

**System 3R – Tooling**

**Delphin – Modular**

**clamping system**



# Becoming better every day – since 1802

## **GF Machining Solutions**

When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From unmatched Electrical Discharge Machining (EDM), Laser texturing, Laser micromachining, Additive Manufacturing and first-class Milling and Spindles to Tooling and Automation, all of our solutions are backed by unrivaled Customer Services and expert GF Machining Solutions training. Our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies help you raise your game – and our digital business solutions for intelligent manufacturing, offering embedded expertise and optimized production processes across all industries, increase your competitive edge.

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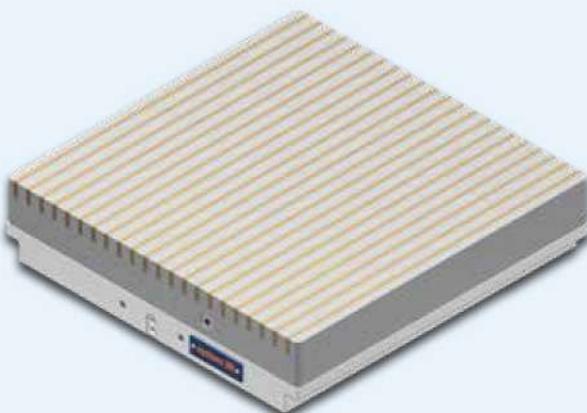
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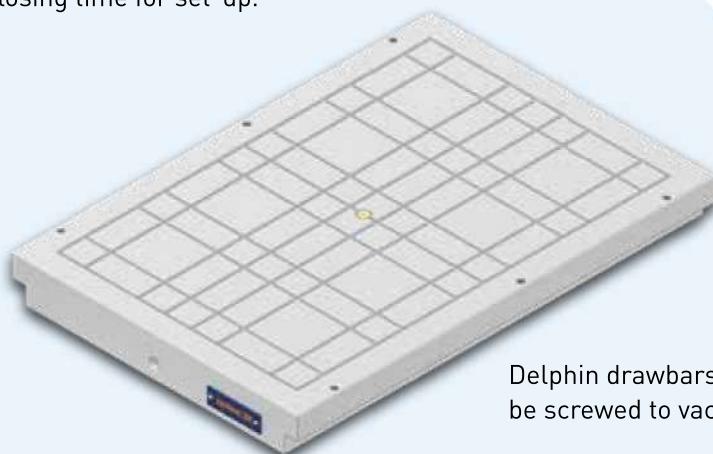
# One Machine Base – lots of Workpiece Fixation



Pre-assemble on the pallet, vices of all types and sizes.



Milling magnets are particularly suitable for five sided machining. The magnet pallet can be changed immediately without losing time for set-up.

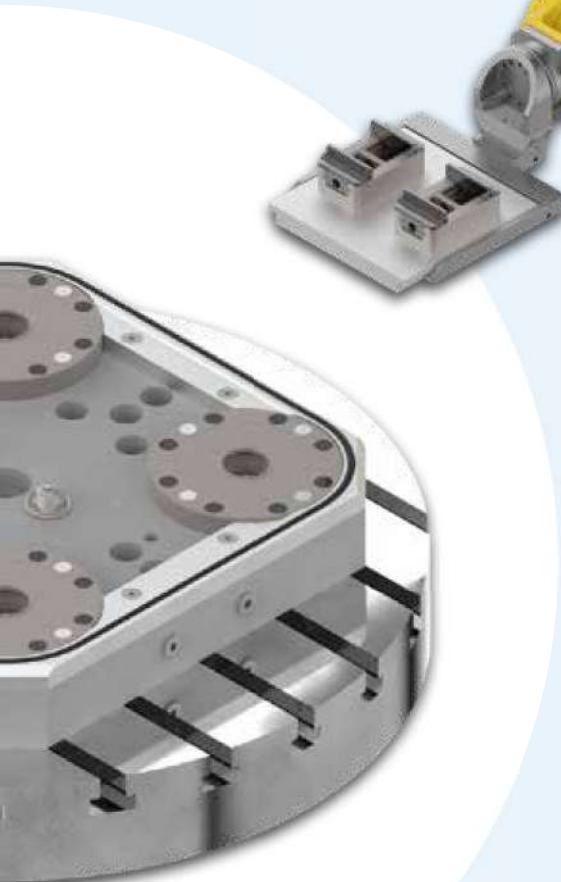


Delphin drawbars can easily be screwed to vacuum plates.





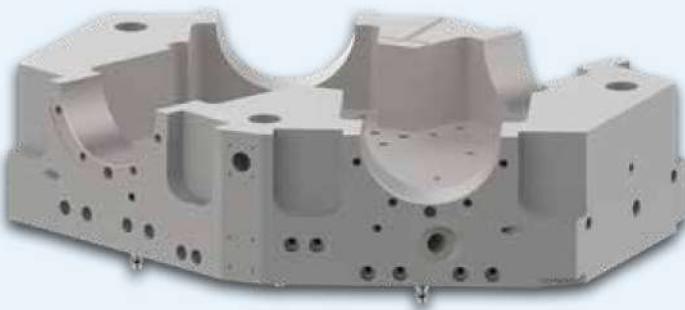
T-slot pallets with Delphin drawbars can be changed quickly. The T-slots are particularly suitable for clamping: workpieces of any kind, vices, rotary tables, stops, dividing attachments and prisms.



Customer specific fixture can easily switch between different machines like milling machine, CMM and grinding machine without losing accuracy or time for set-up.

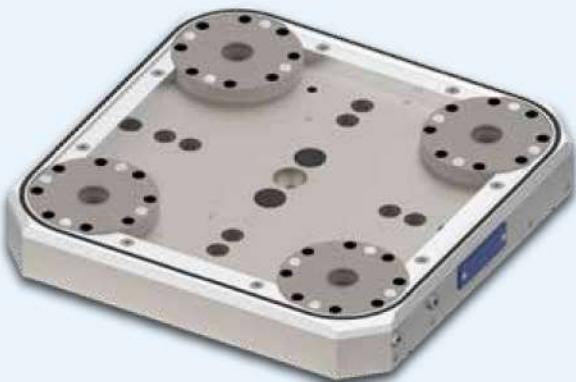


System 3R offers industry robots and handling devices which are stationary or travel on rails and load the Delphin system easily.



The drawbar serve as an interface between the machine table and the customer workpiece. Direct part clamping is very popular, especially in mold making. This ensures accurate positioning of the molds or other workpieces on various machines.

# Different Delphin Applications



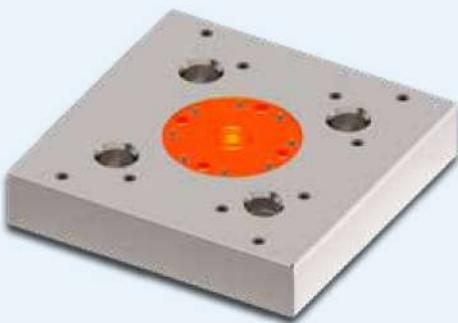
## 4-fold Baseplate

4-fold baseplates with a sealing frame are becoming popular for automated handling of pallets and parts.



## Built-up

Free positioning with Built-up chucks.



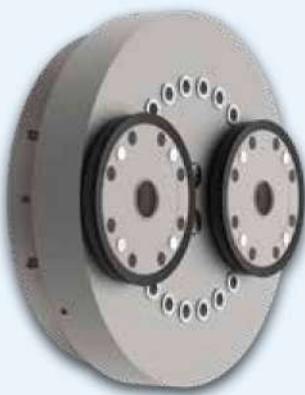
## High temperature & Additive manufacturing

Delphin high temperature chucks are particularly well in additive manufacturing.



