Image intensifier control

**Warning**
This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

**Processing, Reprocessing, Care and Maintenance**
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
# TABLE OF CONTENTS

## INTRODUCTION
- PHILOS Augmentation 2
- AO Principles 4
- Indications 5

## SURGICAL TECHNIQUE
- Patient Positioning and Approach 6
- Implantation 8
  - Option: Define screw configuration for augmentation of screw tips with Traumacem V+ 14
- Augmentation of Screw Tips with Traumacem V+ 26
- Implant Removal 35

## PRODUCT INFORMATION
- Implants 36
- Instruments 38
- Sets 42

## BIBLIOGRAPHY

## MRI INFORMATION

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**AUGMENTATION**
CONTINUED TRUST IN STABLE FIXATION

PHILOS

Trust that is based on more than 10 years of experience, over 500’000 implantations and the results of over 50 journal articles.

Trust that continues: Worldwide every seven minutes a surgeon decides to implant a PHILOS plate and every seven minutes a patient trusts their decision.
**PHILOS AUGMENTATION**

In osteoporotic bone, failure of the bony structure around the implant can result in fixation failure and secondary screw perforation.\(^1,^3\)

Augmentation increases the stability of the PHILOS fixation, when needed. Biomechanical studies show that PHILOS Augmentation offers **enhanced anchorage** in low-density bone.\(^4,^5\)

The PHILOS Augmentation system follows the routine reduction and fixation procedure. In a final step, the screw tips are augmented with a simple add-on.

---

**Correlation of cycles to failure in varus bending with BMD values.** Data received and reprinted with permission of the Laboratory for Biomechanics, Clinic for Trauma Surgery, Innsbruck Medical University, Austria.
In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation\textsuperscript{1, 2}.

**Anatomic reduction**
Fracture reduction and fixation to restore anatomical relationships.

**Stable fixation**
Fracture fixation providing absolute or relative stability, as required by the patient, the injury, and the personality of the fracture.

**Early, active mobilization**
Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

**Preservation of blood supply**
Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.


INDICATIONS

PHILOS indications
• Dislocated two-, three-, and four-fragment fractures of the proximal humerus, including fractures involving osteopenic bone
• Pseudarthroses in the proximal humerus
• Osteotomies in the proximal humerus

PHILOS long indications
• As for PHILOS, but for fractures extending to the shaft or without medial support

PHILOS Augmentation indications
• As for PHILOS and PHILOS long, but exclusively in conjunction with osteoporotic bone
• The perforated screws may also be used without cement augmentation (see page 15)

PHILOS Augmentation contraindications
• In case of potential risk of cement leakage into the fracture gap, the articulation or vascular structures (e.g. via fractures which open into the articulation)

Note:
– Consult the “instructions for use” for indications/contraindications of the “Traumacem V+ Cement Kit”.
– Consult the “instructions for use” for the intended use of the “Trauma Syringe Kit, 4 x 1 mL, 2.3 mm Adapter, sterile”.
– Consult the manufacturer’s directions on indications/contraindications of the radiographic contrast agent.
PATIENT POSITIONING AND APPROACH

1

Position the patient

Place the patient in the beach chair position or supine position on a radiolucent table.

Ensure the fluoroscope is positioned in a way that allows visualization of the proximal humerus in two axes (AP and lateral/axial).

Prepare the patient’s arm so that it can be mobilized intraoperatively.

Note: Please consult www.aosurgery.org for further information.
2

Approach

A deltopectoral or transdeltoid approach is recommended.

If the transdeltoid approach is performed, the use of the LCP Percutaneous Aiming System 3.5 for PHILOS is recommended.

Note: Please consult www.aosurgery.org for further information.
1

Reduce fracture and fix temporarily

Proper reduction of the fracture is crucial for good bone healing and function. In some cases closed reduction before prepping the patient is beneficial.

Reduce the head fragments and check the reduction under image intensifier control.

Kirschner wires can be used for reduction as joysticks in the fragments as well as for temporary fixation. Ensure that Kirschner wires do not interfere with correct plate placement.

