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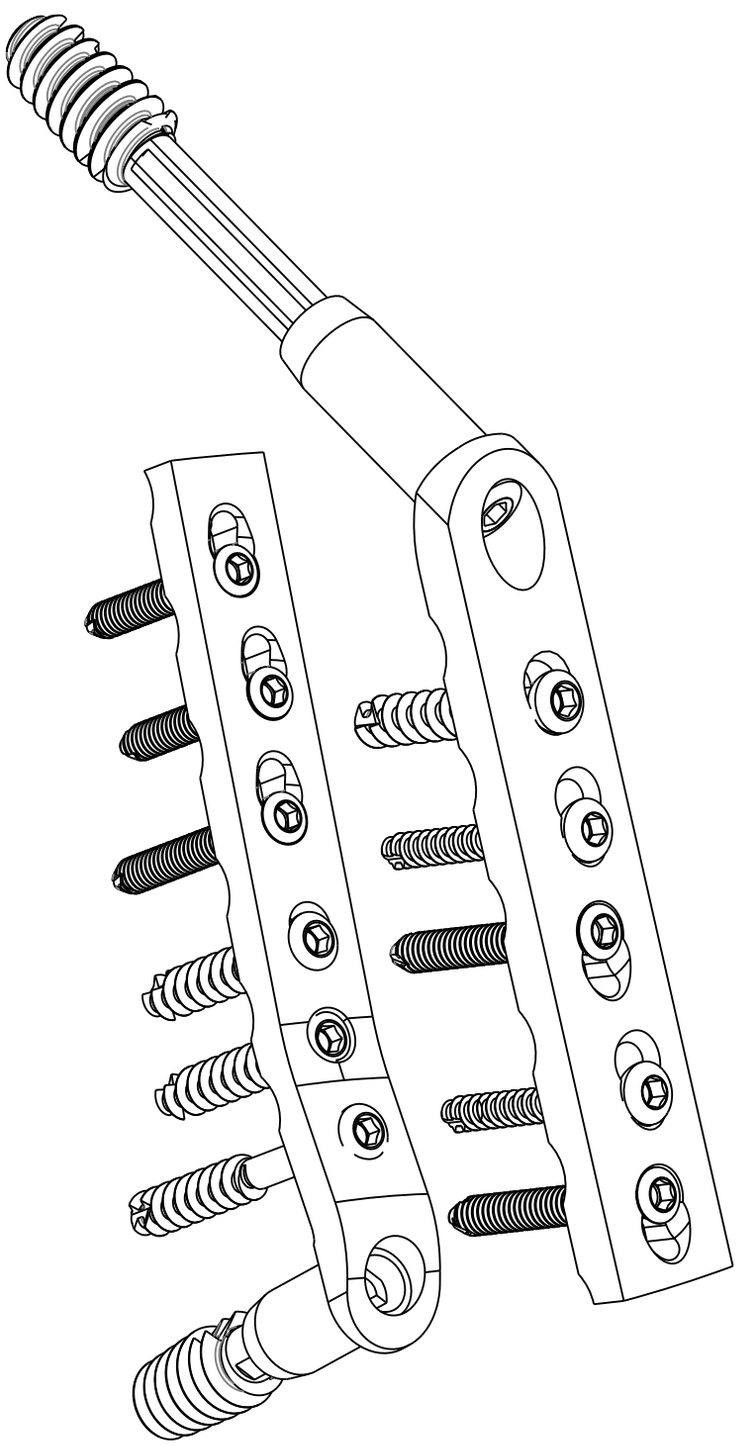
Locking

135° DHS / 90° DCS

Surgical Technique



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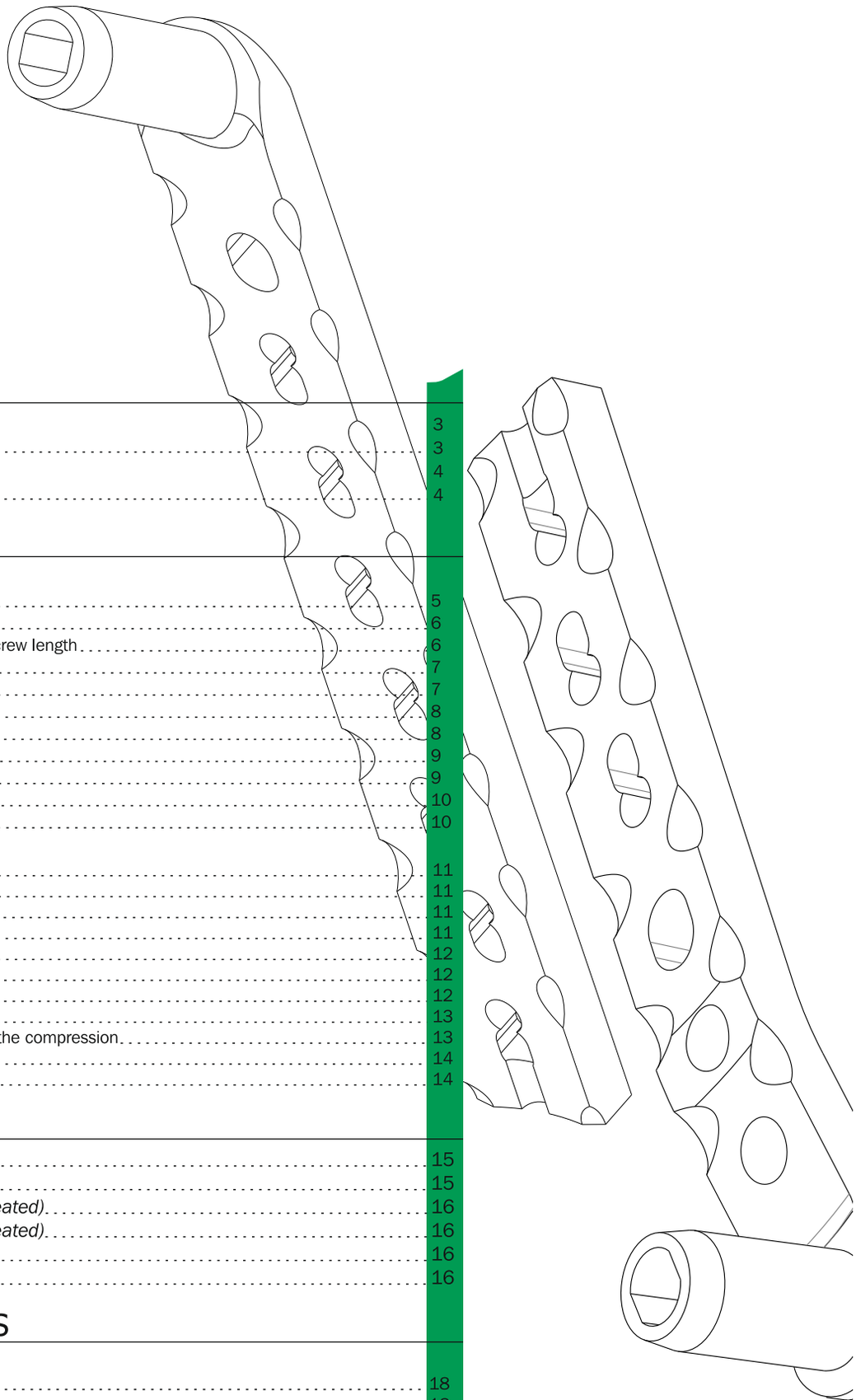

CONTENS

Locking
DHS / DCS

1.Introduction

2.Surgical Tecnique

3.Screw

4.Instrument Set DHS/DCS

5.Disinfection

6.Appendix

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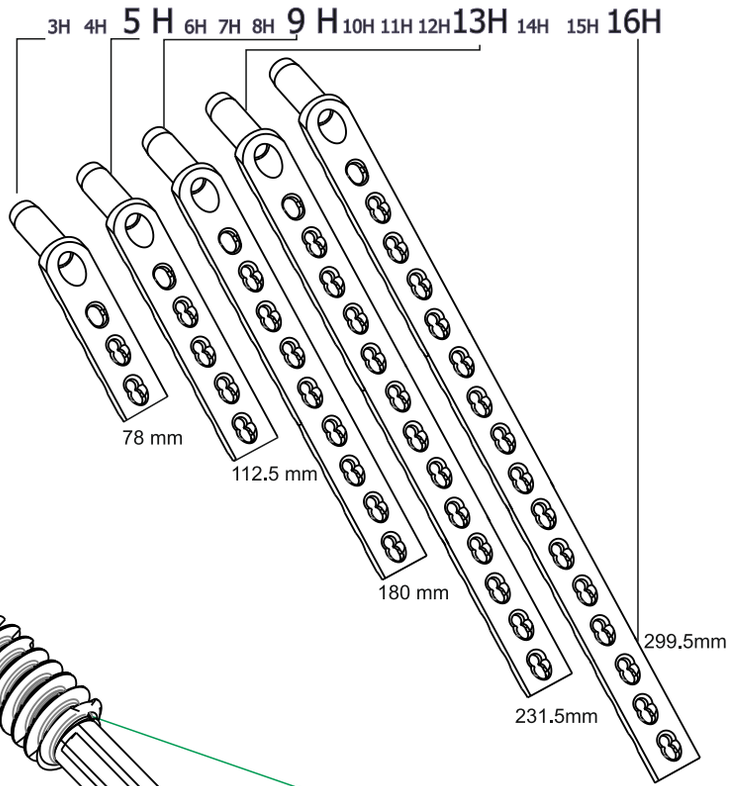
ISO 9001
ISO 13485
CE 1984

