



## Modular Bipolar Head

Product Information  
Surgical Technique



Modular Alternative for Hemiarthroplasty Procedures

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## Design Rationale

### Introduction

The design of the Modular Bipolar System consists of two components – outer shell and insert – assembled intra-operatively and allows use of standard metal or ceramic heads. This offers surgeons an alternative for hemiarthroplasty procedures to meet individual patient's needs. Other benefits of the Modular Bipolar System are:

- Ease of assembly
- Self-aligning effect
- Maximum head security
- Accurate fit with sizes ranging from 38–60 mm
- Available for 22, 28 and 32 mm femoral heads

### Indications and Contraindications

Combined with the wide range of *Zimmer* femoral components and the surgeon's preferred technique the Modular Bipolar System is an efficient approach to femoral neck fractures and avascular necrosis.

The hemiarthroplasty is **contraindicated** when the acetabulum is diseased (coxarthrosis, hip dysplasia, infections and rheumatoid arthritis).

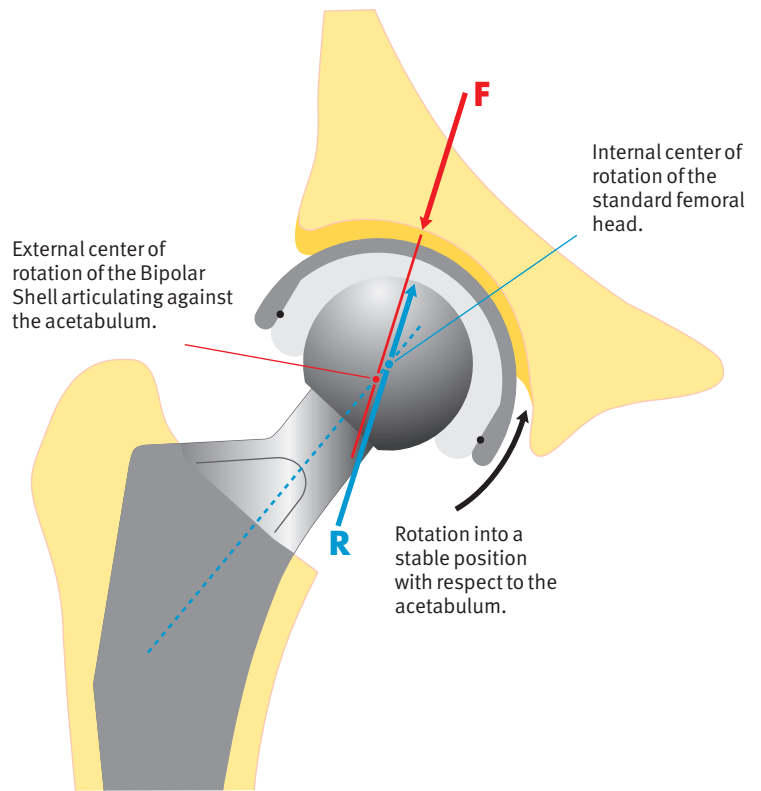
### Sizing

The Bipolar Components are available in a wide range of sizes from 38–60 mm in 2 mm increments. Available options include also 1 mm increment ranging from 42–54 mm. The standard femoral heads – 22 mm, 28 mm, 32 mm – are available in lengths from –4 mm to +8 mm to provide optimal recreation of the patient's anatomy.

