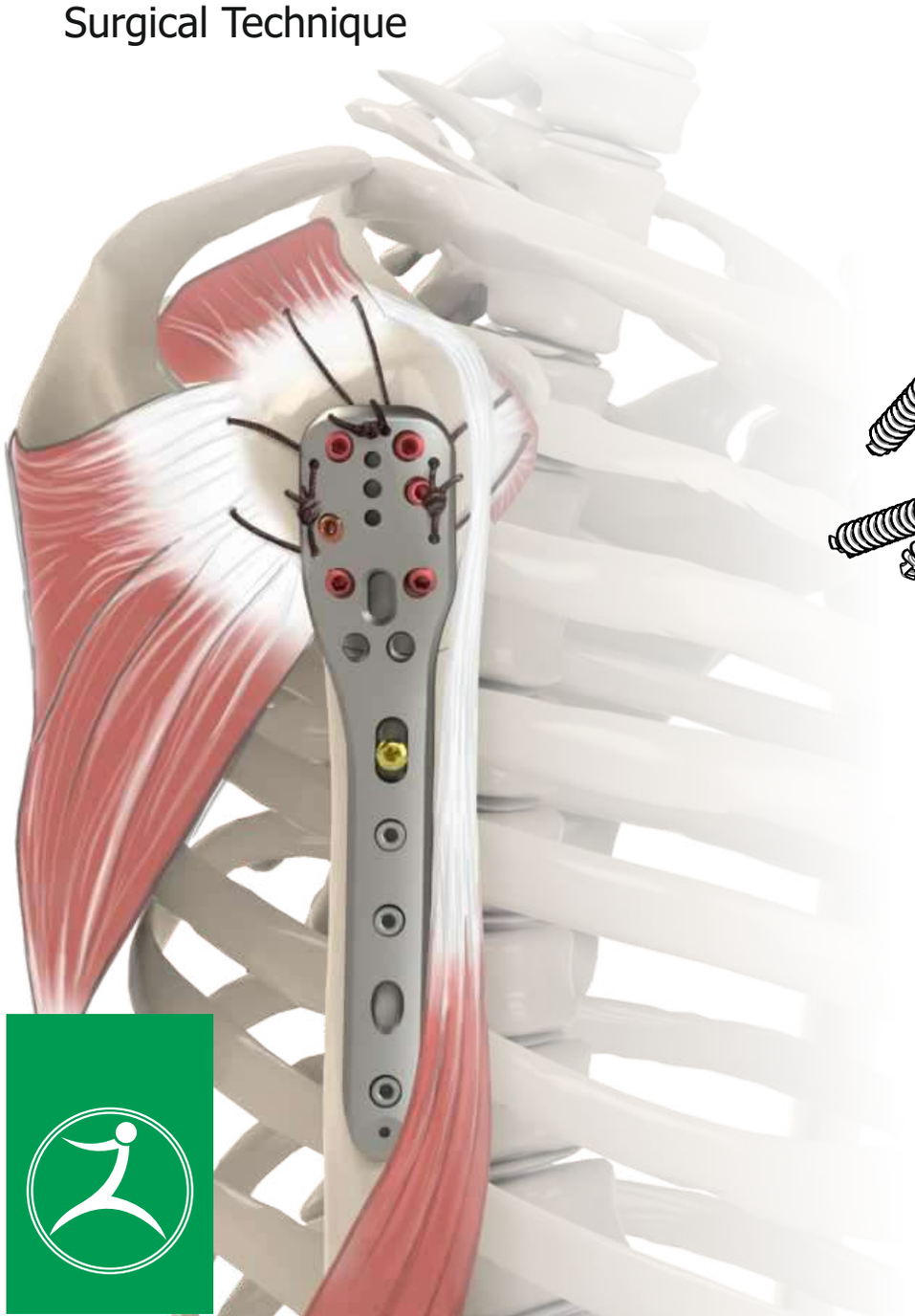
zimed®

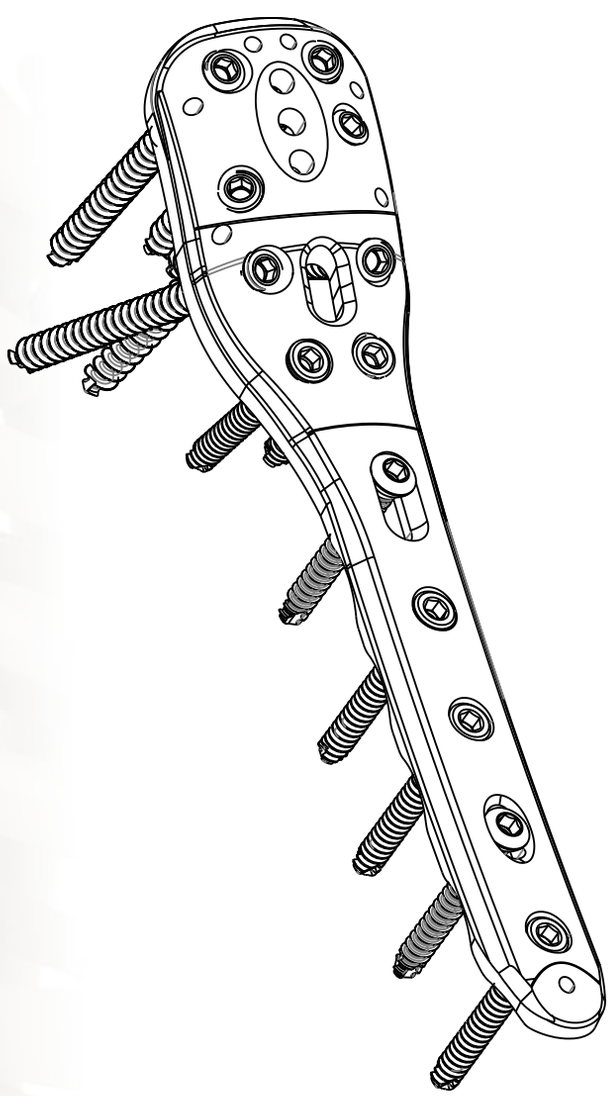
Locking

PLHP

PROXIMAL LATERAL HUMERAL PLATE

Surgical Technique





Locking

PHLP

PROXIMAL LATERAL HUMERAL PLATE

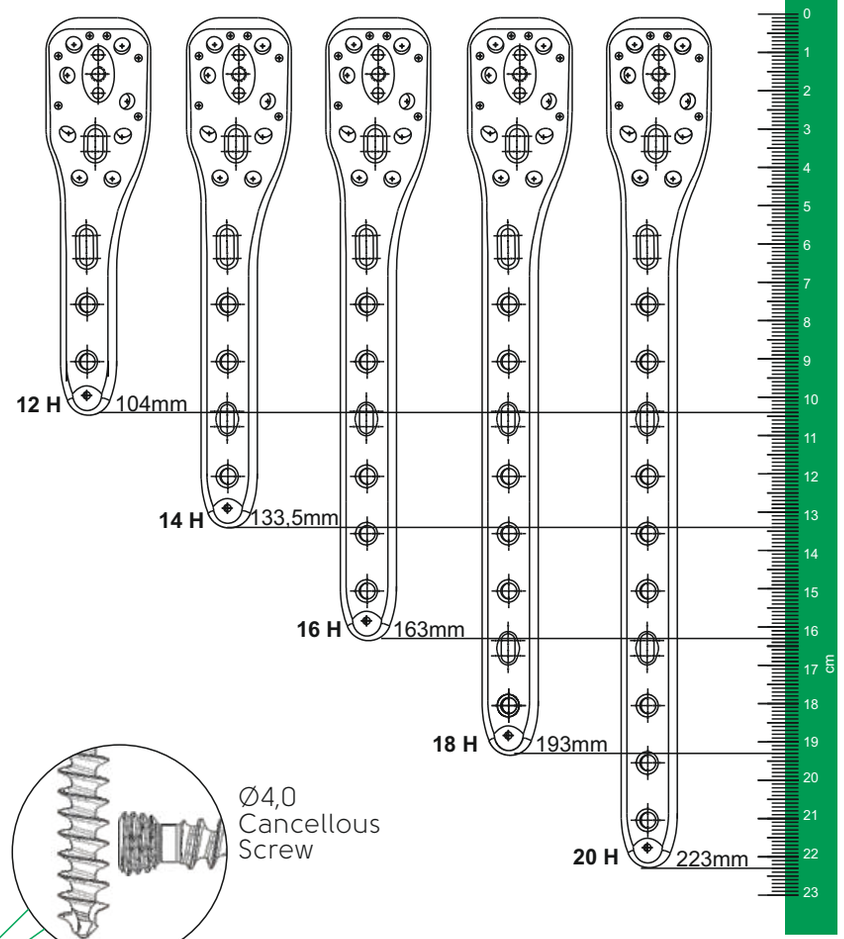
Contents

zimed®

ISO 9001:2015
ISO 13485:2016
CE 1984

Locking Proximal
1.1 Lateral Humeral Plate (PLHP)
1.1.1.Specifications

PLHP is indicated for the surgical treatment of fractures and nonunions of the proximal humerus Manufactured from ISO 5832-3 Ti6Al4V ELI (ASTM F 136). 12, 14, 16, 18, 20 holes, 104, 133.5, 163, 193.5, 222.5 mm length options are available. Used with Ø3,5 locking screw, Ø3,5 cortical screw, Ø3,5 locking cannulated screw, Ø4,0 cancellous screw, Ø4,0 locking cannulated cancellous screw.