1.1. DHS Plate

1.1.1. Specification

DHS Plate 135 °: Locked DHS Plate 135 ° is indicated for intertrochanteric fractures, subtrochanteric fractures and femoral neck fractures. Used with Ø5 mm locking screw, Ø4,5 mm. cortical screw and Ø6,5 mm cancellous screw. Available in sizes from 3 to 16 holes. The Thickness is 7.00 mm for all DHS plates. The plates are made of titanium alloy manufactured according to ASTM F136.



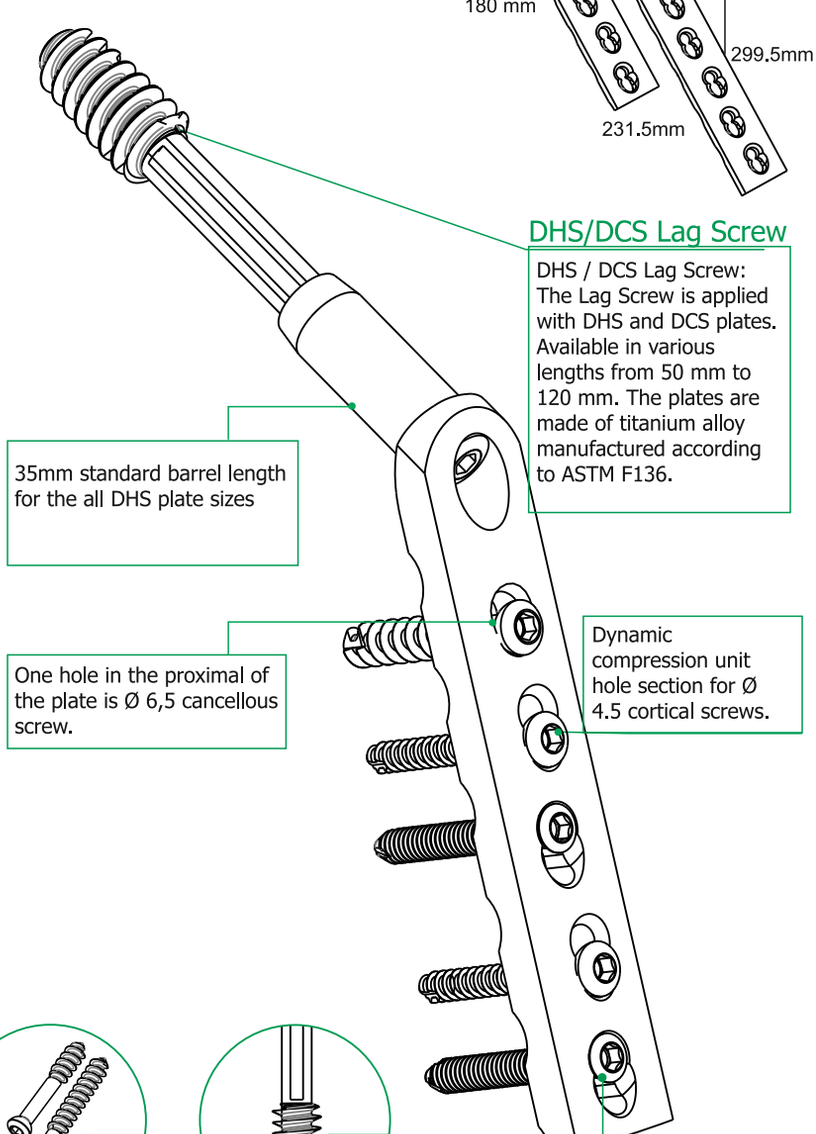
zimed®

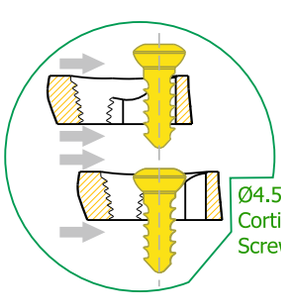
Locking

135° DHS PLATE

(with Ø 6,5 / Ø 5,0 mm screw)

REF. NO	HOLES
1732-0003	3
1732-0004	4
1732-0005	5
1732-0006	6
1732-0007	7
1732-0008	8
1732-0009	9
1732-0010	10
1732-0011	11
1732-0012	12
1732-0013	13
1732-0014	14
1732-0015	15
1732-0016	16

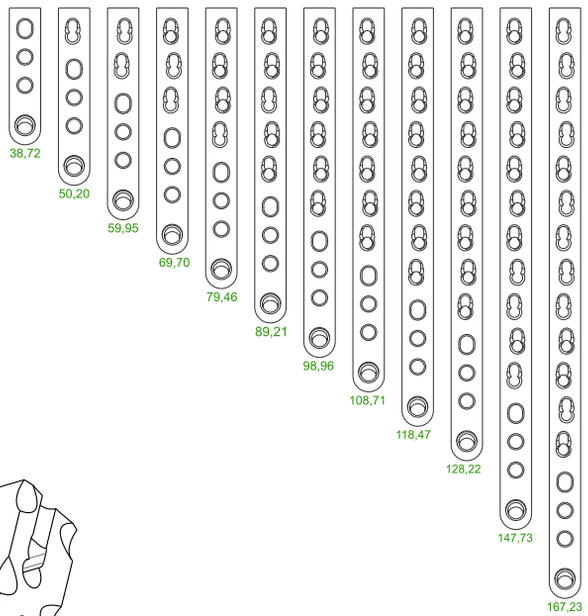




1.2. DCS

1.2.1. Specification

DCS Plate 95 °: Locked DCS Plate 95 ° is indicated for femoral intercondylar fractures, supracondylar fractures and unicondylar fractures. Used with Ø 5mm. locking screw, Ø4,5 mm. cortical screw and Ø6,5mm. cancellous screw. Available in sizes from 3 to 16 holes. The Thickness is 7.5 mm for all DCS plates.The plates are made of titanium alloy manufactured according to ASTM F136.