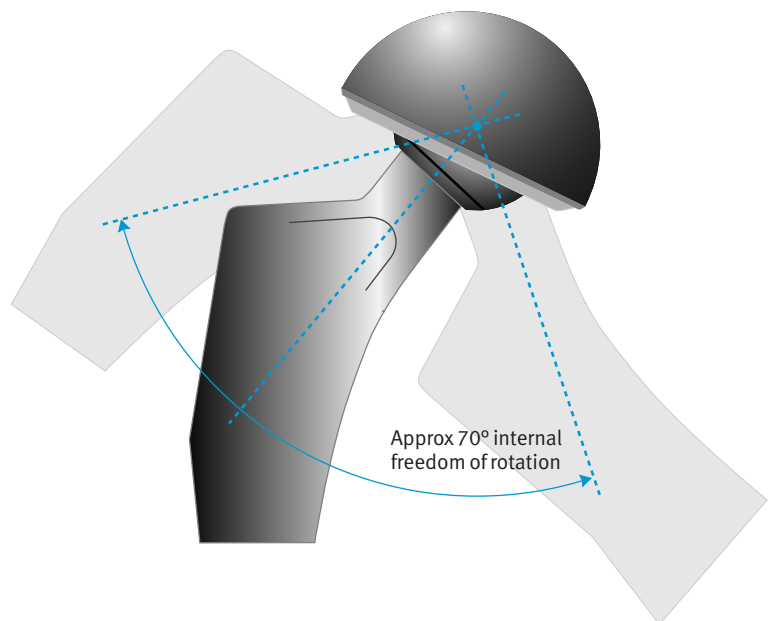


## Biomechanical Concept

The dynamic alignment of the Bipolar Head is based on a proximal displacement of the internal center of rotation (= center of the standard femoral head) and the external center of rotation of the Bipolar Shell (articulating against the acetabulum). Under the influence of body's weight (downward force  $F$ ) and the reactive force  $R$  (which occurs during standing or walking) the displaced centers align themselves while rotating the Bipolar Head to the proper anatomic and stable position.

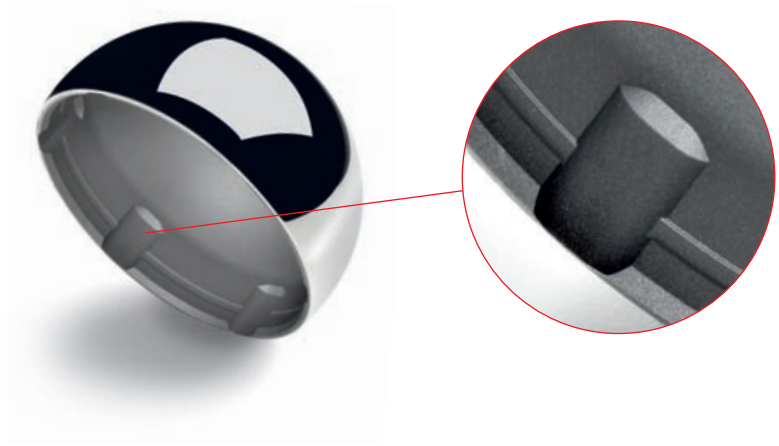


The Bipolar System ensures stability of the outer shell in the natural acetabulum while the stem has the ability to approx. 70 degrees internal freedom of rotation. In terms of wear, the Bipolar's dual articulation uses primary internal articulation in order to help reduce secondary articulation and associated acetabular wear or neck to liner impingement.

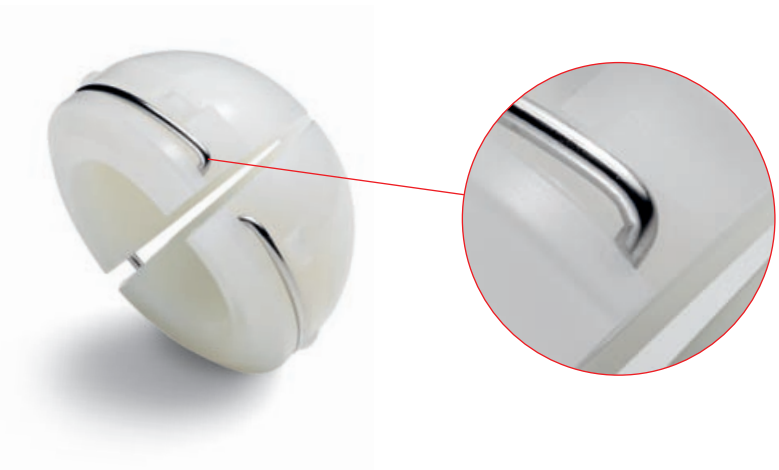


## Implants and Handling

The Bipolar Shell is made of *Protasul*<sup>®</sup>-S30, a reinforced forged alloy suitable for articulation against the natural acetabulum. A circumferential groove and six flutes inside the metal shell provide space for the fixation features of the polyethylene insert.



