LP Ø4x30mm	
2200054035	Reduction Screw LP Ø4x35mm	
2200054040	Reduction Screw LP Ø4x40mm	
2200054045	Reduction Screw LP Ø4x45mm	
	Reduction Screw LP Ø5	
2200055025	Reduction Screw LP Ø5x25mm	
2200055030	Reduction Screw LP Ø5x30mm	
2200055035	Reduction Screw LP Ø5x35mm	
2200055040	Reduction Screw LP Ø5x40mm	
2200055045	Reduction Screw LP Ø5x45mm	
2200055050	Reduction Screw LP Ø5x50mm	
2200055060	Reduction Screw LP Ø5x60mm	
2200055070	Reduction Screw LP Ø5x70mm	
	Reduction Screw LP Ø5.5	
2200055525	Reduction Screw LP Ø5.5x25mm	
2200055530	Reduction Screw LP Ø5.5x30mm	
2200055535	Reduction Screw LP Ø5.5x35mm	
2200055540	Reduction Screw LP Ø5.5x40mm	
2200055545	Reduction Screw LP Ø5.5x45mm	
2200055550	Reduction Screw LP Ø5.5x50mm	
2200055560	Reduction Screw LP Ø5.5x60mm	
2200055570	Reduction Screw LP Ø5.5x70mm	



Rods and Setscrews

Art.No.	Description	
LP-PMS	LP Set Screw	
2200150000	LP Connector Set Screw	

Art.No.	Description	
2200084548H	Rod straight LP CoCr Ø4.5x480mm Hex	

Art.No.	Description	
2200094510H	Rod straight LP Ø4.5x100mm Hex	
2200094515H	Rod straight LP Ø4.5x150mm Hex	
2200094520H	Rod straight LP Ø4.5x200mm Hex	
2200094548H	Rod straight LP Ø4.5x480mm Hex	

Art.No.	Description	
2200140000	LP Transverse Connector Hook Ø4.5	     
2200140040	LP Transverse Connector Rod 40mm	
2200140050	LP Transverse Connector Rod 50mm	
2200140060	LP Transverse Connector Rod 60mm	
2200140070	LP Transverse Connector Rod 70mm	
2200140080	LP Transverse Connector Rod 80mm	

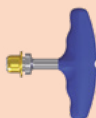
Connectors

Art.No.	Description	Image
2200110015	LP Lateral Connector 15mm	
2200110050	LP Lateral Connector 50mm	
2200124545	LP Domino Connector Ø4.5/4.5	
2200124555	LP Domino Connector Ø4.5/5.5	
2200134545	LP Inline Rod Connector Ø4.5/4.5	
2200134555	LP Inline Rod Connector Ø4.5/5.5	

Instruments

Art.No.	Description		Art.No.	Description	
2200010000	LP Awl		2200010014	LP Shaft Monoaxial Screw Driver	
2200010002	Pedicle Probe 2.5mm		2200010015	LP Shaft Polyaxial Screw Driver	
2200010003 2200010004 2200010005 2200010006	LP Tap Ø4 LP Tap Ø5 LP Tap Ø5.5 LP Tap Ø6		2200010046	LP Shaft Reduction Screw Driver	
2200010011	LP Rocker		2200010012	LP Long Head Sleeve	
2200010008	LP Set Screw Driver				
2200010009	LP Set Screw Inserter				
2200010007	LP Counter Holder				
2200010016	LP Mono/Polyaxial Screw Driver				
2200010013	LP Reduction Crown Breaker				