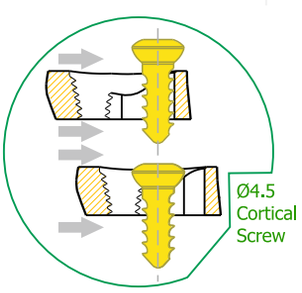


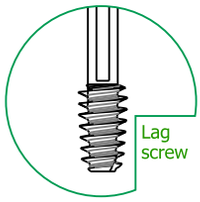
zimed®

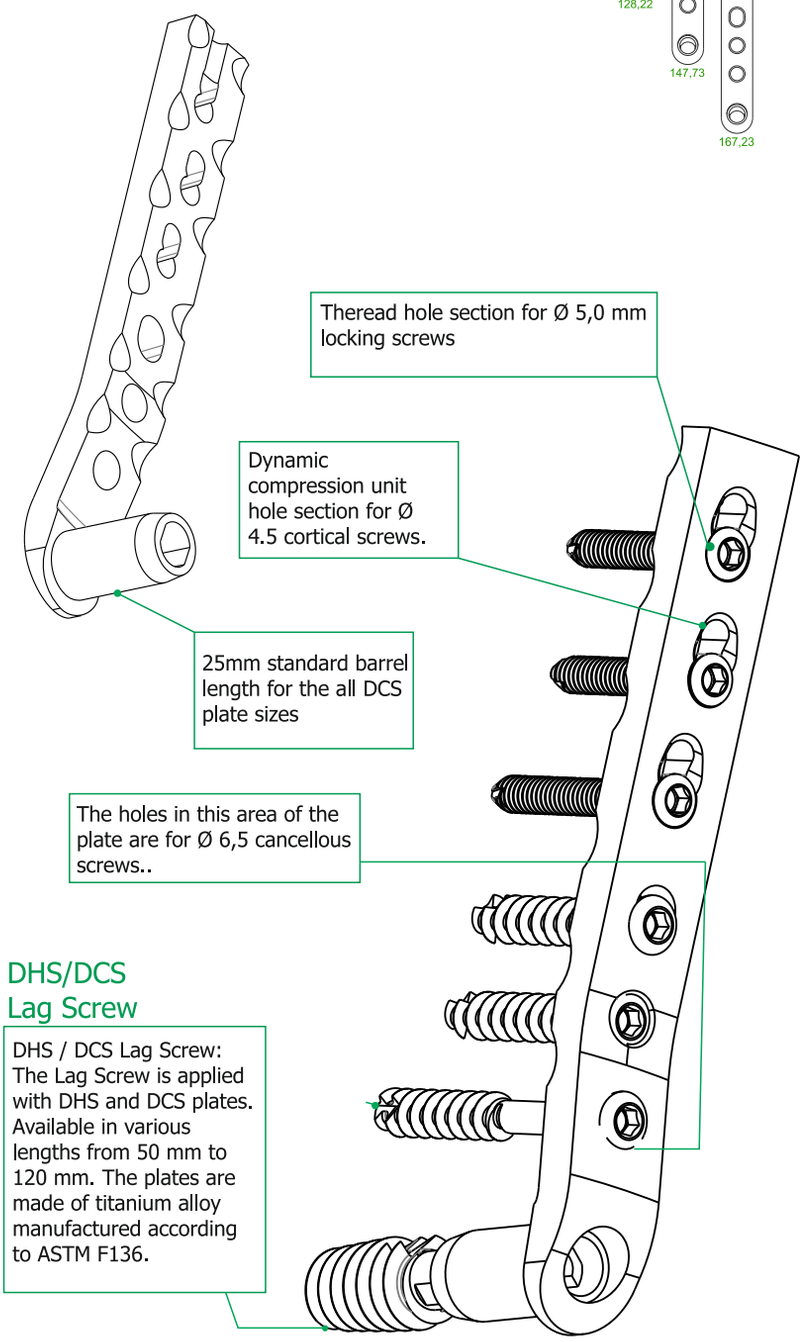
Locking 90° DCS PLATE

(with Ø 6,5 / Ø 5,0 mm screw)

REF. NO	HOLES
1742-0003	3
1742-0004	4
1742-0005	5
1742-0006	6
1742-0007	7
1742-0008	8
1742-0009	9
1742-0010	10
1742-0011	11
1742-0012	12
1742-0013	13
1742-0014	14
1742-0015	15
1742-0016	16







DHS/DCS Lag Screw

DHS / DCS Lag Screw: The Lag Screw is applied with DHS and DCS plates. Available in various lengths from 50 mm to 120 mm. The plates are made of titanium alloy manufactured according to ASTM F136.

2.1.DHS

2.1.1 DHS Lag screw entry point

Place the Angle Guide in full contact with the Femur bone. This will give you the appropriate angle (in 135 °) (Fig.1).

Depending on the angle of the implant, the insertion point of the DHS Lag screw is approximately 25 - 60 mm distal to the innomanite tubercle.

The thread on the tip of the Krishner wire prevents the wire from being pulled.(Fig.2).

Insert the DHS Ø2.5 mm threaded Krishner wire until it reaches the subchondral part of the femoral head. (Fig.3).

Check the position of the guidewire under the Fluoroscopy. Place it mid-mid in the PA and Lateral planes (Fig.4-5).

Important Note: Keep the Krishner wire attached until the plate is in place. If the guide wire is not placed correctly, it must be reattached. If the DHS / DCS screw is inserted in an incorrect position, later correction is not possible


Fig.1

Fig.2

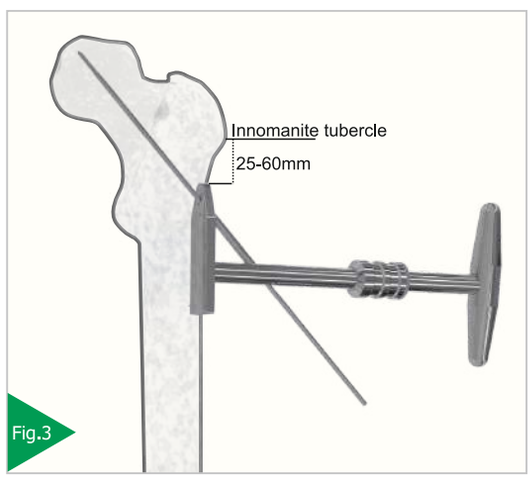


Fig.3

Instruments


T Handle (for Tap and Drill)


Angle Guide 135°


Threadless Guide Wire Ø 2x230 mm

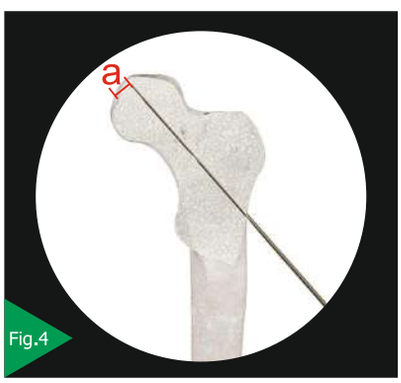


Fig.4

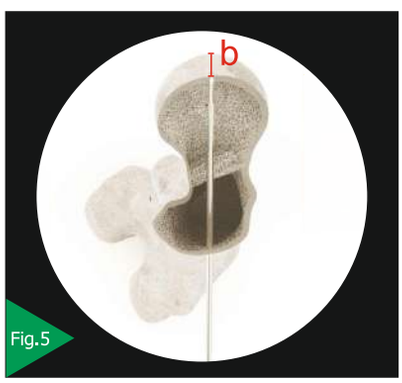


Fig.5

a b

Tip apex distance (PA+LAT) should be less than 25 mm for a succesfull fixation

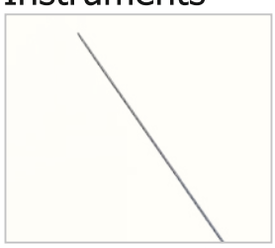
2.1.DHS

2.1.2 Determining insertion depth

Determine the length of the Lag screw to be used with the help of the depth gauge. To do this, slide the gauge over the Krishner wire and measure the length of the guide wire in the bone(Fig.6).

Fig.6

Instruments



Threadless Guide Wire Ø 2x230 mm

Lag Screw Length Gauge

2.1.3 Lag Screw Size Determination by Reaming Depth

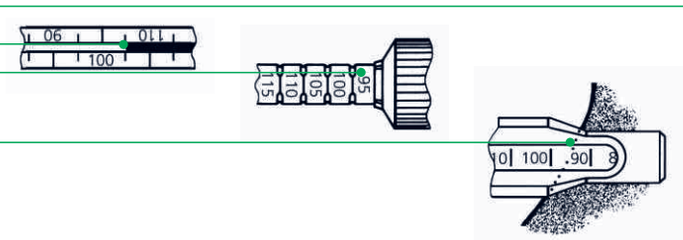
The proper reaming depth is 10mm less than the measured length of the Krishner wire.

Table 1

Example

Measurement Table

a:Direct Measurement 115
b:Reamer setting 95 mm
c:Taping Depth (Optional) 95 mm
Lag Screw Depth 95 mm



2.1.DHS

2.1.4. Reaming

Set the Adjustable Triple DHS reamer to the appropriate depth gauge (For example 95) and slide it over the 8mm drill bit(Fig.7).

The reaming depth can be adjusted in 5 mm increments. Fix the reamer by tightening the nut.

The screw channel is drilled up to 10mm in the subchondral part of the femoral head.

