Designed for EXTREME CONDITIONS
IN WHICH **EXTREME CONDITIONS** 
HAVE WE TESTED OUR DEVICES?

- Handpieces are **autoclaved all night long** after subjecting them to sterilization for 40 minutes and drying for 30 minutes.

- After the autoclave process, we performed cutting, drilling and reaming operations **with a handpiece outer surface 50°C**.

- Just after these tests, we washed the handpieces **for 3 times successively at 70°C** in the automated machine.

- We used the handpieces **for hammering**, out of purpose.
**SINGLE SENSITIVE TRIGGER**

The sensitive trigger system is a technology obtained by dividing the sensor distance of 4 mm into 1500 steps. The system accelerates from 0 rpm, increasing by 10 revolutions every 2.6 micrometers. The sensitive trigger ensures that the doctor has control throughout the operation, even the minimum oscillation created by the blade is noticed, and the entire movement of the blade can be seen accurately. This feature allows the physician to operate in areas close to soft tissue and small bones as easily as in large bones during the procedure.

**IPX 6 WATER PROTECTION**

When the devices are subjected to intensive cleaning after the operation, the sealing feature protects the devices from damage. IPX 6 water protection feature in our Sign system is provided by using quality sealing elements. Thanks to this feature, the power tool handpieces can be safely washed in the automatic machine. Another benefit of this feature is that the personnel cleaning the devices can protect themselves with less contact opportunity from the risk of contagious diseases.

**HIGH-TECH INTERNAL MOTOR AND DRIVER**

Less energy. Less heating up

Internal motor and driver technology used in the handpiece directly affects the energy and heating consumed by the product. In our products, world-proven brushless motors and drivers who design is 100% owned by our company are used. Smart soft start and soft stop features in our drivers are factors that directly affects performance, efficiency and device life. In this way, our Sign systems provide less consuming energy and less heating up thanks to less current requirement.

**READY TO USE IN EMERGENCY**

We have electronic drivers that manage the power tool system in our handpieces that are subject to sterilization. High technology components are selected for the production of our electronic drivers. All components have high operating temperatures. With this technology, after sterilization, the operation team can use the devices without waiting for the device to cool.

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**MEET ACF’S**

Sign

Power Tool System
When purchasing a surgical power tool system which has long life cycle, technical service availability and costs are frequently considered issue. As soon as you invest in ACF Surgical Power Tool Systems, you are sure that there will be no additional cost in the first year.

Our API system is a system implemented for the first time in the world. It also covers errors that occur outside the scope of warranty. It is a support system created by our company that gives a sigh of relief to the investor in the first year.

ONE HAND CONTROLLING
The surgeon needs to change the direction of the device in cases such as screwing, drilling, jamming of the reamer in the bone, and the screw direction is different from the targeted area. Thanks to the left-right safety key designed on the trigger, the required operation is easily performed with one hand.

QUICK CHARGING
Our chargers are designed to be charged in a maximum of 20 minutes after 1 operation.

TECHNICAL SERVICE IN 48 HOURS
All system equipment that received by our company are repaired and shipped to you within 48 hours at the latest after your approval.

BALANCED AND ERGONOMIC
A device is considered ergonomic if it can be operated reliably with one hand. How the battery, motor and gearbox will be positioned is very important. Gearbox and battery balance each other, making it possible to hold the device with one hand. For devices with a grip, the ideal diameter at the grip is 50 mm. The handle should extend across the full width of the palm, as a handle that is too short will cause unnecessary compression in the middle of the palm. Our handpieces are designed based on these features.

Handpieces can stand upright; and this enables attachments to be inserted more easily, to reduce contact with other hand tools and to be grasped quickly.
### Handpieces

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01 310</td>
<td>Handpiece / Modular / Battery / Type / 01</td>
</tr>
</tbody>
</table>

**Specifications:**

- **Drilling Speed:** 0-750 rpm
- **Drilling Torque:** 3.9 Nm
- **Reaming Speed:** 0-250 rpm
- **Reaming Torque:** 17.8 Nm
- **Operation Voltage:** 14.4 V
- **Sterile Conditions:** 134°C (+4°C / -0°C)

*4.2 mm cannulated

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01 400</td>
<td>Saw / Battery / Type / 01</td>
</tr>
</tbody>
</table>

**Specifications:**

- **Oscillation Speed:** 15,000 cpm
- **Oscillation Arc:** 4°
- **Operation Voltage:** 14.4 V
- **Sterile Conditions:** 134°C (+4°C / -0°C)

### Attachments (Compatible with battery and cable systems)

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01 700</td>
<td>Adapter for Drill (keyed)</td>
</tr>
<tr>
<td>A01 702</td>
<td>Adapter for Drill / A.O. Synthes / Small</td>
</tr>
<tr>
<td>A01 720</td>
<td>Adapter for Reamer / Zimmer</td>
</tr>
<tr>
<td>A01 721</td>
<td>Adapter for Reamer / A.O. Synthes</td>
</tr>
<tr>
<td>A01 722</td>
<td>Adapter for Reamer / Harris / Aesculap</td>
</tr>
<tr>
<td>A01 723</td>
<td>Adapter for Reamer / Hudson - Stryker</td>
</tr>
<tr>
<td>A01 741</td>
<td>Adapter for Wire Driver (0.5 - 1.5 mm)</td>
</tr>
<tr>
<td>A01 740</td>
<td>Adapter for Wire Driver (1.6 - 2.5 mm)</td>
</tr>
<tr>
<td>A01 750</td>
<td>Adapter for Pin Driver (2.6 - 3.2 mm)</td>
</tr>
<tr>
<td>A01 751</td>
<td>Adapter for Pin Driver (3.3 - 4.0 mm)</td>
</tr>
</tbody>
</table>