Suturing

Provisionally reduce the tubercles using sutures through the insertions of the musculi subscapularis, infra- and supra-spinatus. The sutures will help to maintain the stability of the reconstruction when fixing them to the plate later.

Note: Please consult www.aosurgery.org for further information.
**2**

**Attach aiming device to plate**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.057 or 03.122.067</td>
<td>PHILOS Aiming Device, without Nose</td>
</tr>
<tr>
<td>03.122.056 or 03.122.066</td>
<td>PHILOS Aiming Device Stardrive, with Nose</td>
</tr>
<tr>
<td>311.431</td>
<td>Handle with Quick Coupling</td>
</tr>
<tr>
<td>314.030 or 314.116</td>
<td>Screwdriver Shaft hexagonal</td>
</tr>
<tr>
<td>314.116</td>
<td>Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
</tr>
</tbody>
</table>

Insert the stabilization pin of the aiming device in the specially provided hole on the PHILOS plate. Use the screwdriver to tighten the securing screw of the aiming device.
### 3

**Position plate**

Position the plate 2–4 mm posterior to the bicipital groove and 5–7 mm distal to the top of the greater tubercule. Align the plate properly to the humeral shaft.

**Precaution:** Placing the plate too high increases the risk of subacromial impingement. Placing the plate too low can prevent the optimal distribution of screws in the humeral head.
Alternative techniques

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.056</td>
<td>PHILOS Aiming Device, with Nose</td>
</tr>
<tr>
<td>03.122.066</td>
<td>PHILOS Aiming Device Stardrive, with Nose</td>
</tr>
</tbody>
</table>

**Option A:** Determine the position of the plate using the PHILOS aiming device with nose. Insert a Kirschner wire into the proximal guide hole below the rotator cuff so that the Kirschner wire aims at the proximal joint surface.

**Option B:** Insert two positioning Kirschner wires 2–4 mm lateral to the bicipital groove and 5–7 mm below the tip of the greater tubercule. Position the plate between the Kirschner wires.
Fix plate temporarily

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.250  Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling</td>
<td></td>
</tr>
<tr>
<td>323.360  Universal Drill Guide 3.5</td>
<td></td>
</tr>
<tr>
<td>319.010  Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm</td>
<td></td>
</tr>
<tr>
<td>314.070  Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove</td>
<td></td>
</tr>
<tr>
<td>314.116  Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
<td></td>
</tr>
<tr>
<td>311.431  Handle with Quick Coupling</td>
<td></td>
</tr>
</tbody>
</table>

**Optional instrument**

| 311.320  Tap for Cortex Screws Ø 3.5 mm, length 110/50 mm |

Fix the plate temporarily with a cortex screw in the elongated combi-hole in the plate shaft.

Use the Ø 2.5 mm drill bit with the 3.5 universal drill guide to predrill the bone through both cortices.

Determine the required length of the cortex screw using the depth gauge.

Insert the appropriate Ø 3.5 mm cortex screw using the screwdriver.
Option: Temporary fixation with Kirschner wires

<table>
<thead>
<tr>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.053 Outer Sleeve 6.0/5.0 for PHILOS Aiming Device</td>
</tr>
<tr>
<td>03.122.054 Drill Sleeve 5.0/2.9, for No. 03.122.053</td>
</tr>
<tr>
<td>03.122.055 Centering Sleeve for Kirschner Wire Ø 1.6 mm, for No. 03.122.054</td>
</tr>
</tbody>
</table>

If required, use Kirschner wires through the triple sleeve system for temporary fixation of the humeral head.

Precaution: Do not penetrate the joint surface with the Kirschner wires.

Option: Temporarily reduce with pull reduction device

<table>
<thead>
<tr>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.059 Pull Reduction Device for use with No. 03.122.060 for Drill Sleeves</td>
</tr>
<tr>
<td>03.122.060 Wing Nut for Pull Reduction for use with No. 03.122.059 for Drill Sleeves</td>
</tr>
</tbody>
</table>

In good bone stock, the pull reduction device can optionally be used for temporary reduction. Using a power tool, insert the pull reduction device through the drill sleeve to the desired depth. Slide the wing nut over the wire and tighten. In this way, bone fragments are pulled towards the plate.