Suitable DHS / DCS screw length is the same as reaming depth (Tablo.1, S:6)

Important Note: Make sure that the guide wire is not bent while reaming. Twisting the Krishner wire may result in improper insertion of the DHS and DCS screw or wire breakage

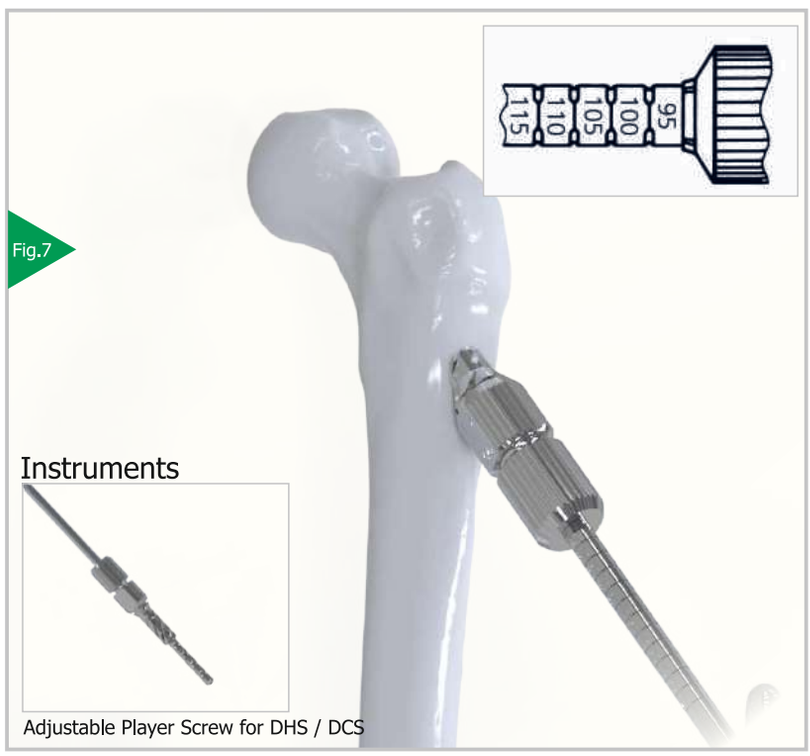


Fig.7

Instruments

Adjustable Player Screw for DHS / DCS

2.1.5. Tap (Optional)

In case of hard bone use DHS / DCS tap. Place the centering guide in the hole Continue to the selected depth (by following the window of the guide (eg 95) until reaching the lateral cortex and complete the tapping.
(Fig.8).

Important Note: DHS / DCS Tap is not recommended for use in osteoporotic bone.

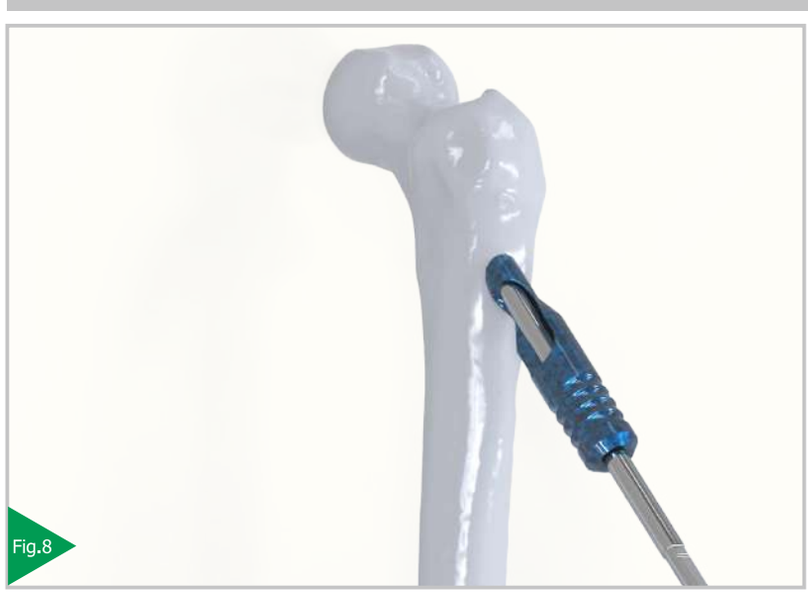


Fig.8

Instruments


Centering Guide Small


DHS / DCS Lag Screw Cannulated Tap


Threadless Guide Wire Ø 2x230 mm

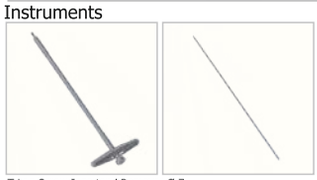
2.1.DHS

2.1.6. Lag Screw

For the lag screw, slide the Lag screw installer over the K-Wire and insert the long centering guide into the hole drilled in the previous step.(Fig.9)
Insert the DHS / DCS screw (110 mm in this example) until the zero mark reaches the lateral cortex. If the bone is osteoporotic, continue inserting the screw for another 5 mm.
The handle of the DHS / DCS should remain parallel to the femoral axis..

Fig.9

Instruments



T Lag Screw Inserter / Remover Ø 7

Do not use the DHS / DCS switch to reduce the fracture as this only provides limited force transmission.

2.1.7. Position / Placement of DHS Plate

Insert plate into bone with DHS / DCS Impactor.
Set the electric drill to reverse operation and remove the guide wire to remove the Krishner wire (Fig.10).

Using the DHS / DCS Impactor, tap the DHS plate into the pre-drilled channel with a hammer.(Fig.11).
(Additt. 6.1.1, P.21)

Fig.10

Fig.11

Instruments

DHS/DCS Impactor Small

Surgical Motorl

2.1.DHS

2.1.8. Cortical Screw

Insert the Ø 4.5 double-head drill guide into the neutral zone of the screw holes designed for cortical screws. Drill conveniently with a Ø 4.5 drill bit (Fig.12). Measure the length of the screw to be used with the depth guide (Fig.13). Fix the plate with the screw to be used with a Ø 4.5 screwdriver. (Fig.14).

Instruments

Double Drill Guide Ø 3,2 / 4,5 mm


Depth Guide


Screwdriver 4.5 mm

2.1.9. Cancellous Screw

Insert the Ø 6.5 drill guide into the hole designed for cancellous screw. Drill with a Ø 4.5 drill bit (Fig.15). Measure the length of the screw to be used with the depth guide (Fig.16). Fix the plate with the screw to be used with a Ø 4.5 screwdriver. (Fig.17).

Instruments


Double Drill Guide Ø 3,2 / 6,5 mm


Depth Guide


Screwdriver 4.5 mm

2.1.DHS

2.1.10.Locking Screw

Instruments

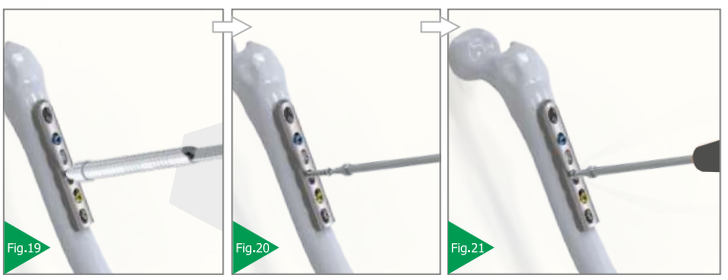
Drill Guide (S)-(M)-(L)

Screwdriver 4.5 mm

Depth Guide

Torque Limiting Screwdriver

Install the Ø 4.5 drill tap into the threaded section of the combined holes designed for the Ø 5.0 mm locking screw. Drill properly with a Ø 4.5 drill bit. (Fig.18)Measure the length of the screw to be used with the depth guide (Fig.19) Fix the screw to be used with a Ø 4.5 screwdriver. (Fig.20) At the last stage, use a Ø 4.5 torque screwdriver to lock the screw on the plate. (Fig.21)



2.1.11. Compression Screw

A DHS / DCS compression screw can be installed for compression of the trochanteric fracture. Install the DHS / DCS compression screw with a Ø 4.5 screwdriver (Fig.22).

Screwdriver 4.5 mm

2.2.DCS

2.2.1. Reduce fracture

The fracture should be temporarily fixed with Kirschner wire definitely with screws. (Fig.1) Important that, they must be placed in a way that does not interfere with the assembly of the DCS. The placement of the guidewire determines the placement of the implant assembly. Incorrect placement of the guide wire may result in varus / valgus or rotational misalignment of the fracture fragments. For proper positioning (Fig1-2) can be examined.