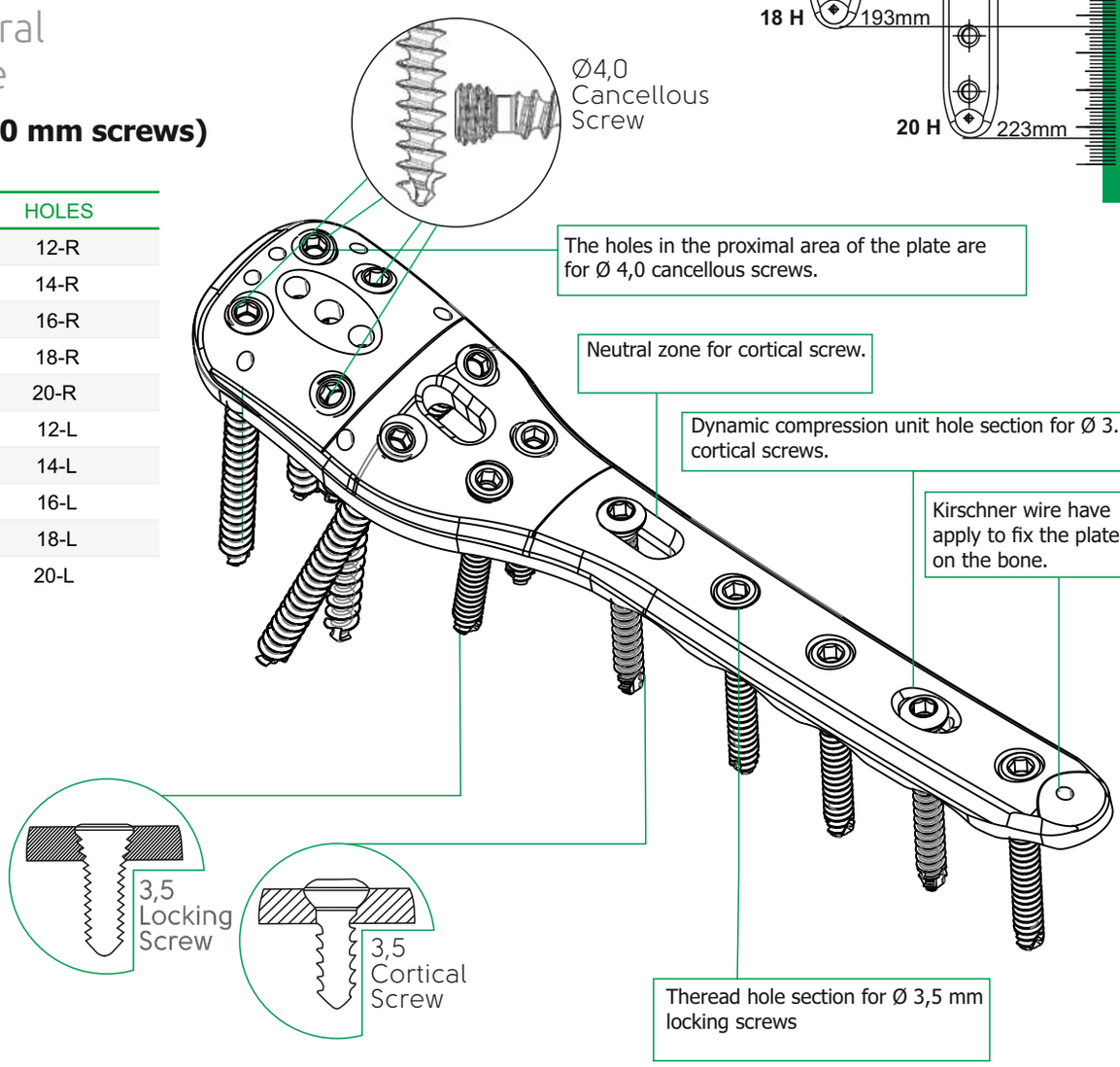


zimed®

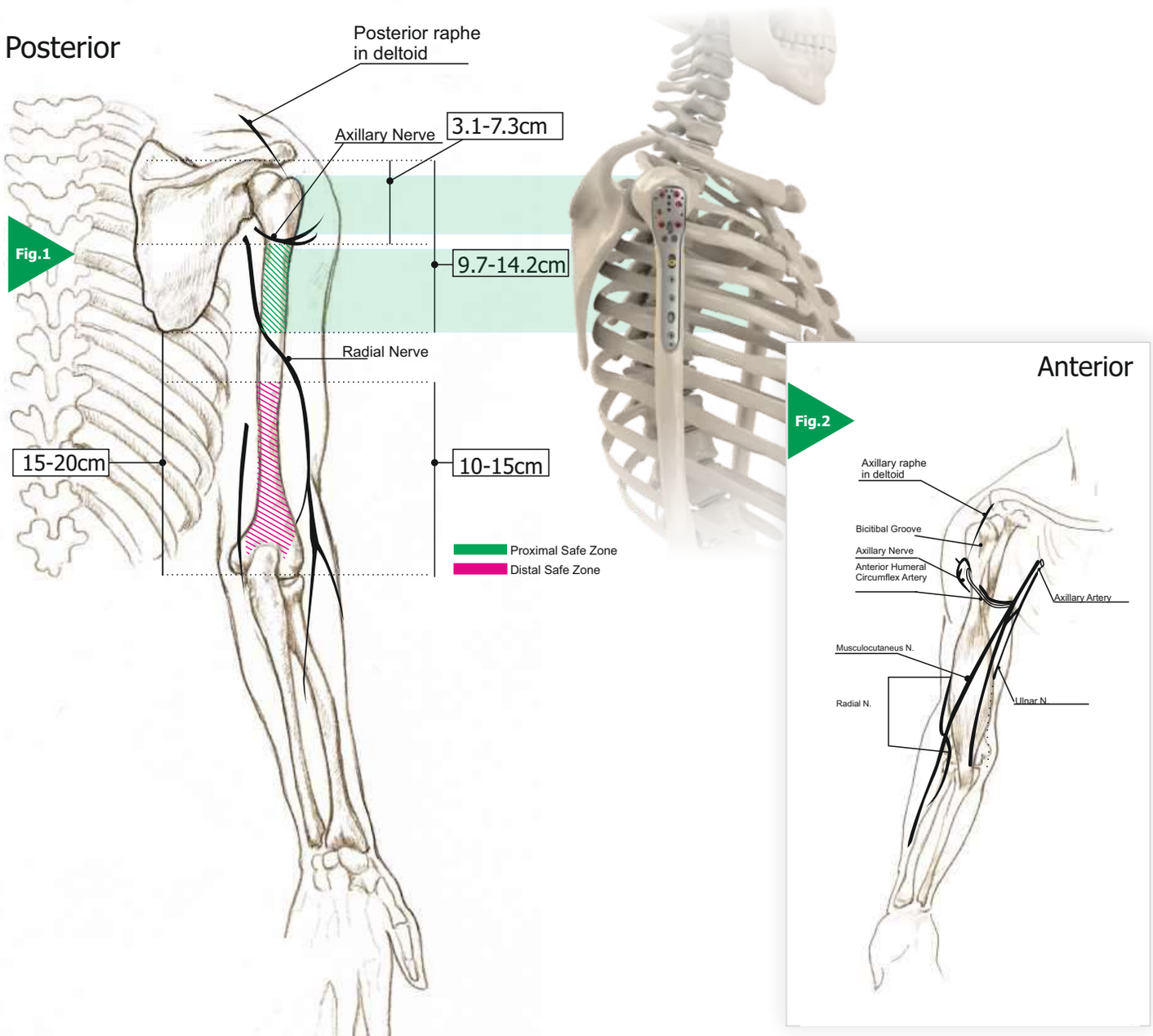
Locking
Proximal Lateral
Humeral Plate

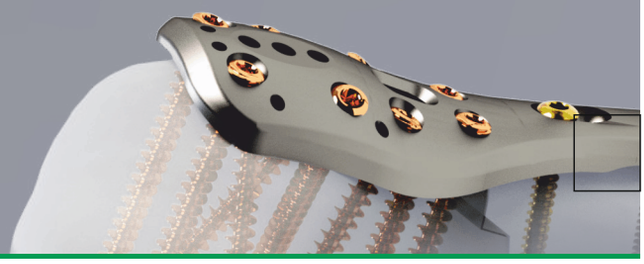
(with Ø 3,5 / Ø 4,0 mm screws)

REF. NO	HOLES
1832-1012	12-R
1832-1014	14-R
1832-1016	16-R
1832-1018	18-R
1832-1020	20-R
1832-2012	12-L
1832-2014	14-L
1832-2016	16-L
1832-2018	18-L
1832-2020	20-L

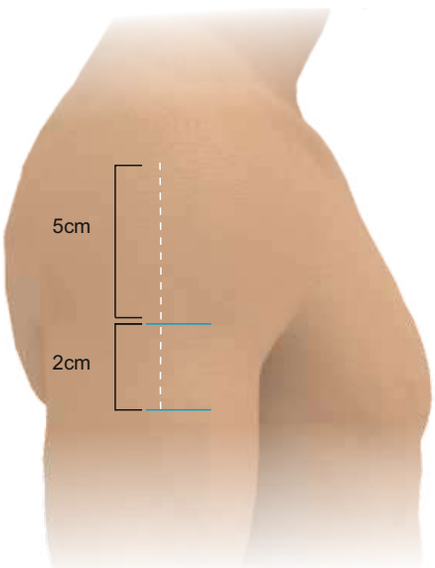


2.1 Safe Area for Humerus

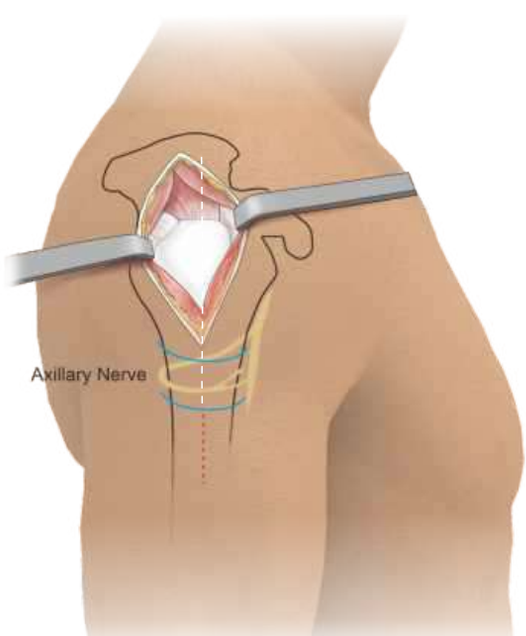