The insert is made of *Sulene*<sup>®</sup>-PE, a conventional polyethylene irradiation-sterilized under nitrogen. The design of the insert includes an axial slot and six knobs along the equator which enable both an easy and secure assembly without the help of instruments.



An innovative metal locking ring provides optimal capture of the standard femoral head when the assembly of the metal shell and the polyethylene insert is completed. The metal ring itself is mechanically anchored within the polyethylene.

## Surgical Technique

### Preoperative Planning

Templates are used to determine proper implant fit and most appropriate size. For patients with fractures it is highly recommended to use the unaffected side, as the femoral head may be displaced. If the Bipolar Head is used in a revision case, the cup should match the diameter of the remaining acetabulum.

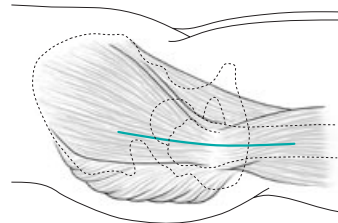


Planning template Bipolar 1.15:1, REF 94.00.80

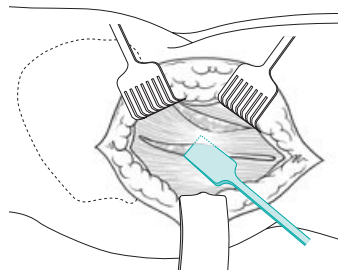
The following surgical technique will distinguish between the lateral approach and the posterolateral approach. The numbers followed by the letter “a” refer to the lateral approach, the ones with the letter “b” to the posterolateral approach. The numbers without letters are explanations applicable to both lateral and posterolateral approaches.

### Lateral Approach

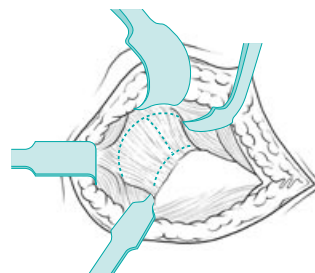
**1a** Vertical lateral incision over the greater trochanter.



**2a** Transgluteal approach, subperiosteal detachment of the ventral part of vastus lateralis, gluteus medius and gluteus minimus with a sharp chisel.

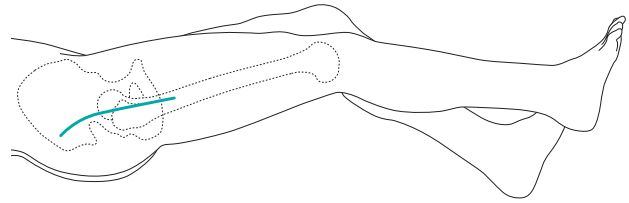


**3a** Incise the hip joint capsule in a H shape and suture after reduction. This is the best way to prevent dislocation.

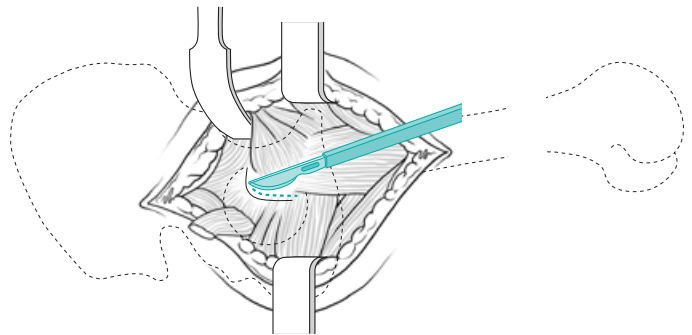


## Posterolateral Approach

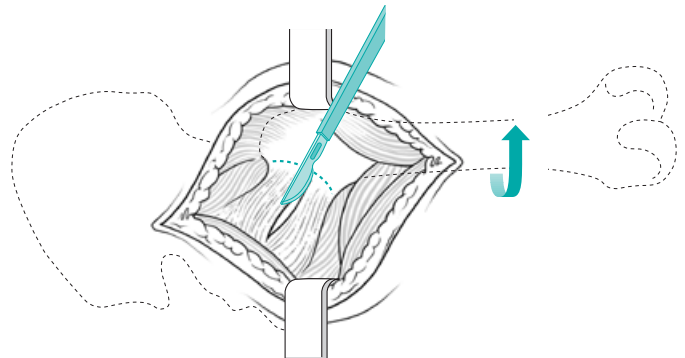
**1b** Patient in lateral position. The skin incision is 3 cm dorsal to the trochanteric crest running in the line of fibers of the gluteus medius and the fascia lata.