Precaution: Do not penetrate the joint surface with the pull reduction device.
Option: Define screw configuration for augmentation of screw tips with Traumacem V+

Choose 4–6 perforated screws for augmentation with Traumacem V+. Carefully determine the configuration of screws to be augmented based on the fracture pattern, the anatomy of the humeral head and the following recommendations.

Note: perforated screws are only available with Stardrive recess.
**Favorable configuration:** If possible, always augment screws from levels A and E to enable a wide distribution of the cement clouds in the humeral head.

**Precaution:** Level E screws can not be implanted in some small humeri. Their tips can also lie close to fracture lines. In this case, choose an alternative configuration.

**Alternative configuration/additional screws:** If the level E screw can not be augmented or additional screws shall be augmented, choose screws from level B and/or D.

It is not recommended to augment level C screws as the tips often lie at the same height as the level A screw tips. Furthermore, due to the divergence of the screw, tips often end close to fracture lines.

**Precaution:** Do not augment screws with tips ending close to fracture lines.

**Option:** The perforated screws may also be used without Traumacem V+ augmentation in the humeral head. If so, at least 6 perforated screws must be inserted proximally.
6
Predrill the lateral cortex and determine proximal screw length

The following technique describes screw depth measuring optimized for osteoporotic bone. In good bone stock, change to options A or B for predrilling the screw hole and depth measuring.

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.053</td>
<td>Outer Sleeve 6.0/5.0 for PHILOS Aiming Device</td>
</tr>
<tr>
<td>03.122.051</td>
<td>Drill Bit Ø 2.8 mm, with Stop, for Quick Coupling</td>
</tr>
<tr>
<td>03.122.052</td>
<td>Length Probe for Nos. 03.122.053 and 03.122.058</td>
</tr>
</tbody>
</table>

Insert the outer sleeve in the desired hole of the aiming device. Predrill the lateral cortex using the drill bit with stop through the outer sleeve.

**Alternative instrument**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.122.058</td>
<td>Drill Sleeve 6.0/2.9 with thread</td>
</tr>
</tbody>
</table>

Use the drill sleeve with thread independently from the aiming device.
Use the length probe through the outer sleeve and push it carefully into the humeral head. Stop pushing when increased bone density is felt. Read off the required screw length from the length probe.

**Precaution:** Do not push the length probe through the joint surface.

The tip of the length probe should be located approximately 5–8 mm below the joint surface for locking screws. Augmented perforated locking screws can be 4 mm shorter.
Alternative techniques for good bone stock
If the bone stock is good, choose one of the following options:

**Option A:** Use a ø 2.8 mm drill bit through the drill sleeve and drill 5–8 mm below the joint surface. Read the required screw length from the drill bit.

**Option B:** Check the subsequent position of the screws using Kirschner wires. Attach the triple sleeve system, consisting of an outer sleeve, a drill sleeve, and a centering sleeve for the Kirschner wire onto the aiming device and insert a Kirschner wire ø 1.6 mm, 150 mm long.

Check the position of the Kirschner wire. The tip of the Kirschner wire should be located in the subchondral bone (5–8 mm below the joint surface).

Slide the PHILOS direct measuring device for Kirschner wire 1.6 mm over the Kirschner wire and determine the length of the required screw.
7
Insert proximal screws

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>511.770 or 511.773</td>
<td>Torque limiter, 1.5 Nm</td>
</tr>
<tr>
<td>314.030 or 314.116</td>
<td>Screwdriver Shaft hexagonal or Stardrive recess</td>
</tr>
<tr>
<td></td>
<td>Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
</tr>
<tr>
<td>311.431 or 397.705</td>
<td>Handle with Quick Coupling or Handle for Torque Limiter</td>
</tr>
</tbody>
</table>

Insert the screw with the appropriate screwdriver shaft (hexagonal or Stardrive recess) and 1.5 Nm torque limiting attachment through the outer sleeve. The sleeve ensures that the locking screw is correctly locked in the plate. The angular stability is reduced if a locking screw is inserted obliquely.

Insert the screw manually or with power until a click is heard. If using power, reduce speed when tightening the head of the locking screw into the plate.