## Pallet gripper

The Delphin gripper is the coupling interface between robot and pallet.



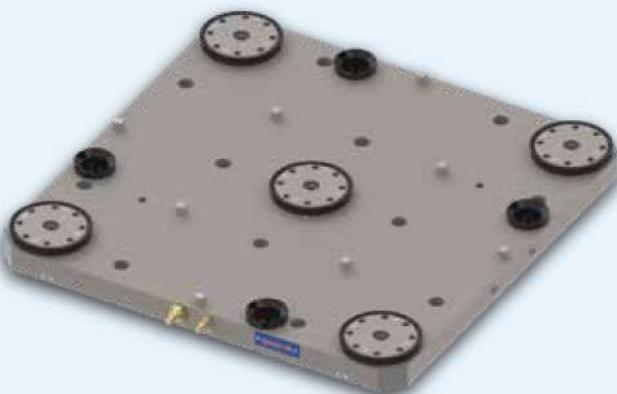
## Spindel

Two chucks on a spindle are very popular for the production of turbin shovels. This clamping solution guarantee high stability by high acceleration force.



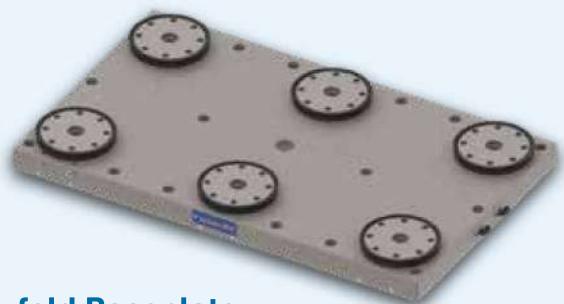
## Tower

Simple and uncomplicated vertical palletizing of vices, pallets and fixations. Less problems with chips because they fall down.



### 5-fold Baseplate

5-fold baseplates are popular with an Delphin index chuck in the middle. Thus, even small pallets can be used and it has more space in the magazine.



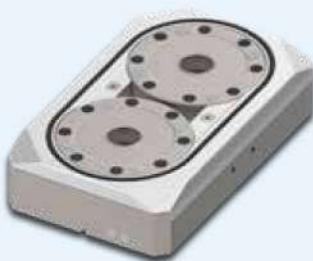
### 6-fold Baseplate

Base plates with any number of Delphin chucks are possible.



### Rotable Presetting Station

While the machine is running, workpieces can be pre-positioned on the rotatable presetting station.



### 2-fold Baseplate

2-fold baseplates are especially suitable for single vices.



### Customised Application

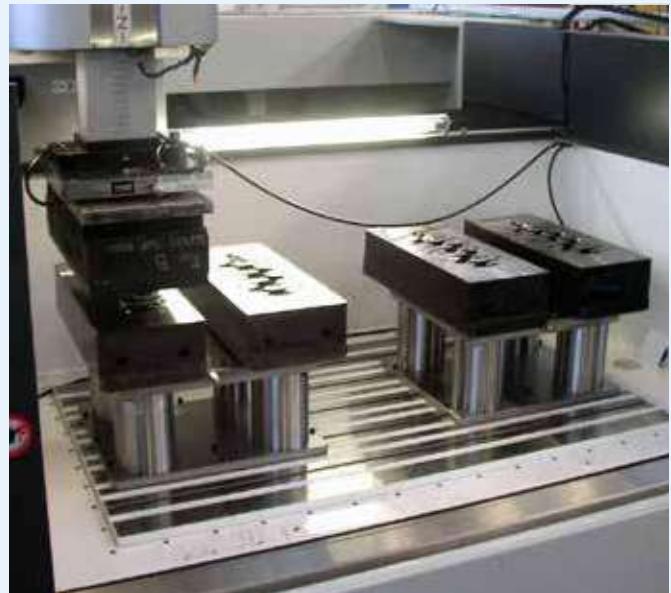
Delphin offers you maximal flexibility and freedom to design your customised application.

## Milling with Delphin



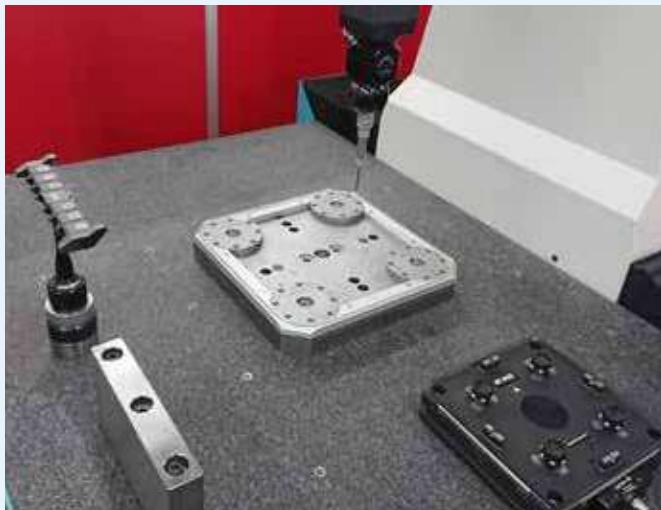
Thanks to high clamping force and mechanical locking, the Delphin clamping system is particularly suitable for milling, even under the highest load. The modular property is extraordinary fitting for various devices and fixtures, which are needed in milling.

## EDM with Delphin



Attaching electrodes or workpieces to a pallet has the great advantage of being able to transfer the accuracy of upstream processes such as CMM and milling etc. into the EDM process. Due to the Delphin clamping system, especially large electrodes and workpieces are possible.

## Measuring with Delphin



For an intermediate control, the workpiece can be measured on a measuring machine without removing the fixture. Thanks to the drawbars, the workpiece can be placed again with high precision into the production machine for further processing.

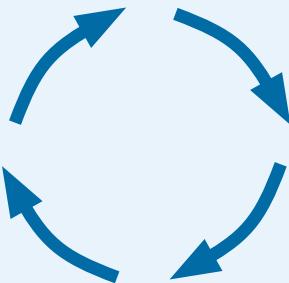
## Automation with Delphin



Depending on the Delphin system, activation is either pneumatic or hydraulic. The control signals can be sent from the machine or from the robot to the corresponding machine valves which then perform activation of the Delphin system.

Modern robot and software work perfect together with the Delphin clamping system and let your machine work day and night.