Fig.1

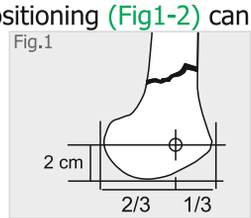
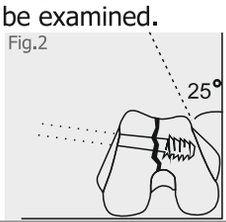


Fig.2



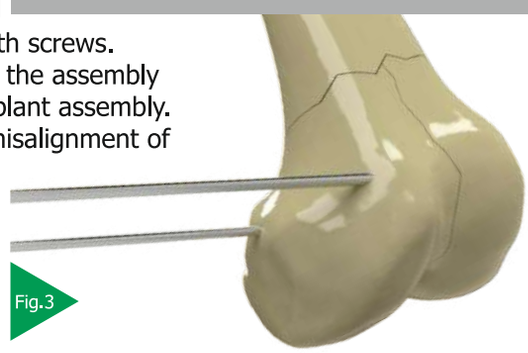
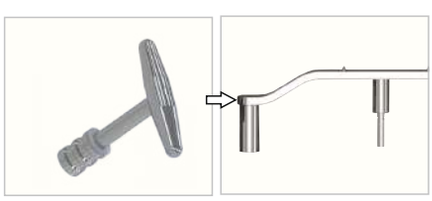


Fig.3

2.2.2. Placement with Angle Guide

Place the Angle Guide at 95 ° to the femoral bone. Using Ø 2x230 Krishner wire, pierce the outer cortex (Fig.4)



Angle Guide 95°

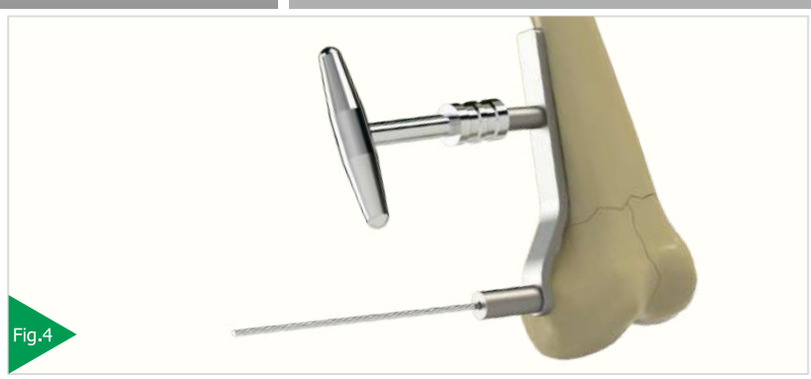
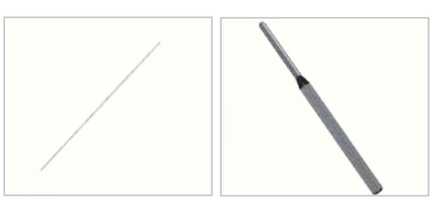


Fig.4

2.2.3. Determine the depth

Determine the length of the Lag screw to be used using the depth scale. To do this, slide the gauge over the Krishner wire and measure the length of the guide wire in the bone.(Fig.5)



Lag Screw Length Gauge

Fig.5

2.2.4. Reaming

Start drilling by placing the adjustable reamer above the Kirschner wire. (Fig.6)

Instruments

Adjustable Player Screw for DHS / DCS

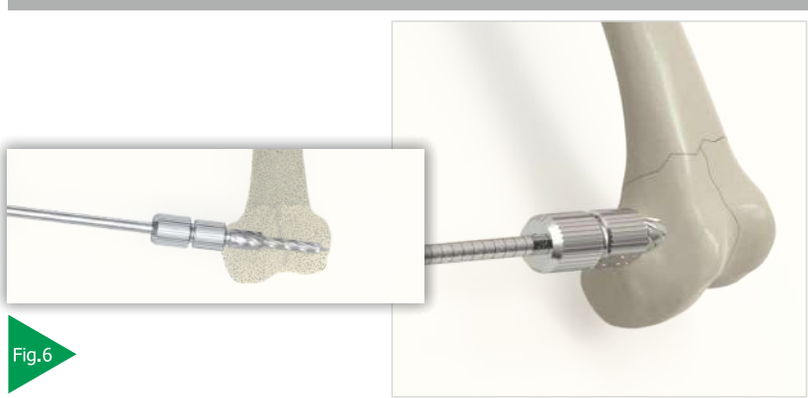


Fig.6

2.2.DCS

2.2.5. Tap(Optional)

In case of hard bone, use DHS / DCS tap and guide. Place the centering guide in the hole. Continue to the selected depth (by following the window of the guide) until reaching the lateral cortex and complete the tapping.(Fig.7).

Centering Guide Small

DHS / DCS Lag Screw Cannulated Tap

Threadless Guide Wire Ø 2x230 mm

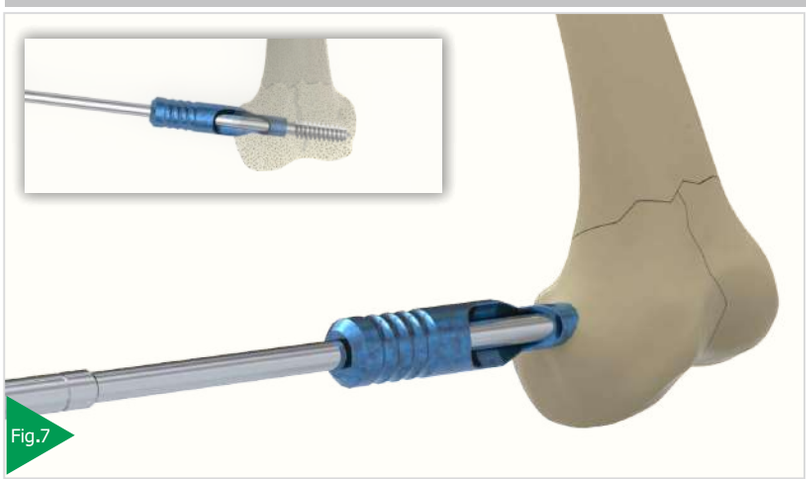


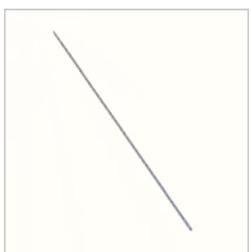
Fig.7

2.2.6. Lag Screw

For the lag screw, slide the lag screw installer over the Kirschner Wire and insert the long centering guide into the hole drilled in the previous step.(Fig.8)

Instruments

T Lag Screw Inserter / Remover Ø 7



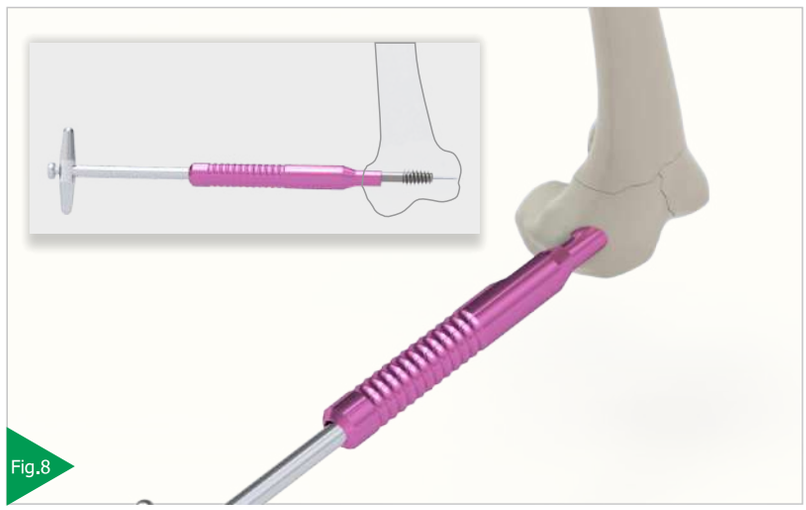


Fig.8

2.2.7. Plate Placement

Insert plate into bone with DHS / DCS Impactor
Set the electric drill to reverse operation to remove the Krishner wire. (Fig.9)
Using DHS / DCS Impactor, tap the DCS plate against the pre-drilled channel. Set the plate with light hammer strokes on the impactor.(Fig.10)
(Additt. 6.1.2, P.21)

Instruments

Surgical Motorl

DHS/DCS Impactor Small

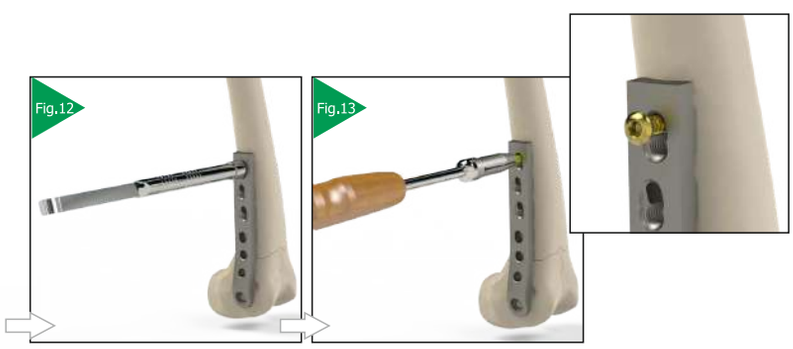
Fig.9

Fig.10

2.2.DCS

2.2.8. Cortical Screw-Half Send

Insert into the dynamic compression zone of joint holes designed for Ø 4.5 double-sided drill guide cortical screws. Drill conveniently with a Ø 4.5 drill bit (Fig.11). Measure the length of the screw to be used with the depth guide (Fig.12) . Send the cortical screw to be used with a Ø 4.5 screwdriver (Not Fully) (Fig. 13).