Repeat the above steps for all required proximal screw holes.

Minimal number of screws Ø 3.5 mm fixing the head fragment:

- fixation with ≥4 standard locking screws or
- fixation with ≥6 perforated locking screws (non-augmented) or
- fixation with ≥4 perforated locking screws (augmented with Traumacem V+)
8

Insert shaft screws

After inserting the proximal screws, determine where locking or cortex screws will be used in the shaft.

**Note:** If a combination of cortex and locking screws is used, cortex screws must be inserted first to pull the plate to the bone.
8a

Fixation with Ø 3.5 mm cortex screws

<table>
<thead>
<tr>
<th>Instruments</th>
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</tr>
</thead>
<tbody>
<tr>
<td>310.250 Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling</td>
<td></td>
</tr>
<tr>
<td>323.360 Universal Drill Guide 3.5</td>
<td></td>
</tr>
<tr>
<td>319.010 Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm</td>
<td></td>
</tr>
<tr>
<td>314.070 Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove</td>
<td></td>
</tr>
<tr>
<td>314.116 Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
<td></td>
</tr>
<tr>
<td>311.431 Handle with Quick Coupling</td>
<td></td>
</tr>
</tbody>
</table>

Optional instrument

| 311.320 Tap for Cortex Screws Ø 3.5 mm, length 110/50 mm |

Use the Ø 2.5 mm drill bit with the 3.5 universal drill guide to predrill the bone through both cortices.

To set screws in a neutral position, press the drill guide down in the non-threaded hole. To obtain compression, place the drill guide at the end of the non-threaded hole away from the fracture, avoiding downward pressure on the spring-loaded tip.

Determine the required length of the cortex screw using the depth gauge.

Insert the appropriate Ø 3.5 mm cortex screw using the hexagonal screwdriver.
### 8b

**Fixation with Ø 3.5 mm locking screws**

<table>
<thead>
<tr>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>323.027 LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm</td>
</tr>
<tr>
<td>310.284 LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling</td>
</tr>
<tr>
<td>319.010 Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm</td>
</tr>
<tr>
<td>314.030 Screwdriver Shaft, hexagonal, small, Ø 2.5 mm</td>
</tr>
<tr>
<td>or 314.116 Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
</tr>
<tr>
<td>511.773 Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling</td>
</tr>
<tr>
<td>311.431 Handle with Quick Coupling</td>
</tr>
</tbody>
</table>

Insert the 3.5 mm drill sleeve into the locking hole until fully seated. Drill through both cortices with the Ø 2.8 mm drill bit and use the scale to read-off the screw length.

**Alternative technique:** Remove the drill guide. Use the depth gauge to determine the screw length.

Insert the locking screw with the appropriate screwdriver shaft (hexagonal or Stardrive recess) mounted on the 1.5 Nm torque limiter. Insert the screw manually or with the use of a power tool until a click is heard. If a power tool is used, reduce the speed when tightening the head of the locking screw into the plate.
Repeat the above steps for all required shaft holes.
9
Attach sutures

Remove the aiming device from the plate.

Knot the sutures through the designated holes in the plate if this has not already been done. This construct functions as a tension band and transmits the forces of the rotator cuff over the plate and into the shaft, while preventing fragment displacement during the early rehabilitation period.
10 Check position of screw tips

Check the screw lengths under image intensifier control in the full range of gleno-humeral-motion and ensure that they do not penetrate the articular surface.

It is important to check the screw lengths in all planes as their angulation and direction may be difficult to visualize.

**Precaution:** Do not augment screws that perforate the joint or have tips close to fracture lines.

Check the stability of the suture fixation. The sutures must not rupture during motion.
AUGMENTATION OF SCREW TIPS WITH TRAUMACEM V+

Note: Refer to page 14 to determine screw configuration for augmentation.

1 Check for possible leakage

| Instrument | 03.702.140S Trauma Syringe Kit, 4×1 mL, Adapter 2.3 mm, sterile |

To avoid potential leakage into the joint or the fracture line, use a radiographic contrast agent and an appropriate syringe with luer lock (6–10 ml).