2.2 Deltoid Splitting Approach



Deltoid Splitting Approach is the division of the deltoid into two parts by protecting the axillary nerve with a lateral longitudinal incision that starts at the acromion type. It can be made with one or two incision.



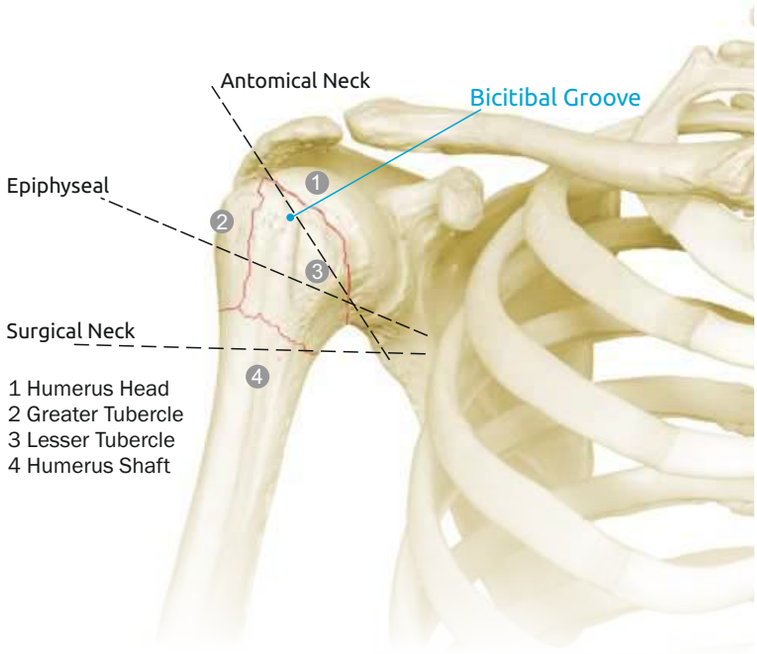
Define the axilliary nerve and protect. Before starting the incision, mark 5 cm distal to the acromion and 1 cm above the axillary nerve. If a plate is to be passed under the axillary nerve, make a 2 cm marking.