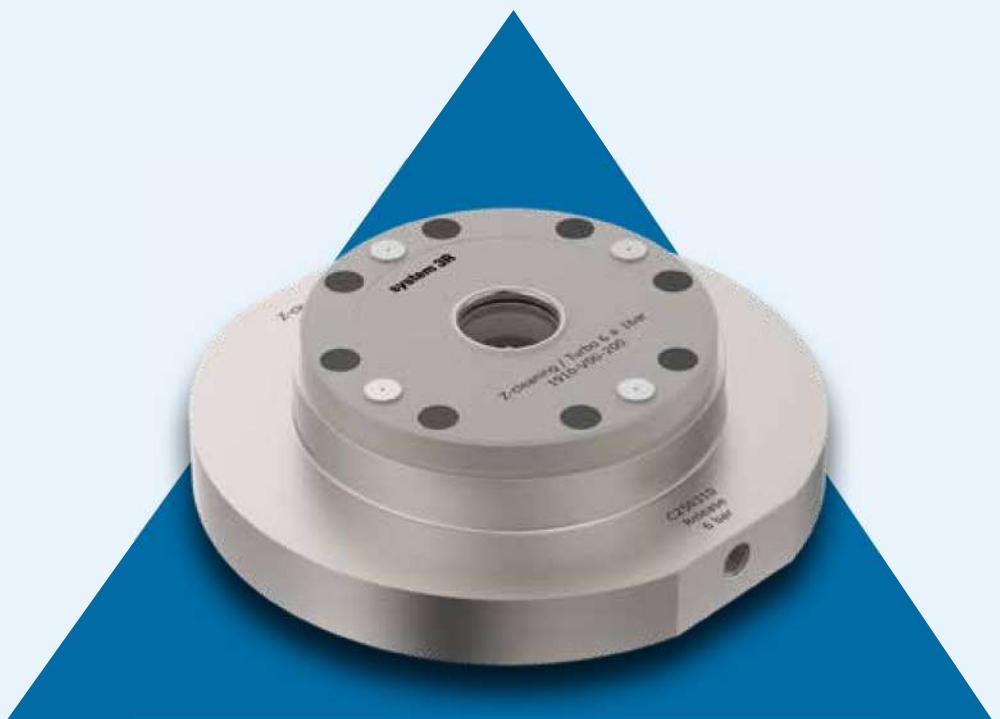
# Why Delphin?



+ Highest repeatability

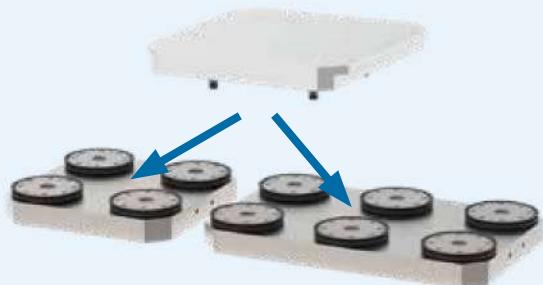
+ Highest process reliability

Quality



Flexibility

Productivity



- + The Delphin clamping system is modular and adapts to your machine
- + Standardized interface for all machines

- + Fastest possible pallet, device and workpiece change
- + Less set-up time
- + Unmanned work with Delphin automation

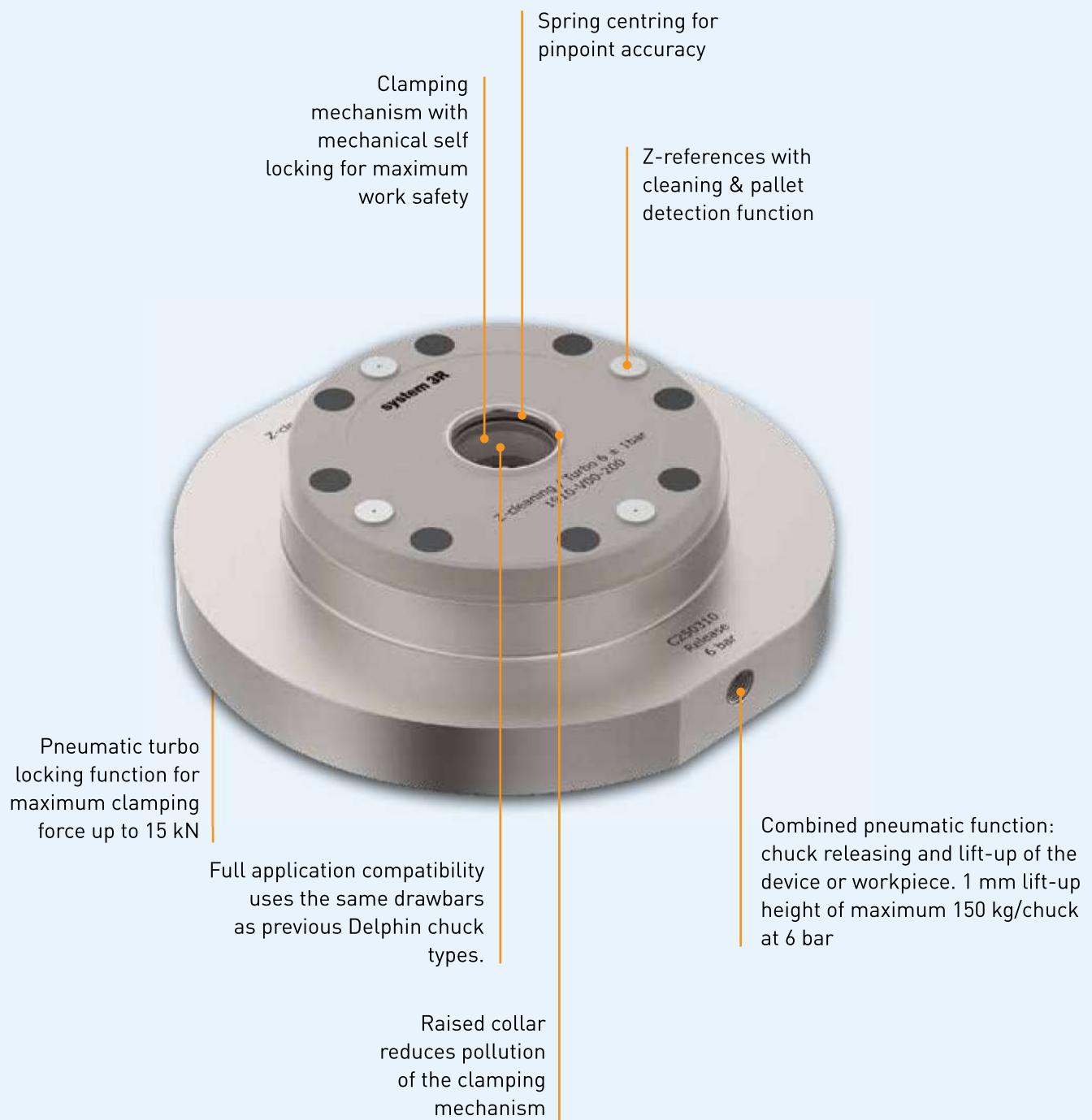
# Product Overview



	DelphinCompact	DelphinClassic	Delphin BIG
	Manual and automatic use	Manual use	For large part manufacturing
<b>Application</b>	 Milling  Wire cutting  Die sinking  Laser  Automation	 Milling  Laser  Die sinking  Wire cutting	 Milling  Laser  Automation
<b>Recommended workpiece weight / chuck</b>	up to 500 kg	up to 500 kg	up to 2 000 kg
<b>Clamping force</b>	15 kN, with turbo locking	10 kN	50 kN, with turbo locking
<b>Holding force</b>	60 kN	60 kN	100 kN
<b>Security</b>	Mechanical self locking	Mechanical self locking	Mechanical self locking
<b>Presence control and cleaning</b>	yes	no	yes
<b>Releasing</b>	pneumatic 4-10 bar hydraulic up to 30 bar	pneumatic 6-10 bar hydraulic up to 30 bar	hydraulic 40-60 bar
<b>Softlanding and lift-up function</b>	up to 1 mm	no	up to 2 mm
<b>Lift-up weight / chuck</b>	up to 150 kg at 6 bar up to 1 000 kg at 30 bar		up to 2 500 kg at 60 bar
<b>Centre distance (c-c)</b>	120-400 mm	120-400 mm	400-1 000 mm
<b>Diameter</b>	Ø 115 mm	Ø 115 mm	Ø 150 mm
<b>Repeatability</b>	within 0.003 mm	within 0.003 mm	within 0.005 mm
<b>System centring accuracy</b>	within 0.005 mm	within 0.005 mm	within 0.010 mm
<b>Material</b>	hardened stainless steel	hardened stainless steel	hardened steel