Prefill the syringe with contrast agent and attach it to an adaptor from the trauma syringe kit. Connect the assembly to the first perforated screw to be checked. Inject 0.5–1 ml of contrast agent.

Precautions:
- Use only radiographic contrast agents that are indicated for this application.
- Consult the manufacturer’s directions on indications, contraindications, use, precautions, warnings and side effects of the radiographic contrast agent.
- If the contrast agent cannot be injected, the screw cannulation might be jammed with bone chips. In this event, remove the screw, clean the cannulation by pushing a 1.6 mm Kirschner wire through it and reinsert the screw.
- Injection may be hindered in dense bone.
- Do not reuse the same syringe or adapter for the application of Traumacem V+.
Monitor the flow of the contrast agent under image intensifier control.

Repeat the steps for all other screws intended to be augmented.

Do not augment the screw if contrast agent leaks into the joint or fracture line. If necessary, select alternative screws to augment. Insert the screws and check for leakage as described in the previous steps.

If less than 4 screws can be augmented, ensure that the humeral head is secured with a total of at least 6 screws (augmented and non-augmented).

**Note:** If the contrast agent hinders proper visualization during these steps, inject saline solution to wash the contrast agent out of the humeral head.

If there is no leakage, proceed with step 2.
AUGMENTATION OF SCREW TIPS
WITH TRAUMACEM V+

2 Prepare Traumacem V+

### Instrument

| 07.702.040S | Traumacem V+ Cement Kit, 10 ml, sterile |

Hold the Traumacem V+ Cement Kit upright and gently tap the top of the mixing device to ensure no cement powder sticks to the cartridge and sterilization lid.

Pull the handle until it is fully retracted.

**Note:** During preparation, mixing and injection always handle the mixing device by gripping the blue part located directly below the transparent cartridge. If the transparent part is gripped, the excess body heat from the user’s hand might result in a shorter working time than intended.
Open the glass ampoule by breaking the bottle neck with the plastic cap (1). Remove and dispose the mixing device sterilization lid. Pour all monomer from the glass ampoule into the cement powder (2) and close the mixing device tightly using the enclosed transferring lid (3).

**Notes:**
- The entire contents must always be mixed.
- It is not permitted to use only one part of the components.

Mix the Traumacem V+ Cement by moving the blue handle back and forth from stop to stop approximately 20 times (1). Perform the first mixing strokes slowly with oscillating-rotating movements (2). After mixing fully retract the handle (3).

**Note:** Ensure homogeneous mixing.
3

**Fill injection syringes**

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.702.140S</td>
<td>Trauma Syringe Kit, 4×1 mL, Adapter 2.3 mm, sterile</td>
</tr>
</tbody>
</table>

Once the cement has been mixed using the Traumacem V+ Cement Kit, remove the small, transparent mixer lid (1). Connect the stop-cock (the side without the funnel) to the mixer (2). Ensure a tight fit between the stop-cock and the mixing device.

**Note:** The application of excessive torque will break the stop-cock.

First remove the air from the system. With the valve open, gently turn the handle of the cement mixer clockwise. The mixer piston will advance in the translucent cartridge and a steady flow of cement will move into the stop-cock. As soon as the cement is visible in the stop-cock, close the valve (3).

Attach a 1 ml syringe (blue) to the funnel side of the stop-cock.
Open the valve. Use controlled clockwise turning movements on the mixer handle to fill the syringe. As soon as the syringe is full, close the valve.

**Note:** Do not push to transfer cement.

Disconnect the filled syringe and attach the next syringe to be filled. Avoid excessive spillage of cement into the funnel during the transfer process. Continue to fill the syringes in the same manner. Always prefill all 1 ml syringes (blue) at once.
4

**Connect syringe to perforated screw**

Attach the syringe to the adapter.

Insert the tip of the adapter into the recess of the perforated screw to be augmented.

Ensure that the tip of the adapter is fully inserted into the screw recess by pushing on the transparent syringe handle.
Augmentation with Traumacem V+

Inject the cement slowly and stepwise in increments of approximately 0.1 ml. 0.05–0.15 ml of cement is required to fill the screw cannulation.

Monitor the flow of the cement under image intensifier control.