2.3 Humerus Fracture

2.3.1 Proximal Humerus Fracture

Proximal humeral fractures are a common type of fracture. Displaced fractures are occurred 2 piece-3 piece , four piece. They are divided into subheadings.

Those fracture are treated with several technique. Plate system is preferred generally. Locking humeral plate is a effective system on 3 fragmented fractures. Low profile, angled screw, suitable design of proximal humerus anatomy, take advantages



2.3.1.1 Two Part

2.3.1.1.1Surgical Neck

This fracture is showing us humerus shaft rotated in any direction. it is an unstable fracture type. The shaft is displaced anteromedially by the pectoralis major muscle.Vascular injury must be taken into attention in significantly prolapse to medial shaft fragment *(Fig.1)*. Periost damage may be seen. (CRIF) Close reduction is conceivable. But soft tissue , periosteum, biceps tendon condition considered, if plate system preferred is take more advantage.

2.3.1.1.2 Greater Tuberosity

This fracture can be seen anterior shoulder dislocation process.In some cases, plate is a safe option for large fragment fractures and if the patient has osteoporosis.*(Fig.2)*

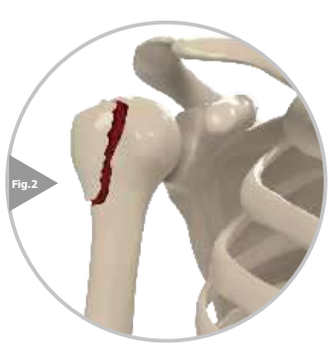
2.3.1.1.3 Lesser Tuberosity

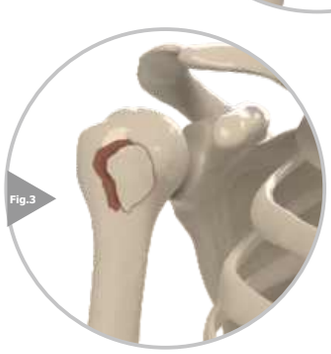
This fracture can be seen at epileptic seizures and at the same time posterior shoulder discolation process *(Fig.3)*

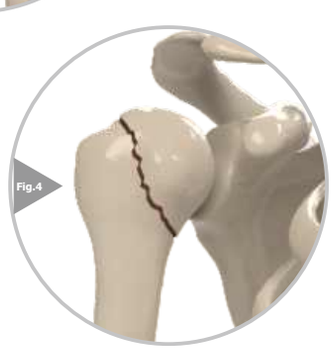
2.3.1.1.4 Anatomical Neck

It is a rare type of fracture and PLHP can be used in young patients if there is displacement. *(Fig.4)*

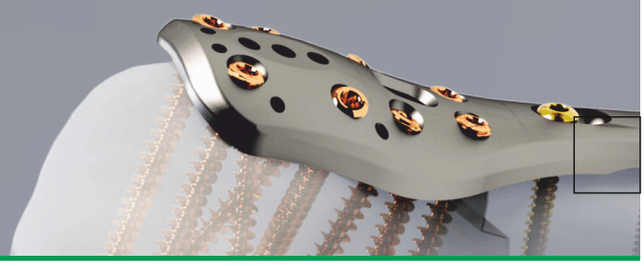
Extraarticular Two Part







a3



2.3 Humerus Fracture

2.3.1 Proximal Humerus Fracture

2.3.1.2 Three Part Fractures

It can be seen more rarely then two part fracture.It is encountered on older patients which have got osteoporosis. As a result of displacemenent neural injury can be seen.*(Fig.5)*

due to muscle tension,on adjoining, healty tuberosity, those fractures show rotational displacement. Either Greater tubercle or lesser tubercle is displaced.

Plate system (ORIF)(open reduction) is preferred instead to(closed reduction)

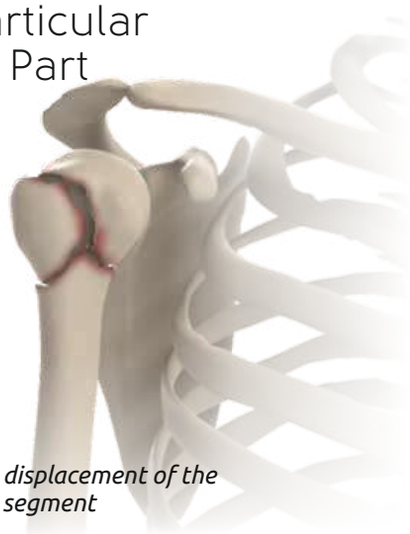
2.3.1.3 Four Part Fractures

Four part fragmented fracture group is characterized with displaced prominently and periost damage.This is quite unstable. Especially on te medial side damaged, in consequence of periosteal cover, blow flow of humerus head is effected severly.*(Fig.6)*