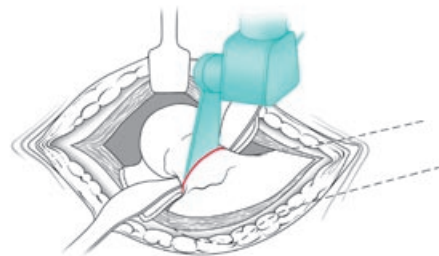
**2b** Divide the short external rotators, including piriformis, in their tendinous part at their insertion into the greater trochanter. Slight internal rotation of the limb assists exposure.



**3b** Incise the hip joint capsule in a T shape and suture after reduction. This is the best way to prevent dislocation.

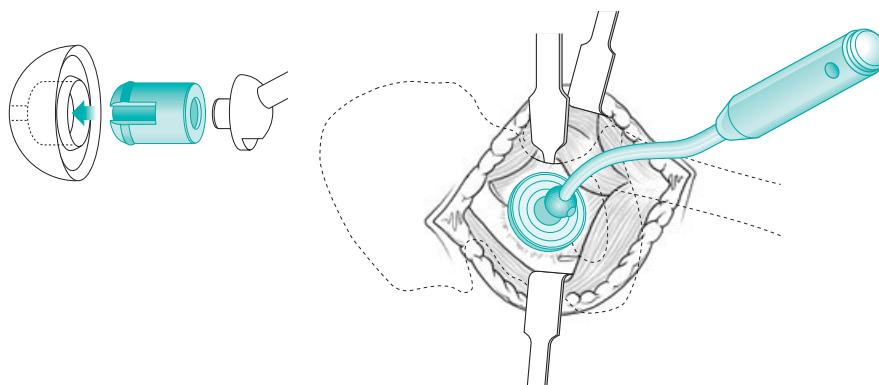


**4** Once soft tissue has been dissected, proceed with osteotomy of the femoral neck. Refer to the appropriate femoral stem surgical technique for further details.

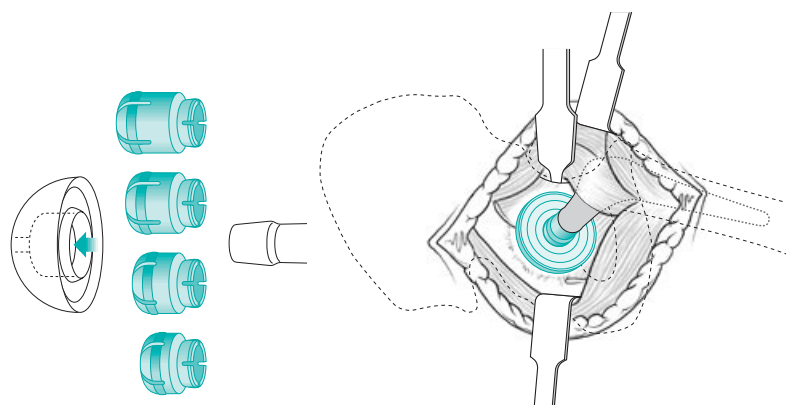




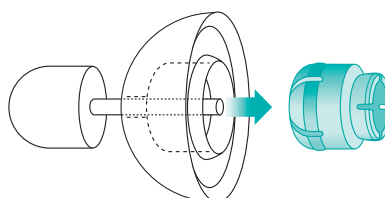
5 Test range of movement and stability of the Bipolar Head in the exposed acetabulum. Combine the impactor and its attachment with the previously determined trial head. The size of the trial head can be determined using the planning template on the preoperative X-ray or by measuring the removed femoral head with the gauge.