Precautions:

- If the cement cannot be injected, the screw cannulation might be jammed with bone chips. In this event, remove the screw, clean the cannulation by pushing a 1.6 mm Kirschner wire through it and reinsert the screw.
- Injection may be hindered in dense bone.
- If there is a danger of cement leakage into the joint, fracture gap or venous system, stop injection immediately.

Do not inject more than 0.5 ml of cement per screw (equates to half the contents of one syringe).

Repeat steps 4 and 5 for all screws to be augmented. One 1 ml syringe can be used to augment 2 screws.

Do not inject more than 3 ml of cement in total (equates to the content of three 1 ml syringes (blue)).

If less than 4 screws can be augmented, ensure that the humeral head is secured with a total of at least 6 screws (augmented and non-augmented).

Note: The working time for Traumacem V+ at room temperature (20 °C) is approximately 27 minutes. At body temperature (37 °C) the setting time is approximately 15 minutes. Mobilizing/repositioning the patient within the first 15 minutes after the last injection should, therefore, be avoided.
6 Final check

Before closing the wound, check the screw lengths and the position of the cement under image intensifier control in the full range of glenohumeral motions. Ensure that they do not penetrate the articular surface.

Remove any spilled cement from the screw recesses (with the sharp hook), the plate and the soft tissues.
IMPLANT REMOVAL

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>314.030</td>
<td>Screwdriver Shaft hexagonal</td>
</tr>
<tr>
<td>or</td>
<td>Screwdriver Shaft Stardrive 3.5, T15,</td>
</tr>
<tr>
<td>314.116</td>
<td>self-holding, for AO/ASIF Quick</td>
</tr>
<tr>
<td></td>
<td>Coupling</td>
</tr>
<tr>
<td>311.431</td>
<td>Handle with Quick Coupling</td>
</tr>
<tr>
<td>309.521</td>
<td>Extraction Screw for Screws Ø 3.5 mm</td>
</tr>
<tr>
<td>319.390</td>
<td>Sharp Hook, length 155 mm</td>
</tr>
</tbody>
</table>

To remove the plate, first unlock all screws with the screwdriver before removing them definitively in a second step, otherwise the plate may rotate while the last screw is being removed and cause soft tissue damage.

If the locking screws cannot be removed with the screwdriver (e.g., if the screw recess is damaged), use an extraction screw with left-handed thread. Loosen the screw by turning the handle counterclockwise.

**Implant removal after augmentation of screw tips with Traumacem V+**

**Notes:**
- The cement will remain in the humeral head.
- If the recess of the screws is blocked with cement, clean it first with the sharp hook.
- When performing a re-fixation, be aware that the cement is not intended to be drilled and new implants might need to be placed in different positions.
- If implants can not be removed with standard instrumentation, use dedicated implant removal systems and consult the corresponding surgical technique.
### PHILOS – Proximal Humeral Plate 3.5

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Titanium</th>
<th>Shaft holes</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>241.901</td>
<td>441.901</td>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td>241.903</td>
<td>441.903</td>
<td>5</td>
<td>114</td>
</tr>
</tbody>
</table>

### PHILOS Long – Proximal Humeral Plate 3.5

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Titanium</th>
<th>Shaft holes</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
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### Screws used with PHILOS

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>X12.102 – X12.124</td>
<td>Locking Screw Stardrive Ø 3.5 mm, length 12–60 mm, self-tapping</td>
</tr>
<tr>
<td>X13.012 – X13.060</td>
<td>Locking Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with hexagonal recess</td>
</tr>
<tr>
<td>0X.200.012 – 0X.200.060</td>
<td>Cortex Screw Stardrive Ø 3.5mm, length 12–60 mm, self-tapping</td>
</tr>
<tr>
<td>X04.812 – X04.860</td>
<td>Cortex Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with hexagonal recess</td>
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<tr>
<td>0X.200.012 – 0X.200.060</td>
<td>Cortex Screw Stardrive Ø 3.5 mm, self-tapping, length 12–60 mm</td>
</tr>
<tr>
<td>0X.125.124S – 0X.125.154S</td>
<td>Locking Screw Stardrive Ø 3.5 mm perforated, length 24–54 mm, sterile</td>
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### Traumacem V+