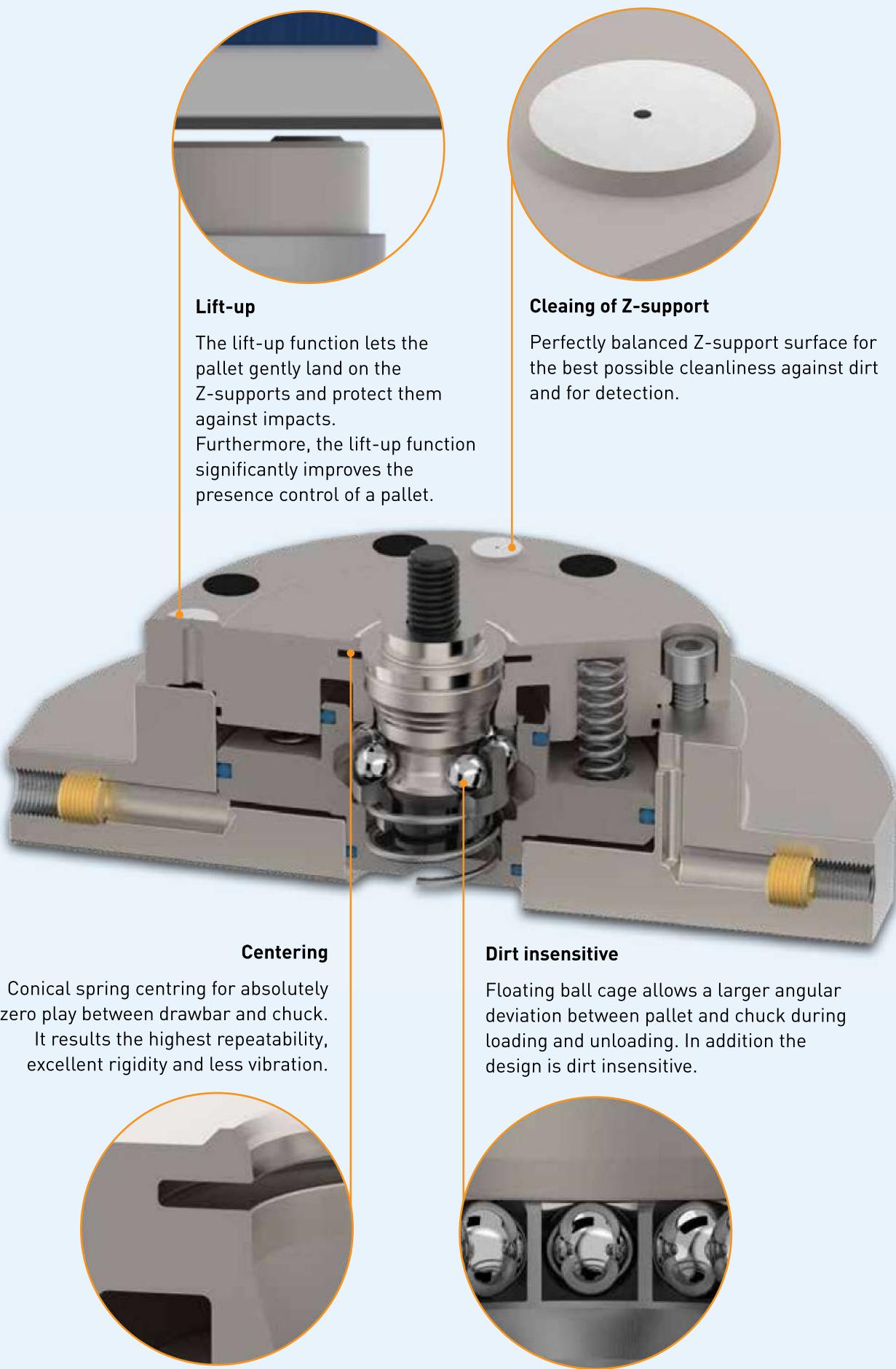
# DelphinCompact Chuck



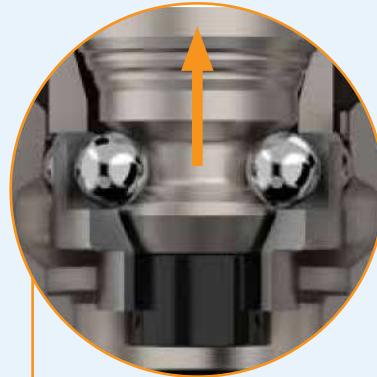
## Key Facts

- + Very compact design: outer diameter 115 mm
- + Stainless steel - to be used in milling, EDM, WEDM, turning and grinding processes
- + High clamping force (up to 15 kN with turbo locking)
- + Pneumatic opening, with lift-up function of 150 kg at 6 bar

# DelphinCompact



# DelphinCompact

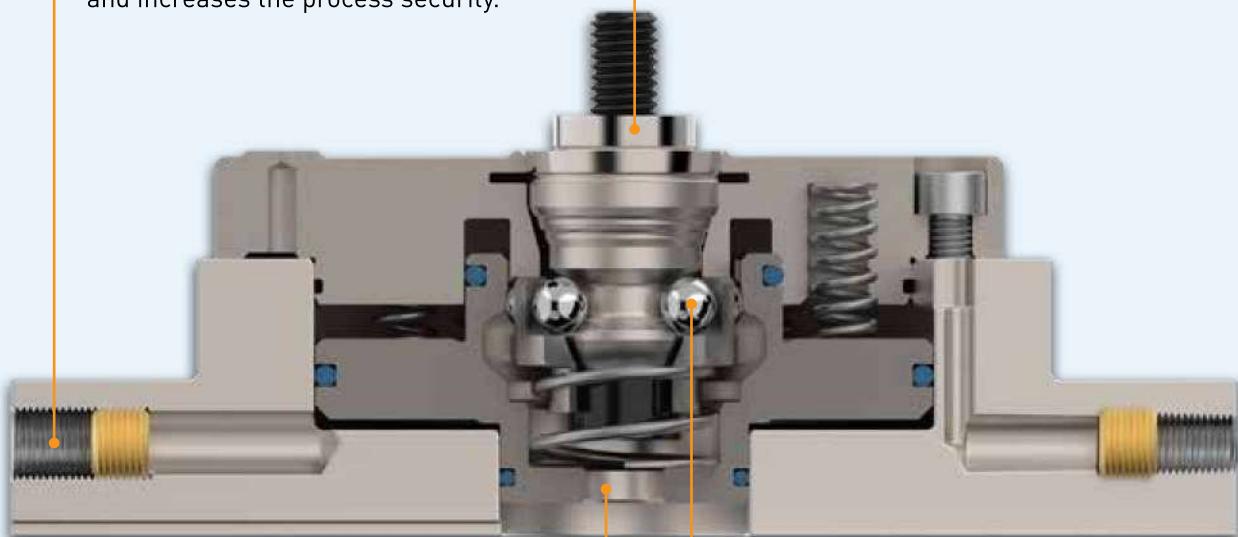


## Required air pressure

Many clamping systems need compressed air with minimum 6 bar. The DelphinCompact chuck requires only 4 bar air pressure to open the chuck and release the drawbar. This saves money and increases the process security.

## Holding force

The holding force indicates the maximum permissible pull out force. This force determines the safety until a pallet is pulled out of the chuck. Delphin chucks have a minimum holding force of 60 kN.