Instruments

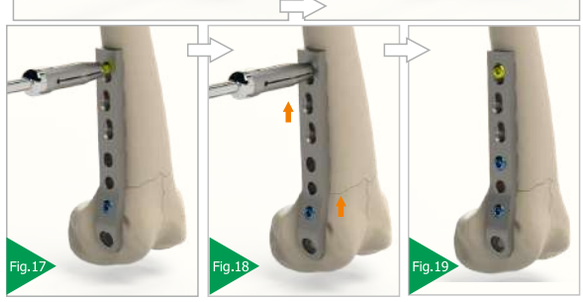
Double Drill Guide


Depth Guide


Screwdriver 4.5 mm

2.2.9. Cancellous Screw and Completing the compression

Insert the Ø 6.5 drill guide into the holes designed for cancellous screws. Drill with a Ø 4.5 drill bit (Fig. 14). Measure the screw length to be applied with the depth guide (Fig.15). Send the cancellous screw to be used on the plate with a Ø 4.5 screwdriver (Fig.16). Tighten the cortical screw half sent in the (2.2.9) stage, this way compression is completed(Fig.17-18).send the proximal screw according to your need(Fig.19).



2.2.DCS

2.2.10.Locking Screw

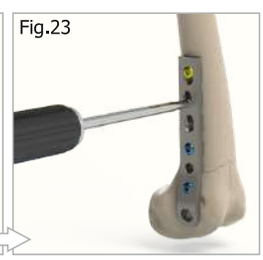
Fig.20

Insert the Ø 4.5 drill guide into the threaded section of the combined holes designed for the Ø 5.0 mm locking screw (Fig.20). Drill with a Ø 4.5 drill bit. Measure the length of the screw to be used with the depth guide (Fig.21). Fix the screw to be used with a Ø 4.5 screwdriver to the plate (Fig.22). At the end of the step, use a Ø 4.5 torque screwdriver to lock the screw on the plate (Fig.23).

Fig.21

Fig.22

Fig.23



Instruments

Drill Guide (S)-(M)-(L)

Depth Guide

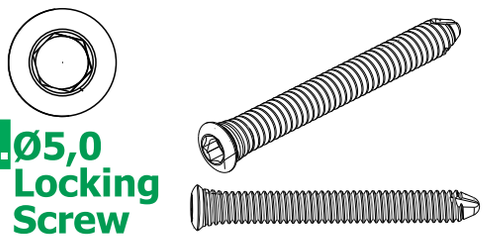
Screwdriver 4.5 mm

Torque Limiting Screwdriver

2.2.11.Compression Screw

A DHS / DCS compression screw is attached to compress the fracture. Install the DHS / DCS clamping screw with Ø 4.5 Screwdriver.(Fig.24).

Fig.25



3.1. Ø5,0 Locking Screw

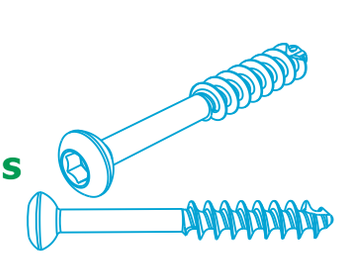
REF. NO	SIZE
2052-5012	12
2052-5014	14
2052-5016	16
2052-5018	18
2052-5020	20
2052-5022	22
2052-5024	24
2052-5026	26
2052-5028	28
2052-5030	30
2052-5032	32
2052-5034	34
2052-5036	36
2052-5038	38
2052-5040	40
2052-5042	42
2052-5044	44
2052-5046	46
2052-5048	48
2052-5050	50
2052-5052	52
2052-5054	54
2052-5055	55
2052-5056	56
2052-5058	58
2052-5060	60
2052-5065	65
2052-5070	70
2052-5075	75
2052-5080	80
2052-5085	85
2052-5090	90
2052-5095	95

3.2. Ø4,5 Cortical Screw

REF. NO	SIZE
2012-4512	4.5x12
2012-4514	4.5x14
2012-4516	4.5x16
2012-4518	4.5x18
2012-4520	4.5x20
2012-4522	4.5x22
2012-4524	4.5x24
2012-4526	4.5x26
2012-4528	4.5x28
2012-4530	4.5x30
2012-4532	4.5x32
2012-4534	4.5x34
2012-4536	4.5x36
2012-4538	4.5x38
2012-4540	4.5x40
2012-4542	4.5x42
2012-4544	4.5x44
2012-4546	4.5x46
2012-4548	4.5x48
2012-4550	4.5x50
2012-4552	4.5x52
2012-4554	4.5x54
2012-4556	4.5x56
2012-4558	4.5x58
2012-4560	4.5x60
2012-4565	4.5x65
2012-4570	4.5x70
2012-4575	4.5x75
2012-4580	4.5x80
2012-4585	4.5x85
2012-4590	4.5x90

3.3. Ø6,5 Cancellous Screw

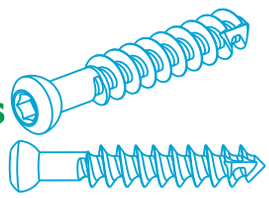
(16 mm Threaded)



REF. NO	SIZE
2402-0030	6.5x30
2402-0035	6.5x35
2402-0040	6.5x40
2402-0045	6.5x45
2402-0050	6.5x50
2402-0055	6.5x55
2402-0060	6.5x60
2402-0065	6.5x65
2402-0070	6.5x70
2402-0075	6.5x75
2402-0080	6.5x80
2402-0085	6.5x85
2402-0090	6.5x90
2402-0095	6.5x95
2402-0100	6.5x100
2402-0105	6.5x105
2402-0110	6.5x110
2402-0115	6.5x115
2402-0120	6.5x120

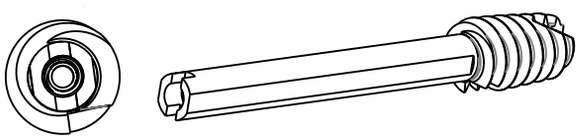
3.4. Ø6,5 Cancellous Screw

(32 mm Threaded)



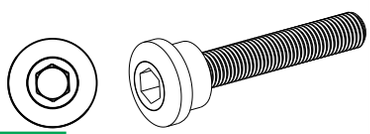
REF. NO	SIZE
2952-0030	6.5x30
2952-0035	6.5x35
2952-0040	6.5x40
2952-0045	6.5x45
2952-0050	6.5x50
2952-0055	6.5x55
2952-0060	6.5x60
2952-0065	6.5x65
2952-0070	6.5x70
2952-0075	6.5x75
2952-0080	6.5x80
2952-0085	6.5x85
2952-0090	6.5x90
2952-0095	6.5x95
2952-0100	6.5x100
2952-0105	6.5x105
2952-0110	6.5x110
2952-0115	6.5x115
2952-0120	6.5x120