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>07.702.040S</td>
<td>Traumacem V+ Cement Kit, 10 ml, sterile</td>
</tr>
</tbody>
</table>

- **Stardrive**
- **Hexagonal**

X = 2: Stainless steel  
X = 4: TAN

All implants are available nonsterile or sterile packed.  
Add suffix “S” to article number to order sterile product.
**INSTRUMENTS**

**PHILOS instruments**

**PHILOS sizing templates**

<table>
<thead>
<tr>
<th>Shaft holes</th>
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<tr>
<td>03.122.003</td>
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<td>03.122.005</td>
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</table>

03.122.051    | Drill Bit Ø 2.8 mm, with Stop, for Quick Coupling |
03.122.052    | Length Probe for Nos. 03.122.053 and 03.122.058 |
03.702.140S   | Trauma Syringe Kit, 4×1 mL, Adapter 2.3 mm, sterile |
<table>
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<tr>
<td>319.390</td>
<td>Sharp Hook, length 155 mm</td>
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<tr>
<td>03.122.053</td>
<td>Outer Sleeve 6.0/5.0 for PHILOS Aiming Device</td>
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<tr>
<td>03.122.054</td>
<td>Drill Sleeve 5.0/2.9, for No. 03.122.053</td>
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<tr>
<td>03.122.055</td>
<td>Centering Sleeve for Kirschner Wire Ø 1.6 mm, for No. 03.122.054</td>
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<tr>
<td>03.122.056</td>
<td>PHILOS Aiming Device, with Nose</td>
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<tr>
<td>03.122.057</td>
<td>PHILOS Aiming Device, without Nose</td>
</tr>
<tr>
<td>03.122.066</td>
<td>PHILOS Aiming Device Stardrive, with Nose</td>
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<tr>
<td>03.122.067</td>
<td>PHILOS Aiming Device Stardrive, without Nose</td>
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Optional instruments

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<th>Item Code</th>
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<tr>
<td>03.122.058</td>
<td>Drill Sleeve 6.0/2.9 with thread</td>
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<tr>
<td>03.122.060</td>
<td>Wing Nut for Pull Reduction for use with No. 03.122.059 for Drill Sleeves</td>
</tr>
<tr>
<td>03.122.059</td>
<td>Pull Reduction Device for use with No. 03.122.060 for Drill Sleeves</td>
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Standard instruments

<table>
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<tr>
<th>Item Code</th>
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<tbody>
<tr>
<td>309.521</td>
<td>Extraction Screw for Screws Ø 3.5 mm</td>
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<tr>
<td>309.510</td>
<td>Extraction Screw, conical, for Screws Ø 1.5 and 2.0 mm</td>
</tr>
<tr>
<td>310.250</td>
<td>Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling</td>
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<tr>
<td>311.431</td>
<td>Handle with Quick Coupling</td>
</tr>
</tbody>
</table>
310.284  LCP Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling

319.010  Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm

314.030  Screwdriver Shaft, hexagonal, small, Ø 2.5 mm

314.116  Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling

323.027  LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm

323.360  Universal Drill Guide 3.5

314.070  Screwdriver, hexagonal, small, Ø 2.5 mm, with Groove

511.773  Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling
<table>
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<th>Code</th>
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<tr>
<td>01.122.031</td>
<td>Proximal Humerus Instruments, in Modular Tray, Vario Case System</td>
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<tr>
<td>01.122.013</td>
<td>Small Fragment Basic Instruments, in Modular Tray, Vario Case System</td>
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<tr>
<td>01.122.015</td>
<td>Screw Insertion 3.5/4.0, in Modular Tray, Optional set</td>
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<tr>
<td>01.122.014</td>
<td>Small Fragment Reduction Instruments, in Modular Tray, Vario Case System</td>
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MRI INFORMATION

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07
Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF)-induced heating according to ASTM F2182-11a
Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

Precautions: The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:
• It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
• Patients with impaired thermo regulation or temperature sensation should be excluded from MR scanning procedures.
• Generally it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
• Using the ventilation system may further contribute to reduce temperature increase in the body.