## Drain hole

When unloading a pallet, it can happen that dirt and water from the milling process pass into the clamping system. The Delphin system has a drain hole. Therefore, dirt and water flush out and the chuck keeps the functionality.



## Clamping force / pull in force

The "clamping force" or "pull in force" indicates how much the drawbar is pulled into the system. Together with other features like the centering, it is responsible for the stability and rigidity of a system.



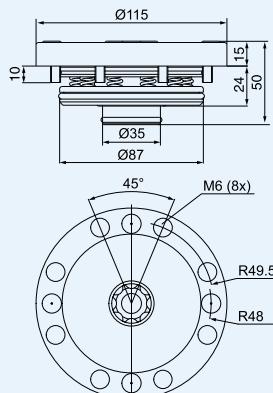
# DelphinCompact – for automation and manual applications

## Technical data

- + Clamping force with 6 bar turbo pressure: up to 15 kN
- + Holding force: 60 kN
- + Air pressure open: 4-10 bar
- + Oil pressure open: Max 30 bar
- + Lift-up function pneumatic: 150 kg at 6 bar, lift-up 1 mm
- + Lift-up function hydraulic: 1 000 kg at 30 bar, lift-up 1 mm
- + Repeatability: within 0.003 mm
- + Material: hardened stainless steel

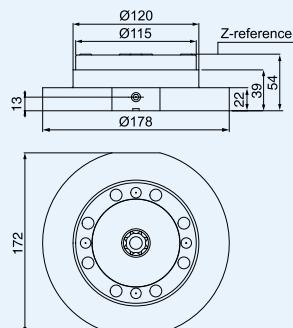
## Built-in

(into machine table or base plate)



## Built-up

(on machine table)



Suitable for:



### Built-in chuck, DelphinCompact, C 250 000

For simple installation in the machine table or in a baseplate.

### Built-in chuck, without lift-up, DelphinCompact, C 250 010

For simple installation in the machine table or in a baseplate. Specially designed for tower or other applications with lateral load.

### Built-in chuck index, DelphinCompact, C 250 050

For simple installation in the machine table or in a baseplate.



### Built-up chuck, DelphinCompact, C 250 310

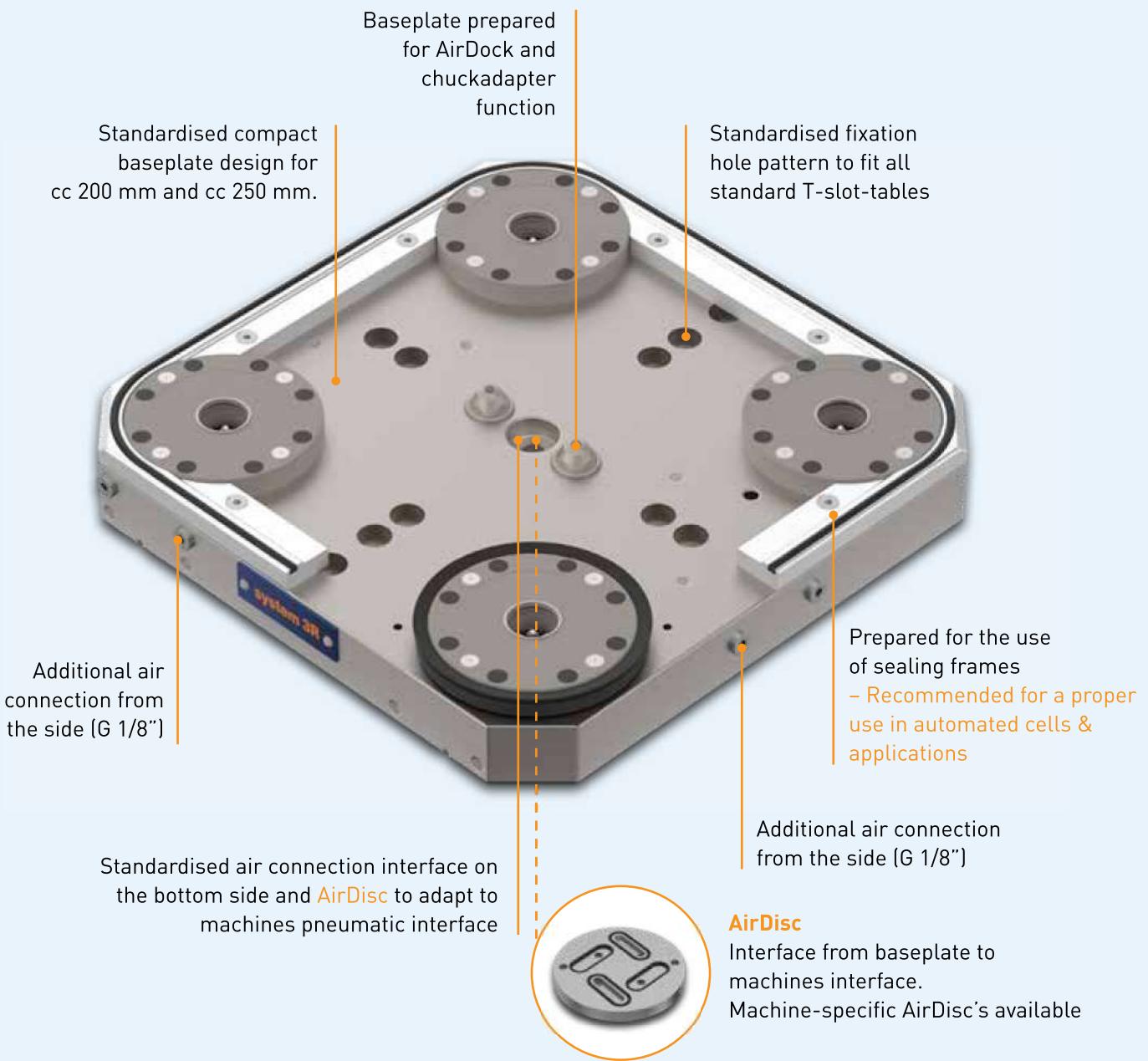
For direct installation on a machine table. Mounting holes to be drilled at installation.

### Built-up chuck index, DelphinCompact, C 250 350

For direct installation on a machine table. Mounting holes to be drilled at installation.



# DelphinCompact 4-fold Baseplate



## Key Facts

- + Standardised design
- + Prepared for a proper use in automated solutions
- + Easy adaptation to machine-specific air connections via AirDisc
- + High clamping force (up to 60 kN with turbo locking)
- + Pneumatic opening, with lift-up function (1 mm) of 600 kg at 6 bar



# Delphin – Accessories

**Load- & Washstation, Delphin**  
(without AirDisc, with 2 fittings for side connection)

**S 252 204**

- cc 200 mm

**S 252 254**

- cc 250 mm



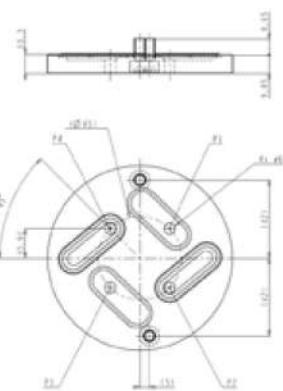
**AirDisc, C 253 0XX**

On request, this AirDisc can be designed to any machine specific interface.



**Standard AirDisc, C 253 040**

Machine specific interface disk from machine table to DelphinCompact baseplate. Suitable for many machines.



**Chuck sealing rings, C 254 090**

Recommended only for manual use of DelphinCompact and DelphinClassic.



**Sealing frames, DelphinCompact**

**C 252 210**

For baseplate C 252 200.