In this fracture both of tuberosity is displaced. Secondary varus collapse can be occur, especially which has got osteoprotic older patient and varus squence was not reduction correctly.
PHLP system ,is prefered.
If It has been plate application before, prosthesis can be conceivable

Extraarticular
Three Part

Fig.5



b2
Rotational displacement of the epiphyseal segment

Articular 11 c Four Part

Fig.6

c3
Partial, dislocated, segmented metaphyseal, segmented joint

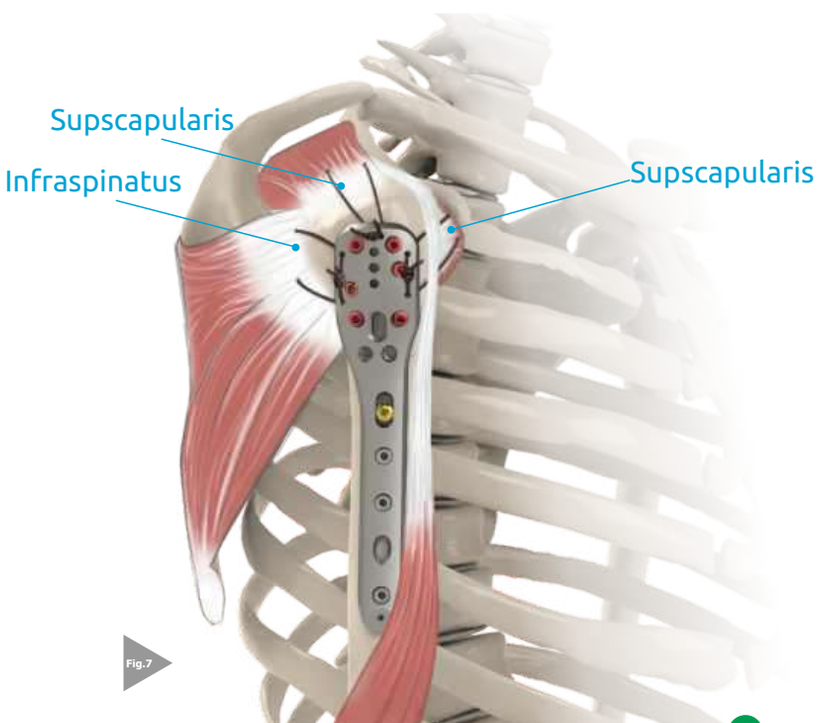
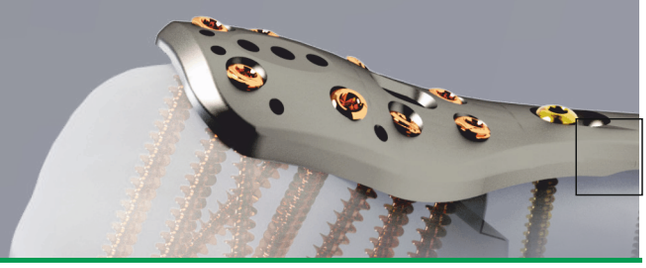


Fig.7

2.3.1.4 Suture Bands

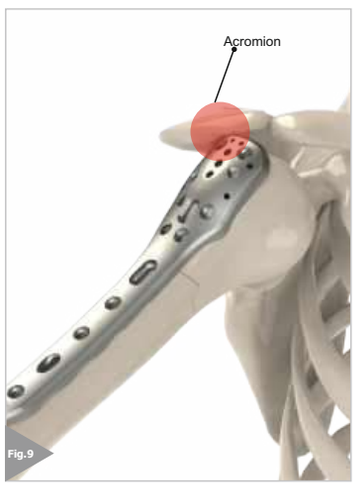
Tendon sutures provide additional stabilization. İt can be useful 3-4 fragmented fracture Sutures are placed to subscapularis, supraspinatus and infasspimatus tendons bony area
PHLP has got holes for the suture.
Sutures are attached to the plate against for muscle force and improve stabilization of plate *(Fig.7)*



2.4 Plate Placement

2.4.1 Position of the plate

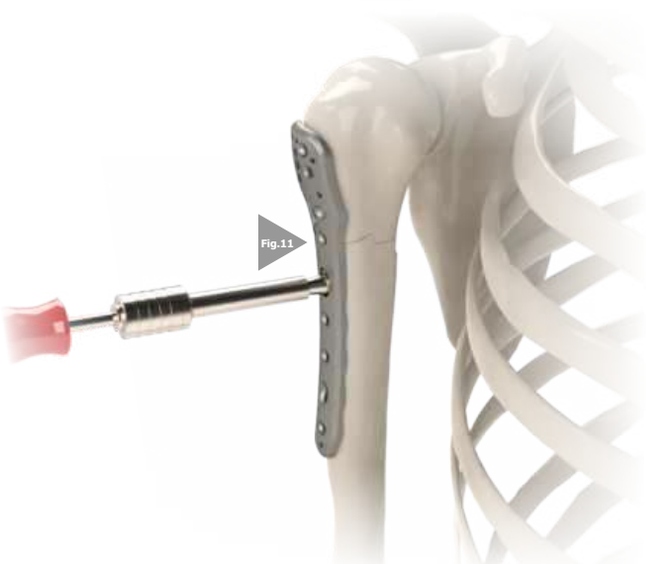
it has to placed 5-8 mm distal to Proximal side of the greater tubercle.It has to correctly align troughtout to humerus shaft. it is placed aligning approximately a few millimeters to the bicipital groove *(Fig.8)*.*(In this way stuation of plate to touch of acromion will disappear, due to motion humerus.)(Fig.9)*

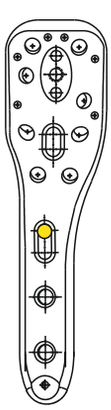


2.4.2 Reduction with plate and cortical screw

In this fracture type, reduction can be made with the help of plate. This technique effective, when fracture on valgus squence and displaced medially. A cortical screw is attached perpendicularly *(Fig.10)*.