3.5. DHS / DCS Lag Screw



REF. NO	SIZE
1062-0050	50
1062-0055	55
1062-0060	60
1062-0065	65
1062-0070	70
1062-0075	75
1062-0080	80
1062-0085	85

REF. NO	SIZE
1062-0090	90
1062-0095	95
1062-0100	100
1062-0105	105
1062-0110	110
1062-0115	115
1062-0120	120

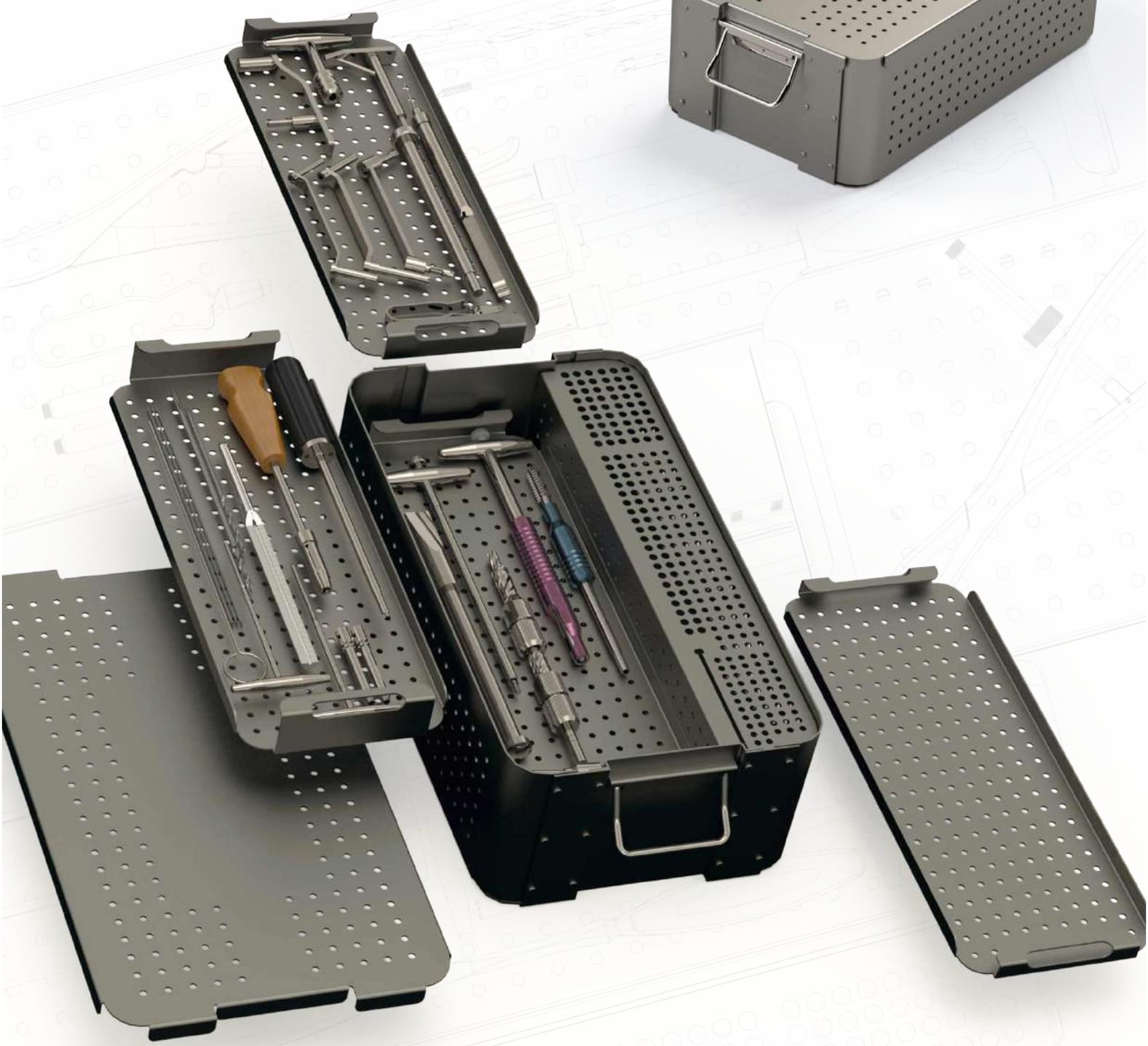


3.6. DHS/DCS Lag Compression Screw

REF. NO
1072-0000

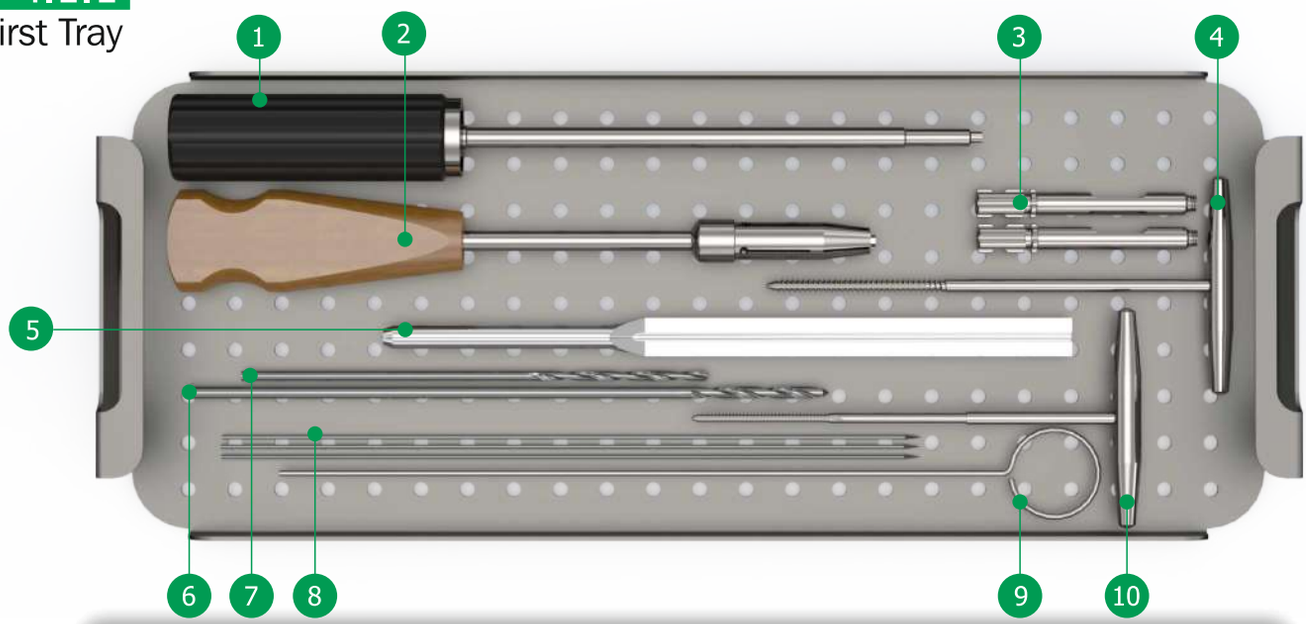
zimed®

4.1. DHS/DCS Plate Instrument Set



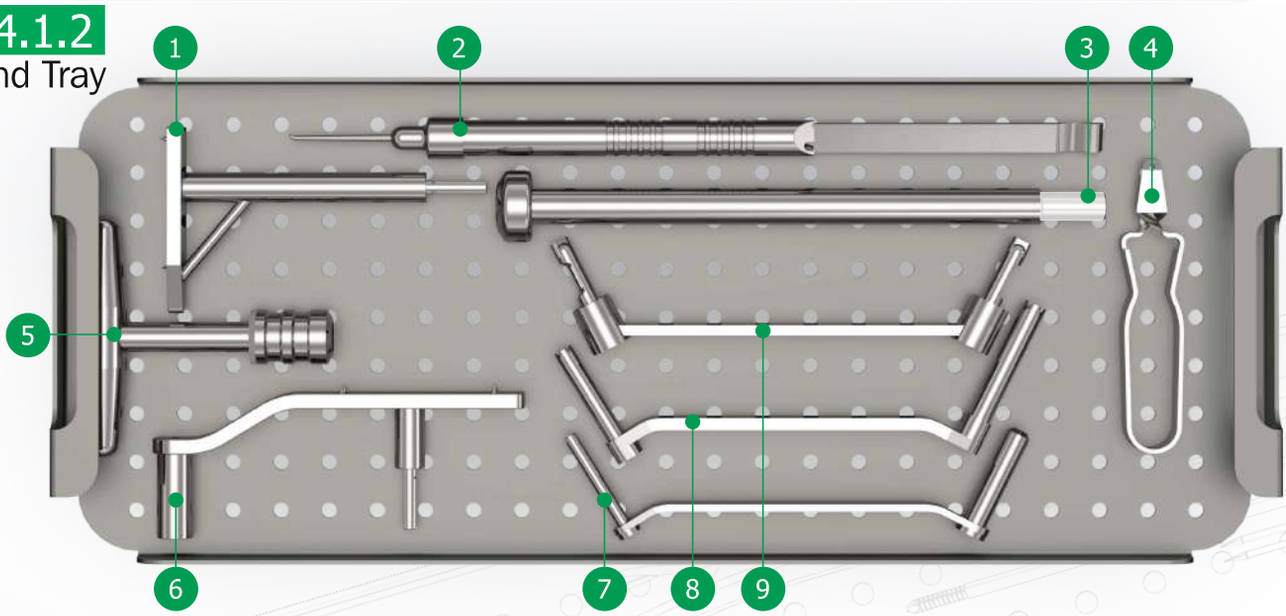
ISO 9001:2015
ISO 13485:2016
CE 1984

4.1.1 First Tray



1	9102-0013	Torque Limiting Screw Driver	6	9104-0020	Drill Ø 4,5 mm
2	9104-0013	Screwdriver 3.5 mm	7	9104-0019	Drill Ø 3,2 mm
3	9104-0030-31-32	Drill Guide (S)-(M)-(L)	8	9104-0029	Threadless Guide Wire Ø 2x230 mm
4	9104-0021	Tap Ø 4.5 mm (For Cortical Screw)	9	9104-0023	Duct Cleaning Wire Ø 2.5 mm
5	9104-0004	Lag Screw Length Gauge	10	9102-0023	Tap Ø 6.5 mm (for Cancellous Screw)