- cc 200 mm

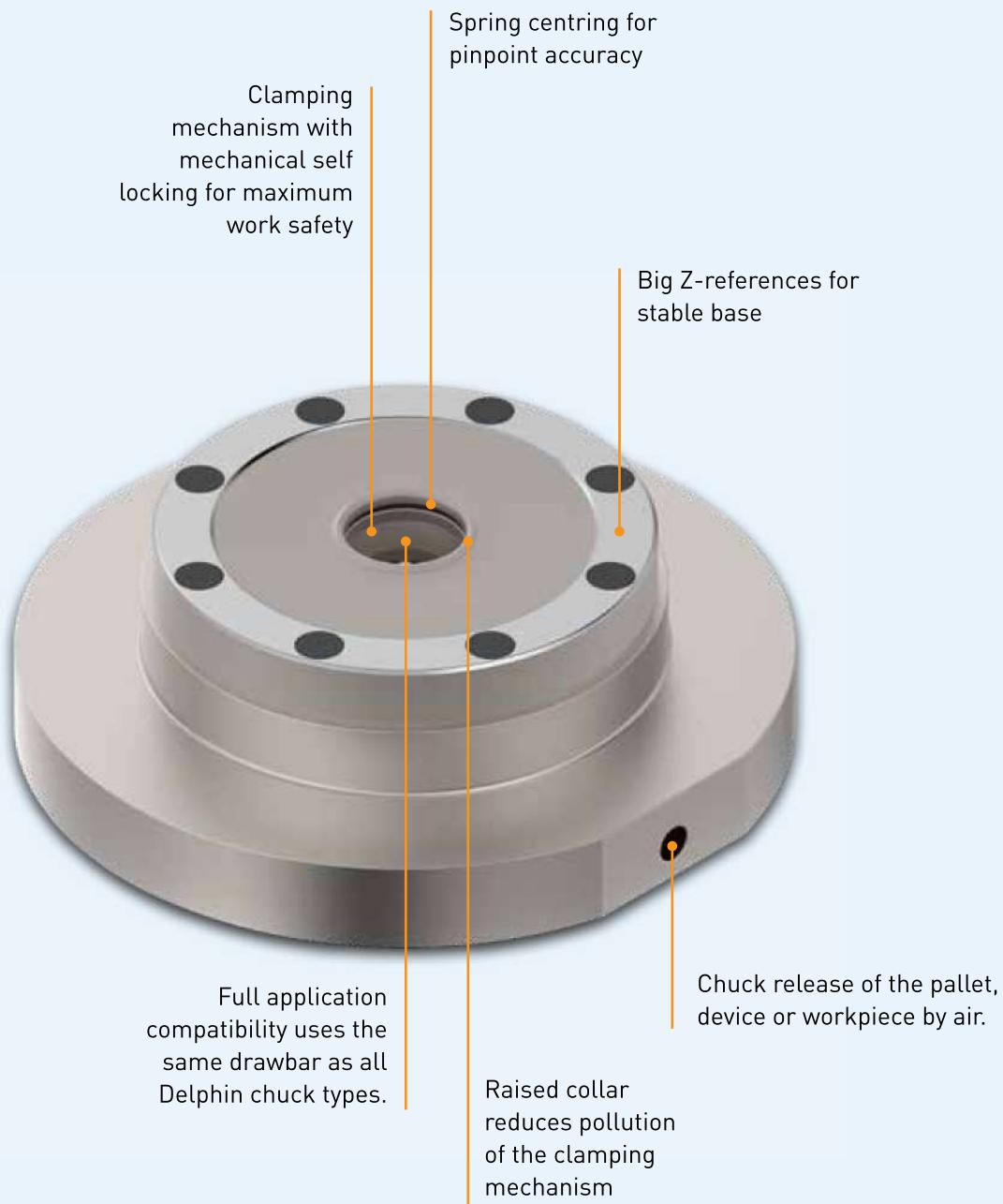
**C 252 260**

For baseplate C 252 250.

