The modular clamping system for large part manufacturing
Delphin BIG for large part manufacturing

The newest member of the Delphin family ventures into new dimensions.

The modular Delphin BIG zero-point clamping system allows the machine table to be equipped with position-determining chucks.

This opens up entirely new approaches for production of large workpieces or production of large moulds.

Delphin BIG allows the workpiece to be clamped outside the machine, thus offering major cost savings from reduced set-up times and enhanced flexibility.

Delphin BIG is suitable for manual and automated applications.

Your advantages

✓ Can be used for large workpieces
✓ Maximize machining times thanks to reduction of set-up times by up to 90%
✓ Unmanned production option thanks to automation
✓ Universal palletisation for metal-cutting manufacturing and measurement processes
✓ Simple loading thanks integrated pre-centring
✓ Thermal expansion of the workpieces of up to ± 0.4 mm can be accommodated
✓ High clamping forces for high-performance machining

Workpiece weight (metric tons)

Centre distance (mm)

Delphin BIG

Delphin HCP/HxP/PxP

2 4 6 10

200 400 1500
Delphin BIG Chuck

Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece weight (recommended)</td>
<td>&lt;10'000 kg</td>
</tr>
<tr>
<td>Centre distance (recommended)</td>
<td>400 - 1000 mm</td>
</tr>
<tr>
<td>Clamping force</td>
<td>50 kN</td>
</tr>
<tr>
<td>Holding force</td>
<td>200 kN</td>
</tr>
<tr>
<td>Presence control</td>
<td>yes</td>
</tr>
<tr>
<td>Lift-off function</td>
<td>yes, 2 mm</td>
</tr>
<tr>
<td>Max. lift-off weight per chuck</td>
<td>pressure-dependent</td>
</tr>
<tr>
<td></td>
<td>(see diagram)</td>
</tr>
<tr>
<td>Releasing</td>
<td>hydraulic 40-50 bar</td>
</tr>
<tr>
<td>Clamping</td>
<td>hydraulic 30 bar,</td>
</tr>
<tr>
<td></td>
<td>locked mechanically</td>
</tr>
<tr>
<td>Material</td>
<td>steel, hardened</td>
</tr>
<tr>
<td>Repetition accuracy</td>
<td>± 0.005 mm</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Recommendation</td>
<td>at least 4 chucks per</td>
</tr>
<tr>
<td></td>
<td>application</td>
</tr>
</tbody>
</table>

Hydraulic

- **Closing:** must be 30 bar
- **Opening:** Recommendation 40-50 bar
  
  Can also be 30 bar, if the workpiece is not heavier than 4000 kg. So the same pressure can be used as for closing.

Max. lift-off weight per chuck

![Graph showing max. lift-off weight per chuck vs. hydraulic pressure](image)

How to read the diagram:

A chuck can raise a weight of 18'000 N at an hydraulic pressure of 45 bar.

With 4 chucks, this results in a total workpiece weight of 72'000 N.
## Delphin BIG Product Overview

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item number with fixation holes</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chucks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in</td>
<td>C297 000</td>
<td>8</td>
</tr>
<tr>
<td>Built-up</td>
<td>C297 310</td>
<td>8</td>
</tr>
<tr>
<td><strong>Cover plates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cover plate type A</td>
<td>C287 300</td>
<td>10</td>
</tr>
<tr>
<td>Cover plate type B</td>
<td>C287 310</td>
<td>10</td>
</tr>
<tr>
<td>Cover plate set</td>
<td>C297 500</td>
<td>9</td>
</tr>
<tr>
<td><strong>Hydraulic power pack</strong></td>
<td>C297600</td>
<td>9</td>
</tr>
<tr>
<td><strong>Connection block</strong></td>
<td>C297 030</td>
<td>9</td>
</tr>
<tr>
<td><strong>Connection equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if using cover plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections for 4 chucks</td>
<td>S819 100</td>
<td>9</td>
</tr>
<tr>
<td><strong>Cups / Rings</strong></td>
<td>Centring</td>
<td></td>
</tr>
<tr>
<td>Cup in 2 axes</td>
<td>C298 000</td>
<td>8</td>
</tr>
<tr>
<td>Cup in 1 axis</td>
<td>C298 100</td>
<td>8</td>
</tr>
<tr>
<td>Cup without</td>
<td>C298 200</td>
<td>8</td>
</tr>
<tr>
<td>Ring in 2 axes</td>
<td>C298 010</td>
<td>9</td>
</tr>
<tr>
<td>Ring in 1 axis</td>
<td>C298 110</td>
<td>9</td>
</tr>
<tr>
<td>Ring without</td>
<td>C298 210</td>
<td>9</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator rotary holder, for horizontal machines</td>
<td>C288 060</td>
<td>10</td>
</tr>
<tr>
<td><strong>Sets accessories fixation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set accessories fixation M12</td>
<td>C289 150</td>
<td>9</td>
</tr>
<tr>
<td>Set accessories fixation M10</td>
<td>C289 160</td>
<td>9</td>
</tr>
<tr>
<td>Set accessories fixation M16</td>
<td>C289 170</td>
<td>9</td>
</tr>
<tr>
<td><strong>Spare parts</strong></td>
<td>S850 000</td>
<td>11</td>
</tr>
<tr>
<td><strong>Mounting case</strong></td>
<td>S820 200</td>
<td>10</td>
</tr>
</tbody>
</table>
Installation and mounting dimensions

Chuck built-in
(in machine table)

Chuck built-up
(on machine table)

Clamping non-symmetrical workpieces

In the case of non-symmetrical workpieces, it is frequently the case that they cannot be lifted straight. They are suspended at an angle on the frame. When clamping on conventional chucks, this inclined position poses major problems.