Instruments

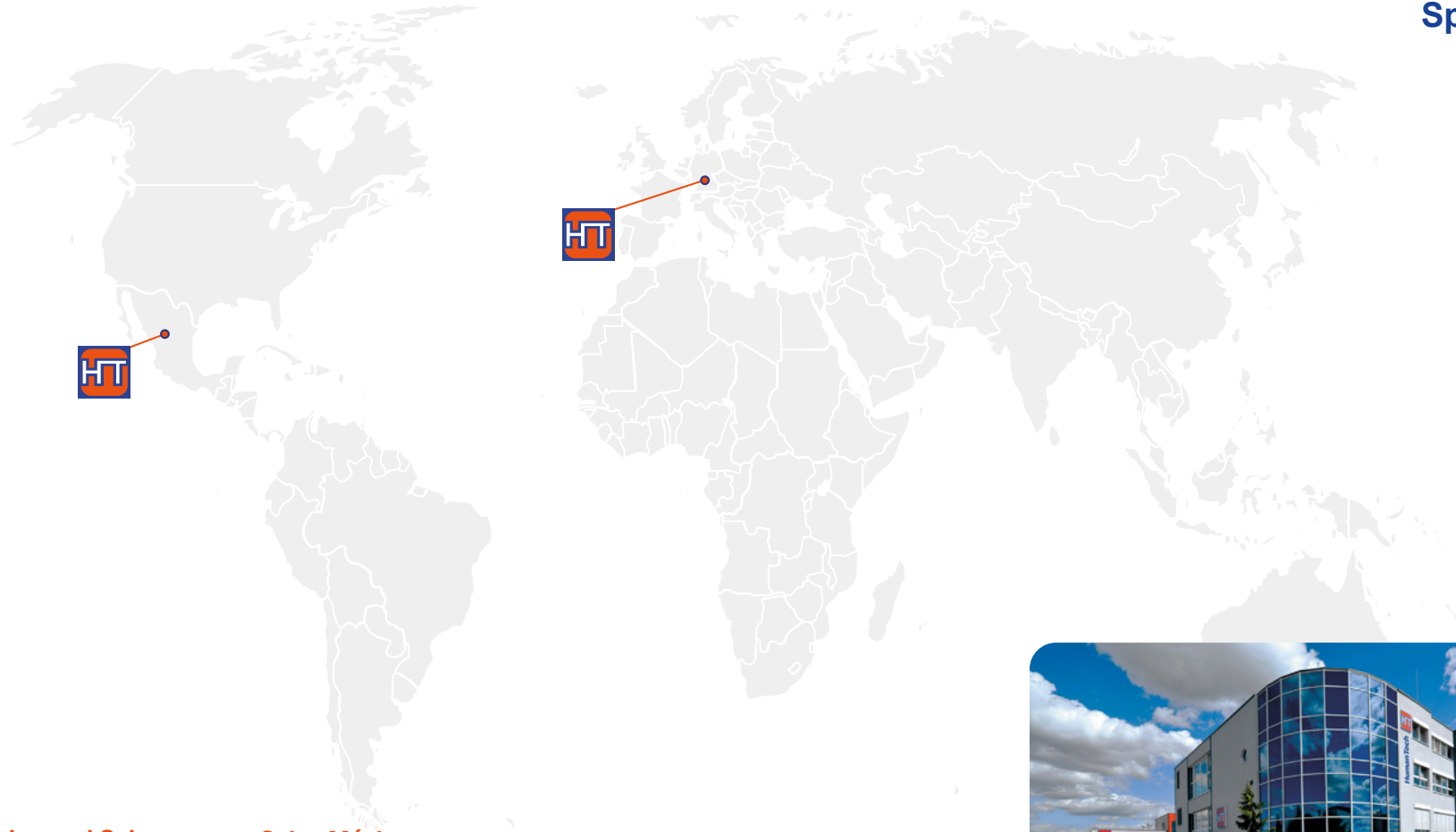
Art.Nr.	Bezeichnung	
1006010600	T-Handle Cannulated	 optional
1006010701	Ratchet T-Handle Cann. T30	 optional
1006010711	Ratchet-ST T-Handle Can. T30	
1006010801	Ratchet Handle Straight CanT30	 optional
1006010811	Ratchet-ST Handle Straight Can. T30	
1006010501	Ratchet Handle Pearshaped Cannulated T30	 optional
1006010511	Ratchet-ST Handle Pearshaped Can. T30	 optional



Instruments

Art.No.	Description
055057	Phantom Rod 200mm
2200010017	LP Rod Inserter
2200010018	LP Rod Bender
2200010019	LP Rod Pusher
2200010020	LP Compressor
2200010021	LP Distractor
2200010022	LP TC Inserter
2200010023	LP TC Rod Holder
055084	Rod Cutter
2200010054	LP Torque Driver-10





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