- cc 250 mm



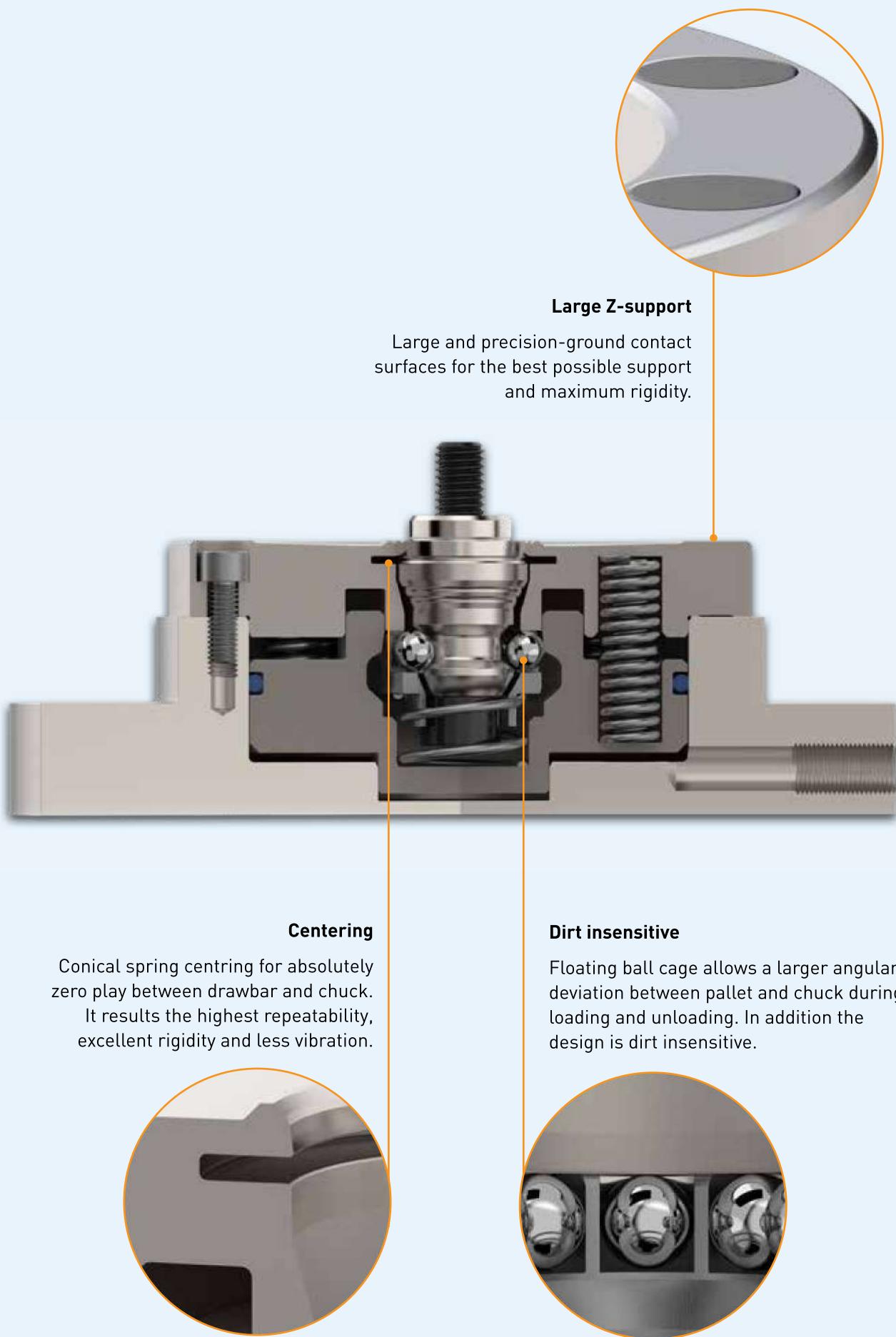
# DelphinClassic Chuck



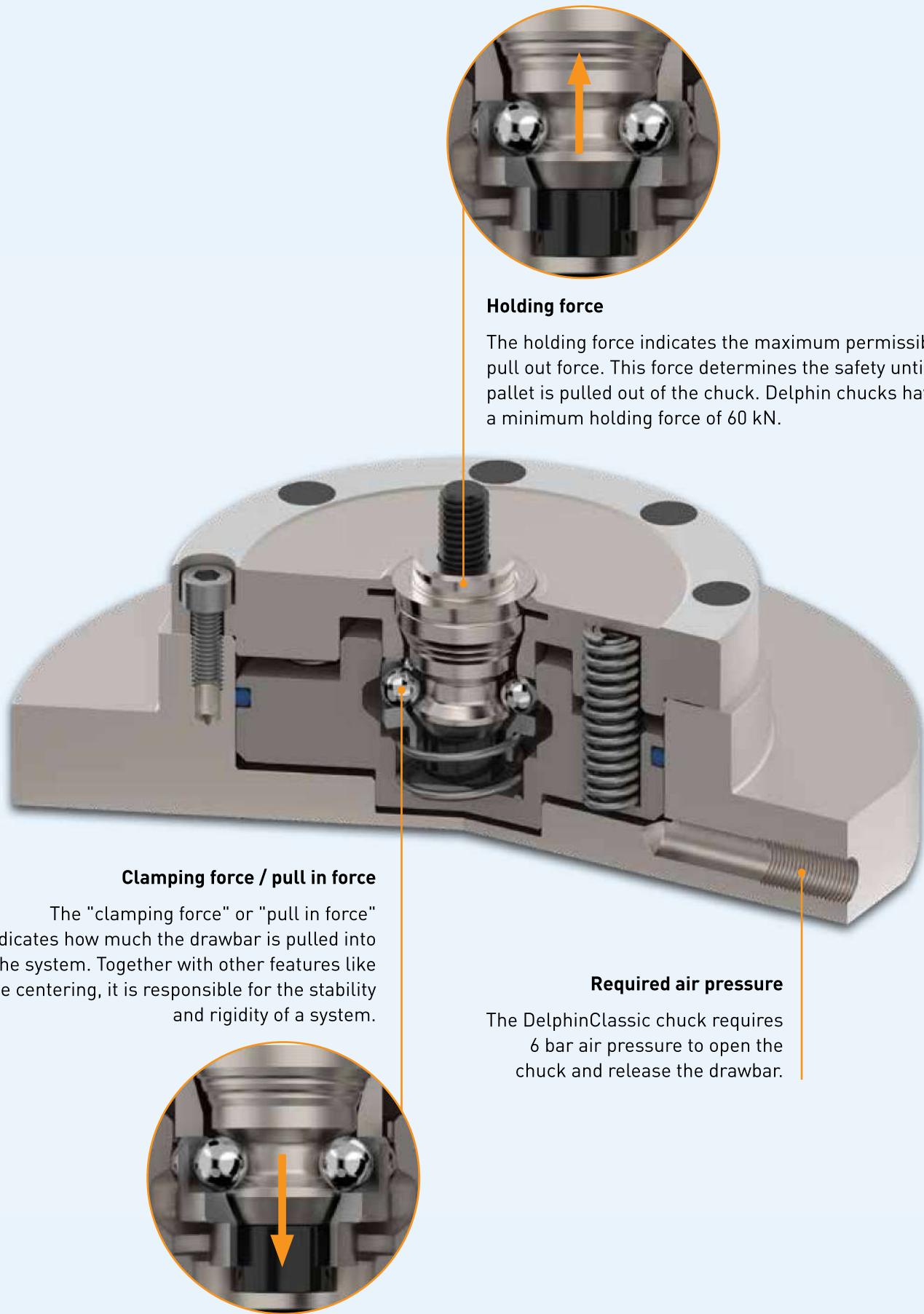
## Key Facts

- + Very compact design: outer diameter 115 mm
- + Stainless steel – to be used in milling, EDM, WEDM, turning and grinding processes
- + High clamping force up to 10 kN.

## DelphinClassic Chuck



# DelphinClassic Chuck



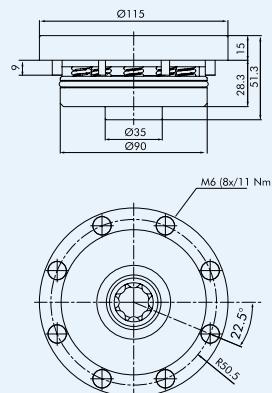
# DelphinClassic – for manual applications

## Technical data

- + Clamping force: 10 kN
- + Holding force: 60 kN
- + Air pressure open: 6-10 bar
- + Oil pressure open: Max 30 bar
- + Repeatability: within 0.003 mm
- + Material: hardened stainless steel

## Built-in

(into machine table or base plate)



## Suitable for:

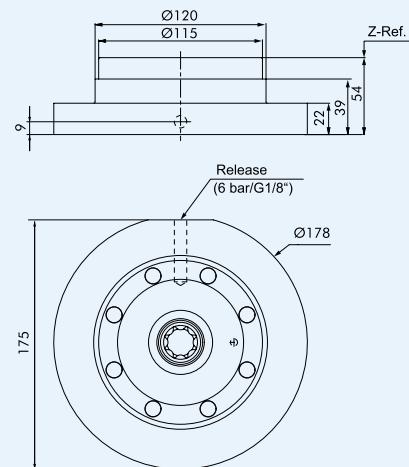


## Built-in chuck, DelphinClassic, C 272 000

For simple installation in the machine table or in a baseplate.

## Built-up

(on machine table)