Humeral shaft is pulled to plate, by tightening the cortical screw, In this way fracture is reducted *(Fig.11)*.





Cortical Screw

2.4 Plate Placement

2.4.3 Ø4.0 Locking cancellous scew

2.4.3.1 Drilling and determining screw lenght

Drilling is made for the locking cancellous screw on the proximal area of the plate. Use Ø2.5 drill bit. Determine screw lenght while drilling process. Follow the black line on the drill bit and read numbers on the drill guide. *(Fig.12)*


Fig.12

2.4.3.2 Screw

Which is determined screw lenght, send the Locking cancellous screw with Ø3.5 screw driver. *(Fig.13)*


Fig.13

Which is determined lenght screw is send with using Ø3.5 screw driver. *(Fig.14)*

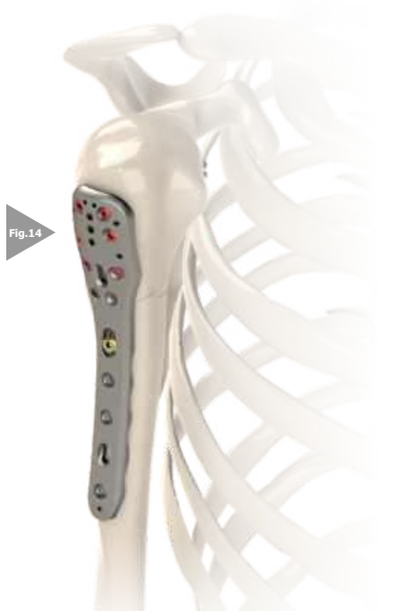
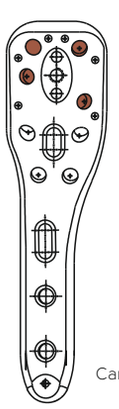


Fig.14


Cancellous Screw

2.4 Plate Placement

2.4.4 Ø3.5 Locking scew

2.4.4.1 Drilling and determining screw lenght

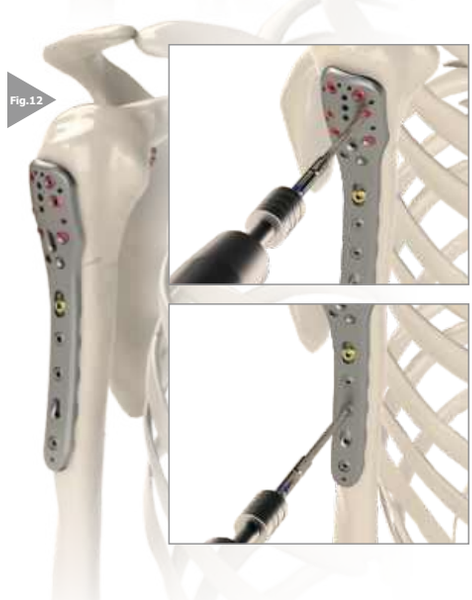
Plate is fixed in this way. But Locking screw have to be send for the complete stabilization to distal of the plate. drilling is made for Ø3.5 locking screw. At the same time screw lenght can be detemined. Number of screw is changing by the lenght of the plate and shape of the fracture *(Fig.14)*

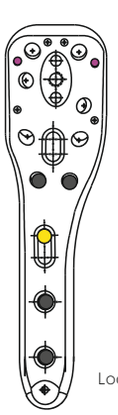
2.4.4.2 Screw

Send the screw with Ø3.5 screwdriver *(Fig.15)*

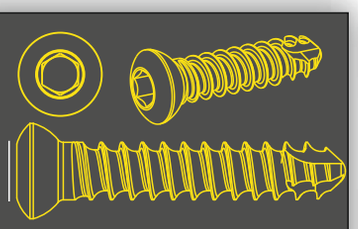
2.4.4.3 Torque and finish

At the end of the sending, torque to the all locking screws with torque screw driver and finish *(Fig.16)*.