This is not the case on Delphin BIG. As shown by the illustration, the workpiece can still be clamped with no major problems even with major inclination.

Z-support guard

The Z-supports of Delphin BIG clamping bushings and rings are protected by an all-round ring: the Z-supports remain protected if the workpiece is placed on the floor.

If the workpiece moves into the chucks, the edge of the bushing strikes the cone of the chuck. These minor impacts may leave notches on the clamping bushing. There is a recess at the end of the cone (chuck) in order to prevent inaccuracies of the system, consequently ensuring constant accuracy.
**Cup Delphin BIG**

The cups are fitted directly to the device or workpiece.
The Z-support is located inside the cup and is thus protected against damage and contamination.
Centring of the conical face of the centring and compensating cups without backlash achieves the high level of repeat accuracy.

**Advantages**
- Centring free of play
- Protected reference surfaces X, Y, Z
- Easy mounting to devices and workpieces
- Fixing to part or device from the top (45° offset) or bottom of the cups

**Example arrangement**

**Positioning / installation / mounting dimensions**

Positioning tolerance for cups and chucks

**Installation of cups**

Built-up and built-in can be screwed from the bottom or from the top.
Ring Delphin BIG

The rings are fitted directly to the device or workpiece. The Z-support is located inside the ring and is thus protected against damage and contamination. Centring of the conical face of the centring and compensating rings without backlash achieves the high level of repeat accuracy. A bore (72 x 19.5) must be provided on the workpiece for the chuck.

Advantages

- Centring free of play
- Protected reference surfaces X, Y, Z
- Easy mounting to devices and workpieces
- Fixing to part or device from the top (45° offset) or bottom of the rings

Example arrangement

Positioning / installation / mounting dimensions

Positioning tolerance for rings and chucks

Installation of rings

shows screw connection from the bottom

shows screw connection from the top

Built-up and built-in can be screwed from the bottom or from the top.

system 3R
Delphin BIG chuck built-in
C 297 000
For simple installation in the machine table.

Delphin BIG chuck with flange, without fixation holes
C 297 310
Fixation holes can be made by customer
Recommendation: at least 4 chucks per application

Delphin BIG chuck with flange, with fixation holes
C 297 320
Please submit dimension diagram of the fixation holes
Recommendation: at least 4 chucks per application

Cup centring in 2 axes
C 298 000
including fixation screws

Cup centring in 1 axis
C 298 100
including fixation screws

Cup without centring
C 298 200
including fixation screws
**Ring centring in 2 axes**  
C 298 010  
including fixation screws

**Ring centring in 1 axis**  
C 298 110  
including fixation screws

**Ring without centring**  
C 298 210  
including fixation screws

**Hydraulic power pack**  
C 297 600  
Including connection block and connection tubes. Interface provided for machine signals.

- Oil tank 2 l
- Oil pressure $P_1 = 40-50$ bar $P_2 = 30$ bar
- Air pressure 6 bar
- Power 0.75 kW
- Oil DIN 51524/2

**Connection block**  
C 297 030

- Material: Steel
- Dimensions: 170x30x50 mm
- Scope of delivery: fixation material (T-nuts)

**Set connection equipment for 4 chucks**  
S 819 100  
Scope of delivery: hydraulic pipes and air hoses and fittings

**Set fixation M12**  
C 289 150

**Set fixation M10**  
C 289 160

**Set fixation M16**  
C 289 170  
For fixing on machine table

**Cover plate**  
C 297 500  
For the protection of the connecting tubes
Cover plate type A
Dimensions in the range 1500 x 1500 mm
C 287 300

Scope of delivery
1x cover plate, approx. 1500x1500 mm
16x C 286 033 supports
16x E 000 974 screws M8x60
16x E 005 156 setscrew (mounting aid)
16x E 111 111* T-nuts of your choice

To be defined optionally:
16x E 040 020 T-nuts M8x12
16x E 040 021 T-nuts M8x14 (standard)
16x E 040 022 T-nuts M8x16
16x E 040 023 T-nuts M8x18

Cover plate type B
Dimensions in the range 1150 x 1150 mm
C 287 310

Scope of delivery
1x cover plate, approx. 1150x1150 mm
12x C 286 033 supports
12x E 000 974 screws M8x60
12x E 005 156 setscrew (mounting aid)
12x E 111 111* T-nuts of your choice

To be defined optionally:
12x E 040 020 T-nuts M8x12
12x E 040 021 T-nuts M8x14 (standard)
12x E 040 022 T-nuts M8x16
12x E 040 023 T-nuts M8x18

Indicator, rotary holder
C 288 060
For positioning of chucks on horizontal machine table.

- Material: steel, stainless, hardened and ground

Mounting case
S 820 200
Required tools for installation are combined in a tool case.
(Contents include torque wrench and dial gauge)
Installation hardware, such as connecting pipes and screw unions, must be ordered separately.
(See Chapter Connection hardware page 37.)
Spare parts
S 850 000

<table>
<thead>
<tr>
<th>Pos</th>
<th>Qty</th>
<th>Item Nr</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>E010328</td>
<td>Spring</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>E010335</td>
<td>Spring</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>E010336</td>
<td>Spring left-winding</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>E020314</td>
<td>O-Ring</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>E020367</td>
<td>O-Ring</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>E020381</td>
<td>O-Ring</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>E020426</td>
<td>O-Ring</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>E020990</td>
<td>X-Ring</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>E020991</td>
<td>X-Ring</td>
</tr>
</tbody>
</table>