4.1.2 Second Tray



1	9104-0009	Angle Guide 135°	6	9104-0010	Angle Guide 95°
2	9104-0016	Depth Guide	7	9104-0012	Double Drill Guide Ø 3.2 / 6.5 mm
3	9104-0026	DHS/DCS Impactor Small	8	9102-0020	Double Drill Guide Ø 3.2 / 6.5 mm
4	9104-0025	Screw Forceps	9	9104-0011	Double Drill Guide Ø 3,2 / 4,5 mm
5	9104-0015	T Handle (for Tap and Drill)			

4.1.3
Third Tray

1	9104-0028	T Handle
2	9104-0014	DHS/DCS Impactor Large
3	9104-0040	Adjustable Player Screw for DHS / DCS
4	9104-0002	T Lag Screw Inserter / Remover Ø 7
5	9104-0001	T Lag Screwdriver Ø 11
6	9104-0003	DHS / DCS Lag Screw Cannulated Tap
7	9104-0007	Centering Guide Large
8	9104-0008	Centering Guide Small

zimed®
DHS/DCS Plate
Instrument Set

5.1. DEVICE CLEANING CONDITIONS

Do not use metal brushes or rubbing pads during Decontamination of the tools should be performed immediately after the surgical procedure is completed. Contaminated tools must not be allowed to dry before reprocessing.

Excessive blood or debris must be removed in order to prevent the drying on the surface. All users must be qualified staff with documented evidence of training and competence. Training should include the current guidelines, standards and hospital policies. Even if they are made of high-grade stainless steel, the surgical tools must be thoroughly dried in order to prevent rust formation. Prior to sterilization, all the tools should be examined for the cleanliness of the lumens of the joints of the surfaces. manual cleaning process. Use cleaning agents with low-foam surfactant to be able to see the tools in the cleaning solution. Rinse the cleaning materials easily from the tool in order to prevent residue formation.

Mineral oil or silicon lubricants should not be used on Zimed tools. Neutral pH enzymatic and cleaning materials are recommended for cleaning the reusable instruments. It is very important to neutralize and rinse the alkaline cleaning materials thoroughly from the tools. Anodized aluminum should not contact with certain cleaning or disinfectant solutions. Avoid strong alkaline cleaners and disinfectants and solutions containing iodine, chlorine or certain metal salts.

5.1.1. Manual Cleaning/Disinfection:

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces.

Keep in the fluid for minimum 20 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. In order to remove the dirt in the open springs, coils or flexible parts, wash the recesses with plenty of cleaning solution. Rub the surface with a scrubbing brush to remove all the visible dirt from the surface and the recesses. To ensure that all the recesses are cleaned, turn the component while rubbing. Remove the tools and rinse them for minimum 3 min. under running water. Pay particular attention to the cannulas and use a syringe to pass the fluid through the hard-to-reach areas. Place all the tools that are completely immersed in water, in an ultrasonic unit containing teh cleaning solution. Operate all the movable parts so that the detergent contacts with all the surfaces. Expose the tools to sonification process for minimum 10 min..

Remove the tools and rinse with deionized water for at least 3 minutes or unless all the blood or dirt traces are eliminated in the rinsing water. Examine the tools under normal light to verify that visible dirt is removed. If visible dirt is present, repeat the above mentioned sonification procedure and the rinsing steps. Remove the excessive moisture on the tool with a clean, absorbent, lint-free cloth.

5.1.2. Combination Manual / Automated Cleaning and Disinfection:

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces. Keep in the fluid for minimum 10 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. A sonicator will help to clean the instruments thoroughly. The use of a syringe or a water fountain will facilitate passing of the liquid from the low-spaced areas and difficult-to-access areas. Remove the tools from the enzyme solution and rinse them for minimum 1 min. under deionized water. Place the tools in a suitable washer / disinfector basket and perform a standard washer / disinfector cycle. Specific minimum parameters are essential for a complete cleaning and disinfection. These parameters are given in a below mentioned table.

5.1.3. Combination Manual / Automated Cleaning and Disinfection:

Automated washing / drying systems are not recommended as the only cleaning method for surgical tools. An automated system can be used as a follow-up operation after manual cleaning. To ensure an effective cleaning, tools must be thoroughly examined before sterilization. For detailed information on Washing and Disinfection see

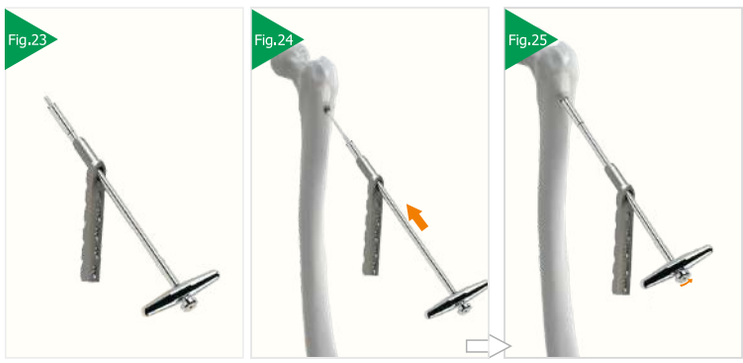
Specific minimum parameters used for a complete cleaning and disinfection:

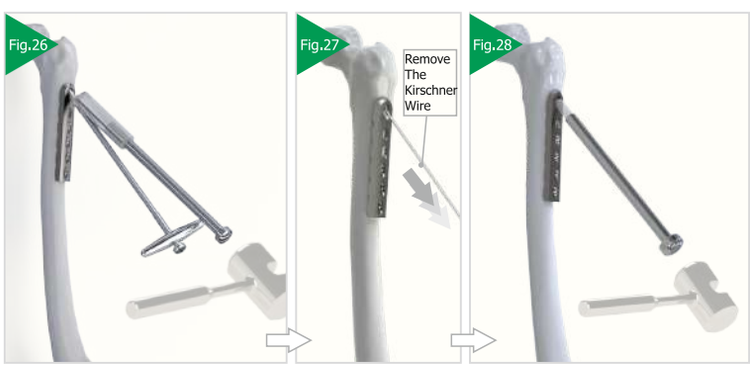
	Definition
1	Pre-washing for 2 minutes with cold tap water
2	enzyme sprey for 20 seconds with hot tap water
3	Immersion in enzyme after 1 minute
4	rinsing for 15 seconds with cold tap water (Should be repeated twice)
5	Washing with detergent for 2 minutes with hot tap water
6	rinsing for 15 seconds with hot tap water
7	Rinsing with 10 seconds with optional lubricated purified water
8	Drying for 7 minutes with hot air

Note: Follow the isntruction of the washer/disinfector manufacturer

6.1.1. DHS Plate

Attach the plate to the (DHS-DCS Lag installer-extractor) tool (Fig.23).
Pass the (DHS-DCS Lag installer-extractor) over the Kirschner wire (Fig.24).
Lock with screw of lag(Fig.25).
Use the impactor to hammer the plate into place (Fig.26).
remove the (DHS-DCS Lag installer-extractor) after the process is complete
(You can remove the threaded Kirschner wire at this stage.) Set the drill in reverse position and remove the Kirschner (Fig.27).
If required, you can insert it a little more with the straight impactor (Fig.28).





6.1.2. DCS Plate

Attach the plate to the (DHS Lag installer-extractor) tool (Fig.27).
Pass the (DHS-DCS Lag installer-extractor) over the Kirschner wire (Fig.28).
Lock with screw of lag(Fig.25).
Use the impactor to hammer the plate into place (Fig.30).
remove the (DHS-DCS Lag installer-extractor) after the process is complete
(You can remove the threaded Kirschner wire at this stage.) Set the drill in reverse position and remove the Kirschner (Fig.31).
If required, you can insert it a little more with the straight impactor (Fig.32).

Zimed Medical, as the manufacturer of this device, and their surgical consultants do not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the device in each individual patient. Zimed and their surgical consultants are not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.

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ISO 9001
ISO 13485 CE 1984

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