6 Prior to implanting the femoral component, a trial reduction and check for range of motion should be performed. Use large trial heads and adapter with corresponding neck lengths (S, M, L, or XL) when using a modular femoral stem.

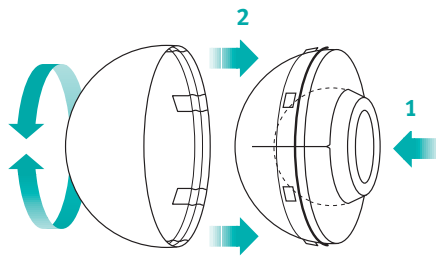


7 Remove trial head and separate the inner adapter with the help of the adapter remover device.

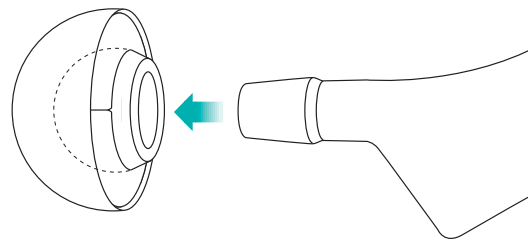


### Assembly using “Modular Heads”

**8a** Back table technique is recommended where the head components of the modular system are assembled on the instrument trolley in the correct order. First place the polyethylene insert on the standard femoral head. The slotted PE insert will expand to allow seating of the femoral head and contract then to capture the femoral head. You will hear a “popping” sound. Snap the metal shell over the polyethylene insert and the captured femoral head by holding the metal shell parallel over the polyethylene insert. Turn it until the knobs of the PE insert fit into the flutes of the metal shell. Press the components together now and the metal locking ring will snap into the corresponding groove.

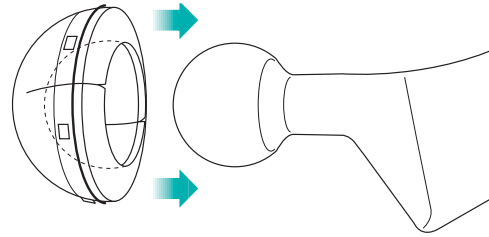


**9a** Place the Bipolar Assembly on the femoral implant and impact the assembly onto the taper. Check that there is no tissue (or blood) caught between the components. The construct is now ready for final reduction.

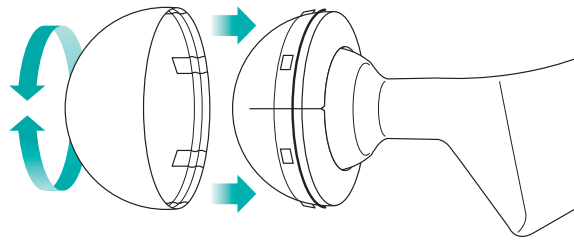


### Assembly using “Monobloc Stems”

**8b** First place the polyethylene insert on the femoral head of the monobloc stem. The slotted PE insert will expand to allow seating of the femoral head and contract then to capture the femoral head. You will hear a “popping” sound.

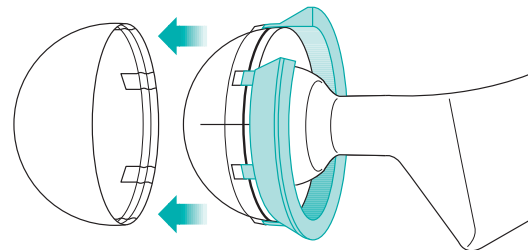


**9b** Snap the metal shell over the polyethylene insert and the captured femoral head by holding the metal shell parallel over the polyethylene insert. Turn it until the knobs of the PE insert fit into the flutes of the metal shell. Press the components together now and the metal locking ring will snap into the corresponding groove. Check that there is no tissue (or blood) caught between the components. The construct is now ready for final reduction.



### Bipolar Disassembly Method

In case of revision surgery, a release ring unlocks the cup and liner. Ensure that any connecting tissue is removed from the polyethylene insert. Using the release ring, the metal locking ring can be squeezed, thus unlock the mechanism and separate the components without damaging them. Push the protruding tabs of the release ring completely into the corresponding flutes in the outer shell and withdraw the shell from the PE insert.