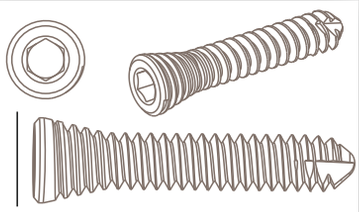


Locking Screw



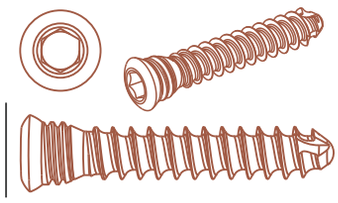
3,5 CORTICAL SCREW

Ref.No.	Size
2012-3512	3,5 X 12 MM
2012-3514	3,5 X 14 MM
2012-3516	3,5 X 16 MM
2012-3518	3,5 X 18 MM
2012-3520	3,5 X 20 MM
2012-3522	3,5 X 22 MM
2012-3524	3,5 X 24 MM
2012-3526	3,5 X 26 MM
2012-3528	3,5 X 28 MM
2012-3530	3,5 X 30 MM
2012-3532	3,5 X 32 MM
2012-3534	3,5 X 34 MM
2012-3536	3,5 X 36 MM
2012-3538	3,5 X 38 MM
2012-3540	3,5 X 40 MM
2012-3542	3,5 X 42 MM
2012-3544	3,5 X 44 MM
2012-3546	3,5 X 46 MM
2012-3548	3,5 X 48 MM
2012-3550	3,5 X 50 MM
2012-3552	3,5 X 52 MM
2012-3555	3,5 X 55 MM
2012-3560	3,5 X 60 MM
2012-3565	3,5 X 65 MM
2012-3570	3,5 X 70 MM
2012-3575	3,5 X 75 MM
2012-3580	3,5 X 80 MM
2012-3585	3,5 X 85 MM
2012-3590	3,5 X 90 MM
2012-3595	3,5 X 95 MM
2012-3100	3,5 X 100 MM
2012-3105	3,5 X 105 MM
2012-3110	3,5 X 110 MM
2012-3115	3,5 X 115 MM
2012-3120	3,5 X 120 MM



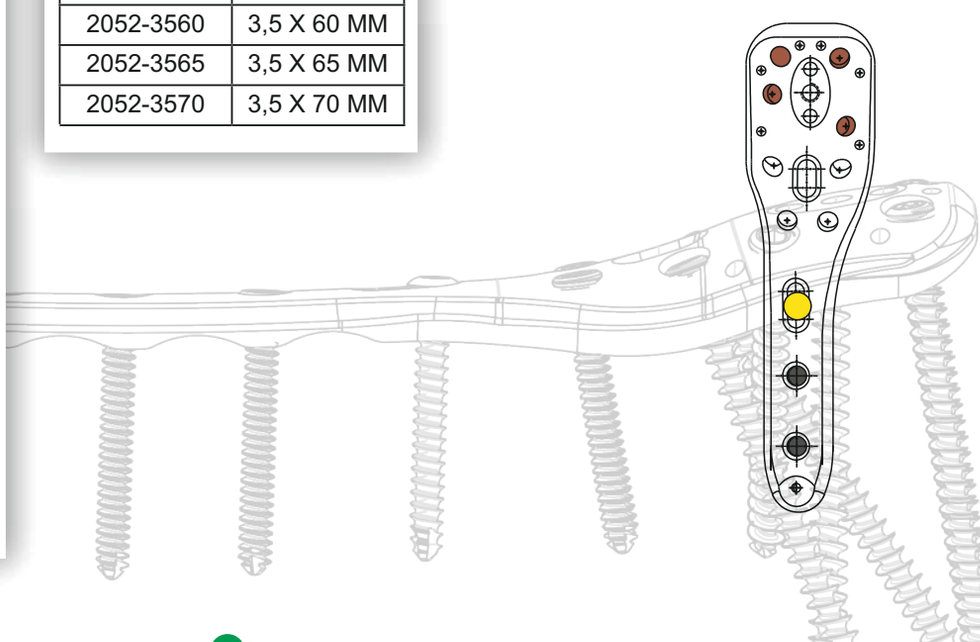
3,5 LOCKING SCREW

Ref.No.	Size
2052-3512	3,5 X 12 MM
2052-3514	3,5 X 14 MM
2052-3516	3,5 X 16 MM
2052-3518	3,5 X 18 MM
2052-3520	3,5 X 20 MM
2052-3522	3,5 X 22 MM
2052-3524	3,5 X 24 MM
2052-3526	3,5 X 26 MM
2052-3528	3,5 X 28 MM
2052-3530	3,5 X 30 MM
2052-3532	3,5 X 32 MM
2052-3534	3,5 X 34 MM
2052-3536	3,5 X 36 MM
2052-3538	3,5 X 38 MM
2052-3540	3,5 X 40 MM
2052-3542	3,5 X 42 MM
2052-3544	3,5 X 44 MM
2052-3546	3,5 X 46 MM
2052-3548	3,5 X 48 MM
2052-3550	3,5 X 50 MM
2052-3552	3,5 X 52 MM
2052-3555	3,5 X 55 MM
2052-3560	3,5 X 60 MM
2052-3565	3,5 X 65 MM
2052-3570	3,5 X 70 MM



Locking
4,0 CANCELLOUS SCREW

Ref.No.	Size
2152-4012	4,0 X 12 MM
2152-4014	4,0 X 14 MM
2152-4016	4,0X 16 MM
2152-4018	4,0 X 18 MM
2152-4020	4,0 X 20 MM
2152-4022	4,0 X 22 MM
2152-4024	4,0 X 24 MM
2152-4026	4,0 X 26 MM
2152-4028	4,0 X 28 MM
2152-4030	4,0 X 30 MM
2152-4032	4,0 X 32 MM
2152-4034	4,0 X 34 MM
2152-4036	4,0 X 36 MM
2152-4038	4,0 X 38 MM
2152-4040	4,0 X 40 MM
2152-4042	4,0 X 42 MM
2152-4044	4,0 X 44 MM
2152-4046	4,0 X 46 MM
2152-4048	4,0 X 48 MM
2152-4050	4,0 X 50 MM
2152-4052	4,0 X 52 MM



4.1 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.

4.1.1 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.

4.1.2 *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.

4.1.3 *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

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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Rev.02
17.05.2021