### Accessoires

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A02 460</td>
<td>Charger / Type / 01</td>
</tr>
</tbody>
</table>

**Specifications:**

- **Charging Same Time:** 2 Batteries
- **Shows Battery Rating:** Yes

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A02 520</td>
<td>Power Box / Type / 01</td>
</tr>
</tbody>
</table>

**Specifications:**

- **Battery Capacity:** 2500 mAh
- **Battery Voltage:** 14.4 V
- **Type:** Lithium - Ion

### Sterilization Containers and Guide

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A05 140</td>
<td>Sterilization Container / Battery / Saw / Modular / 400x302x107</td>
</tr>
<tr>
<td>A05 160</td>
<td>Sterilization Container / Battery / Saw / 302x302x107</td>
</tr>
<tr>
<td>A05 161</td>
<td>Sterilization Container / Battery / Modular / 302x302x107</td>
</tr>
<tr>
<td>A01 310 04</td>
<td>Power Box Installation Guide</td>
</tr>
</tbody>
</table>
**Required torque for reaming**
- Min. 15 Nm
- Max. 20 Nm

**Handpiece Operational Weight**
- Min. 1200 gr
- Max. 2100 gr

**Sterilization Conditions**
- Sterilizability in steam autoclave.

**Battery and Charger**
- Battery - Lithium Ion
- Charger should show battery charge rate
- Battery charging time max. 1 hour

**Cannulation and Left-Right Safety Key**
- Must be cannulated
- Cannula Diameter must meet the max Wire and Pin sizes.
- The handpiece should be controllable with one hand and therefore the left right key should be close to the trigger.

**Required speed for drilling**
- Min. 500 rpm
- Max. 1500 rpm

**Required speed for wire and pin driving**
- Min. 500 rpm
- Max. 1500 rpm
- Size range for Wire and Pin Driving: 0.5 mm - 4.0 mm

**Required speed for sawing**
- Min. 11,000 cpm
- Max. 15,000 cpm
- Oscillation Arc between 3° - 5°

**Required speed for cutting**
- Min. 11,000 cpm
- Max. 15,000 cpm

**Comparison of Power Tool Modes Used for Kirschner Wire Driving: Forward & Reverse (F&R) Mode – Oscillation Mode**
- F&R Mode: Min. 500 rpm, Max. 1500 rpm
- Oscillation Mode: Min. 11,000 cpm, Max. 15,000 cpm

**The Importance of Heat in Bone Cutting and Drilling Procedures in Orthopedic Operations**
- Heat can affect the stability and integrity of bone tissue during surgical procedures.

**USEFUL INFORMATION**

**General Features of Power Tools Systems Used for Orthopedics and Traumatology Surgical Procedures**
- Light and durable design
- Lithium Ion battery for long runtime
- Quick charging feature
- Multiple speed settings for various procedures
- Comfortable grip for extended use
We focused on fast patient recovery and success surgery. Not for fast surgery.

Thompson (1958) examined low drilling speeds, temperature increase according to the speed and tissue damage in the drilling operations. He tried different drilling speeds on the dog jaw bone and examined bone reactions. While the temperature at 125 rpm was 39 °C, it exceeded 65.5 °C at 1000 and 2000 rpm speeds. Therefore, in accordance with Pallan (1960), he proposed a drilling speed of 500 rpm to minimize the thermal damage and histological response of the bone. Abouzgia and James (1997) found that the maximum temperature rise is rapidly decreasing in free running speeds from 27,000 rpm to 97,000 rpm. Apart from Matthews and Hirsch's studies (1972), there seems to be a general agreement that the temperature rise increases with the drilling speed until about 10,000 rpm. (Parsa, 2006)

Considering the global usage conditions of the drill bits, ACF determined a sufficient speed that minimizes the heating in the bone and the torque value that will support the doctor in this drilling process.

<table>
<thead>
<tr>
<th>Revolution Speed (rpm)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>39°C</td>
</tr>
<tr>
<td>500</td>
<td>50°C</td>
</tr>
<tr>
<td>750</td>
<td>50°C</td>
</tr>
<tr>
<td>1000</td>
<td>50°C</td>
</tr>
<tr>
<td>2000</td>
<td>47°C</td>
</tr>
<tr>
<td>10,000</td>
<td>Starting point of bone necrosis (death of bone cells)</td>
</tr>
</tbody>
</table>

How you should evaluate the weight of handpiece?

Surgical power tool systems have different production methods. Manufacturers can add weight-creating elements inside the handpiece to accessories. For example, the internal motor and driver can be placed in the battery or the gearbox can be included in the attachments. This can cause the weight of the handpiece to be perceived as light.

For this reason, when evaluating the weight of a surgical power tool handpiece, all accessories used in the operation should be considered.
Required torque for reaming
Min. 15 Nm
Max. 20 Nm

Handpiece Weight
Approx. 900 - 1750 gr

Sterilization Conditions
Sterilizability in steam autoclave.

Battery and Charger
Battery - Lithium Ion
Charger should show battery charge rate
Battery charging time max. 1 hour

Cannulation and Left-Right Safety Key
Must be cannulated
Cannula Diameter must meet the max
Wire and Pin sizes.
The handpiece should be controllable with one hand and therefore the left right key should be close to the trigger.