**Caution: The release ring is only to be used to separate the outer shell from the insert. It must never be left in situ.**

## Implants



Modular Bipolar Shell  
Protasul®-S30

FeCr22Ni10Mn4Mo2NNb Alloy  
ISO 5832-9



Modular Bipolar Insert  
Sulene®-PE, Protasul®-10

UHMWPE  
ISO 5834-1/-2  
ISO 5832-6 (Locking Ring)



Femoral Head, Cobalt Chrome  
Protasul®-20

Co28Cr6Mo Alloy,  
Carbon content 0.05%  
ISO 5832-12

STERILE R

Shell Ømm

REF

38	61.27.00-38
40	61.27.00-40
42	61.27.00-42
43	61.27.00-43
44	61.27.00-44
45	61.27.00-45
46	61.27.00-46
47	61.27.00-47
48	61.27.00-48
49	61.27.00-49
50	61.27.00-50
51	61.27.00-51
52	61.27.00-52
53	61.27.00-53
54	61.27.00-54
56	61.27.00-56
58	61.27.00-58
60	61.27.00-60

STERILE R

Inner  
Ømm

Corresponding  
shell diameter

REF

22	38–40 mm	61.27.22-38
22	42–45 mm	61.27.22-42
28	42–45 mm	61.27.28-42
28	46–49 mm	61.27.28-46
28	50–53 mm	61.27.28-50
28	54–60 mm	61.27.28-54
32	46–49 mm	61.27.32-46
32	50–53 mm	61.27.32-50
32	54–60 mm	61.27.32-54

STERILE R

Ømm

Neck  
length

Taper

REF

22	0	12/14	7210-22-000
22	+3.5	12/14	7210-22-350
22	+8	12/14	7210-22-800
28	S/-4	12/14	14.28.05-20
28	M/0	12/14	14.28.06-20
28	L/+4	12/14	14.28.07-20
28	XL/+8	12/14	01.01012.288
32	S/-4	12/14	14.32.05-20
32	M/0	12/14	14.32.06-20
32	L/+4	12/14	14.32.07-20
32	XL/+8	12/14	01.01012.328



Femoral Head, Stainless Steel  
Protasul®-S30

FeCr22Ni10Mn4Mo2NNb Alloy  
ISO 5832-9



Femoral Head Tribosul™  
Protasul®-100, ODH-treated

Ti6Al7Nb  
ISO 5832-11



Femoral Head Sulox™

Al<sub>2</sub>O<sub>3</sub> Ceramic  
ISO 6474

STERILE R

Ø mm	Neck length	Taper	REF
22	S/-3.5	12/14	30.22.05
22	M/0	12/14	30.22.06
22	L/+3.5	12/14	30.22.07
28	S/-4	12/14	30.28.05
28	M/0	12/14	30.28.06
28	L/+4	12/14	30.28.07
28	S/-4	8/10	01.01102.285
28	M/0	8/10	01.01102.286
28	L/+4	8/10	01.01102.287
32	S/-4	12/14	30.32.05
32	M/0	12/14	30.32.06
32	L/+4	12/14	30.32.07

STERILE R

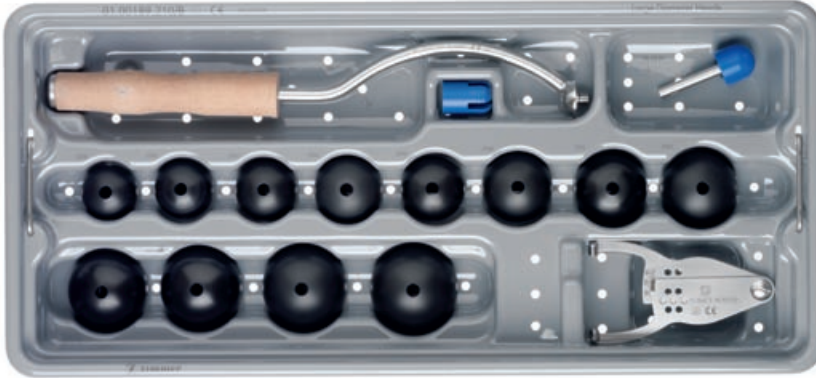
Ø mm	Neck length	Taper	REF
28	S/-4	12/14	18.28.05
28	M/0	12/14	18.28.06
28	L/+4	12/14	18.28.07
28	S/-4	14/16*	21.28.05
28	M/0	14/16*	21.28.06
28	L/+4	14/16*	21.28.07
32	S/-4	12/14	18.32.05
32	M/0	12/14	18.32.06
32	L/+4	12/14	18.32.07
32	S/-4	14/16*	21.32.05
32	M/0	14/16*	21.32.06
32	L/+4	14/16*	21.32.07

STERILE R

Ø mm	Neck length	Taper	REF
28	S/-3.5	12/14	17.28.05
28	M/0	12/14	17.28.06
28	L/+3.5	12/14	17.28.07
28	S/-3.5	8/10	01.01202.285
28	M/0	8/10	01.01202.286
28	L/+3.5	8/10	01.01202.287
32	S/-3.5	12/14	17.32.05
32	M/0	12/14	17.32.06
32	L/+3.5	12/14	17.32.07

\* Heads with taper 14/16 for revision surgery in cases of a well fixed older stem design (in clinical use until 1990).

## Instruments (all instruments are not sterile)



Tray Bipolar Head (complete)

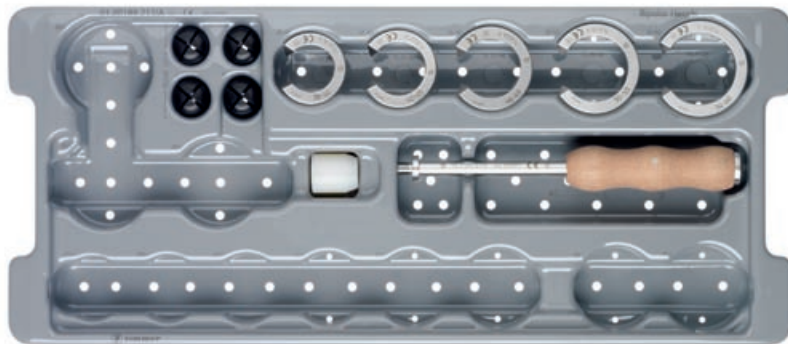
REF  
ZS01.00189.200

Tray base for large diameter heads  
(empty)

REF  
01.00189.210

Tray base for Bipolar Head (empty)

REF  
0100189.212



Standard tray cover, grey

REF  
01.00029.031



Gauge for femoral heads

REF  
75.36.62



Adapter for Bipolar, taper 12/14

	REF
Short	01.00189.200
Medium	01.00189.201
Large	01.00189.202
Extra large	01.00189.203



Cup impactor, curved

REF  
75.00.39

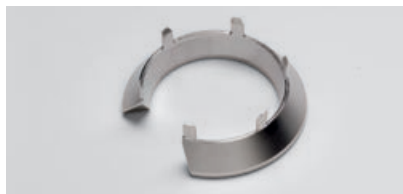
Impactor attachment

REF  
75.10.11



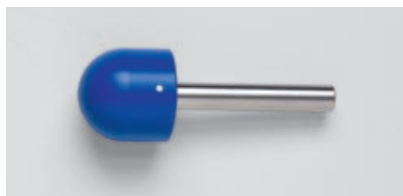
Large trial heads

∅mm	REF
38	01.00189.380
40	01.00189.400
42	01.00189.420
44	01.00189.440
46	01.00189.460
48	01.00189.480
50	01.00189.500
52	01.00189.520
54	01.00189.540
56	01.00189.560
58	01.00189.580
60	01.00189.600



Release ring

Shell ∅mm	REF
38–40	75.20.38
42–45	75.20.42
46–49	75.20.46
50–53	75.20.50
54–60	75.20.54



Adapter remover

REF  
75.10.01

Intermediate sizes

∅mm	REF
43	75.41.43
45	75.41.45
47	75.41.47
49	75.41.49
51	75.41.51
53	75.41.53

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Lit. No. 06.01134.012x – Ed. 11/2008 WL



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