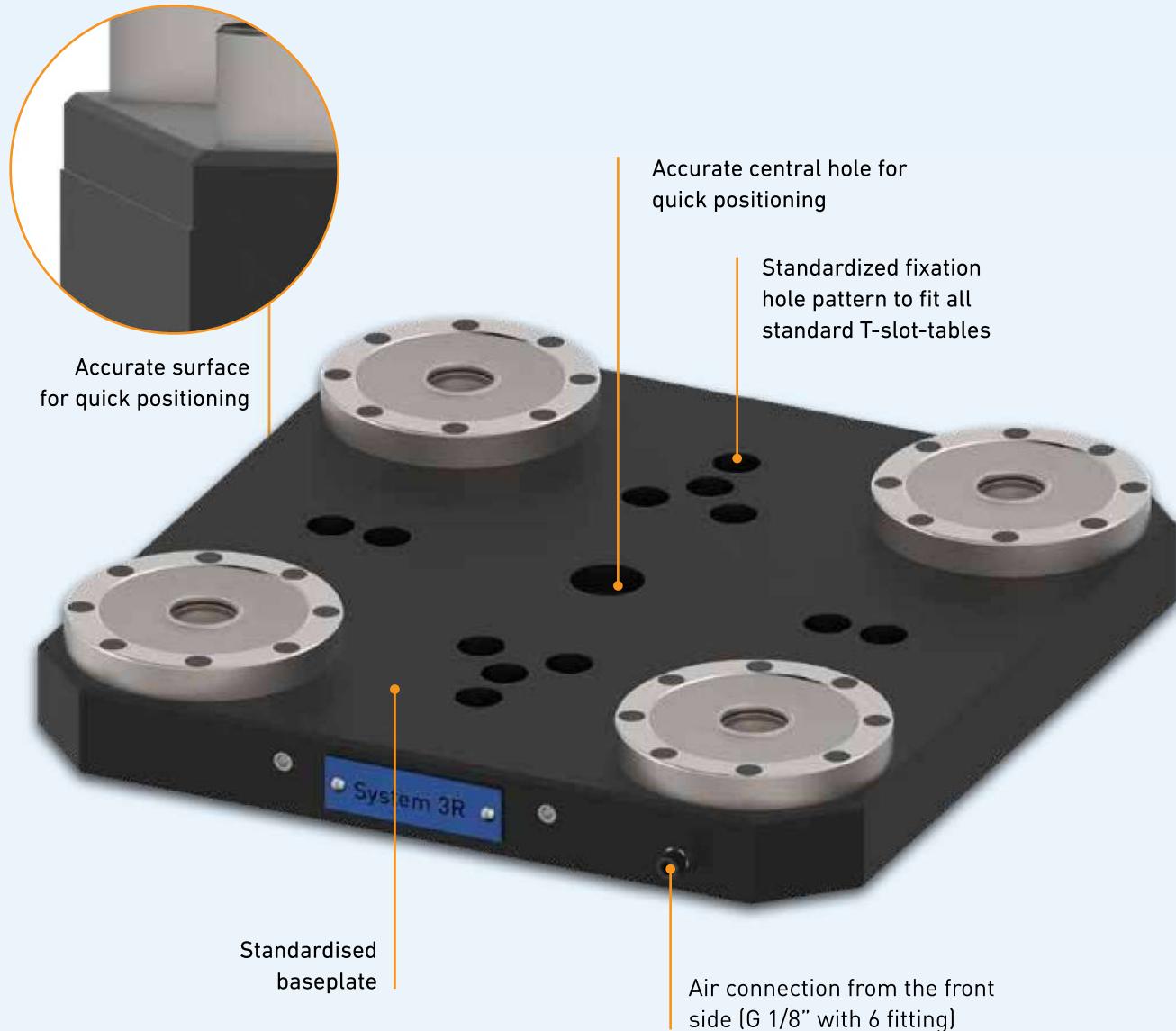
## Built-up chuck, DelphinClassic, C 272 310

For direct installation on a machine table.  
Mounting holes to be drilled at installation.



# DelphinClassic Baseplate

With the starter baseplate you are prepared for the fastest possible pallet, device and workpiece change. The Delphin baseplate offers maximum flexibility and process reliability throughout the entire production process. High clamping force with maximum accuracy is guaranteed.



## Key Facts

- + High clamping force up to 40 000 N
- + Pneumatic opening
- + Mechanical self locking for highest process reliability

# DelphinClassic Baseplates – for manual applications

## Technical data

- + Clamping force: up to 40 kN
- + Holding force: 240 kN
- + Release pressure: 6-10 bar
- + Repeatability: within 0.003 mm
- + Material: Hardened stainless steel and hard anodized aluminum.

## Suitable for:



## 4-fold Baseplate, DelphinClassic (with 1 fittings for side connection)

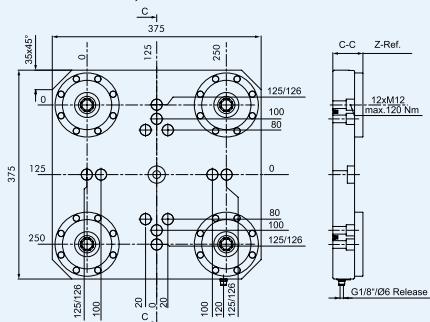
### C 272 250

- cc 250 mm



## 4-fold Baseplates, DelphinClassic,

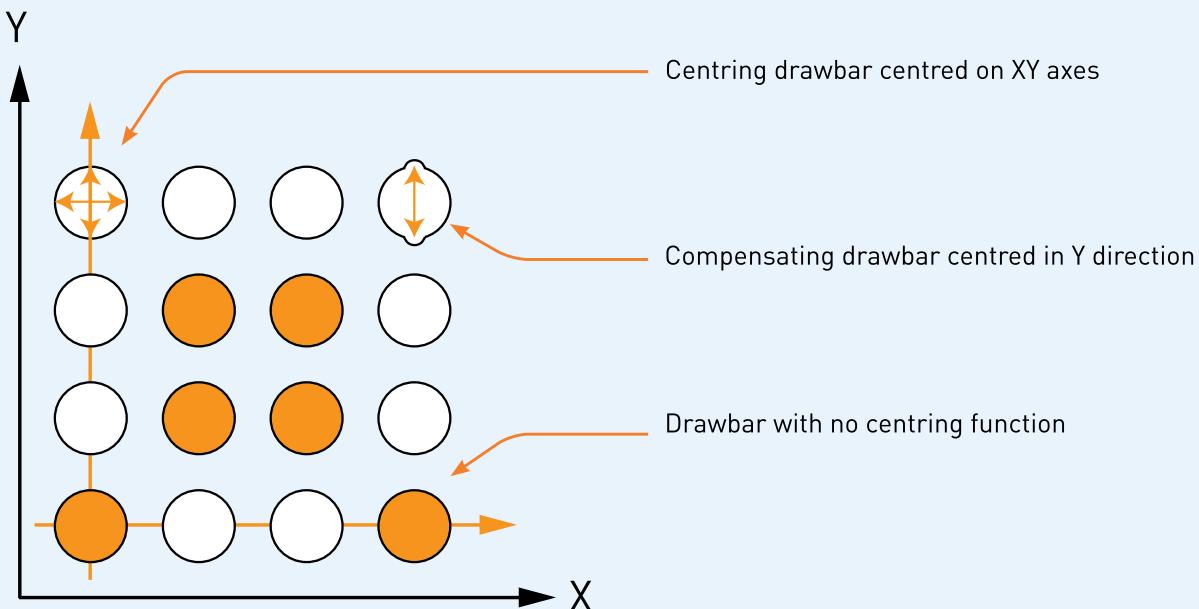
### cc 250 mm, (without AirDisc)



# Delphin Drawbars

## Function of the drawbars

Drawbars are mounted directly into a workpiece, pallet or fixture. There are three different types of drawbars. One defines the zero point and centers thus in 2 axes. The second drawbar is centering in one axis. All other drawbars have no centering, only clamping function.



For centering in 2 axis  
= zero point



For centering in 1 axis  
= angle definition



No centring  
= only clamping



# Delphin Drawbars

## Drawbar – centring on 2 axes

### C 282 000

Fixed in pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in: Ø28 x 40.5 mm.



two grooves

## Drawbar – centring on 1 axis

### C 282 100

Fixed in pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in: Ø28 x 40.5 mm.



single groove

## Drawbar – without centring

### C 282 200

Fixed in pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in: Ø28 x 40.5 mm.



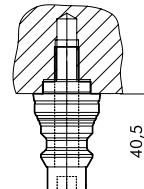
no grooves

## Function of the Delphin drawbar

centring on 2 axes

centring on 1 axis

without centring



fixed in pallet

## Drawbar – Sets

### Set with 2 drawbars

#### S 812 000

- Scope of delivery:  
1 x C 282 000 (centring on 2 axes)  
1 x C 282 100 (centring on 1 axis)



### Set with 4 drawbars

#### S 812 100

- Scope of delivery:  
1 x C 282 000 (centring on 2 axes)  
1 x C 282 100 (centring on 1 axis)  
2 x C 282 200 (without centring)



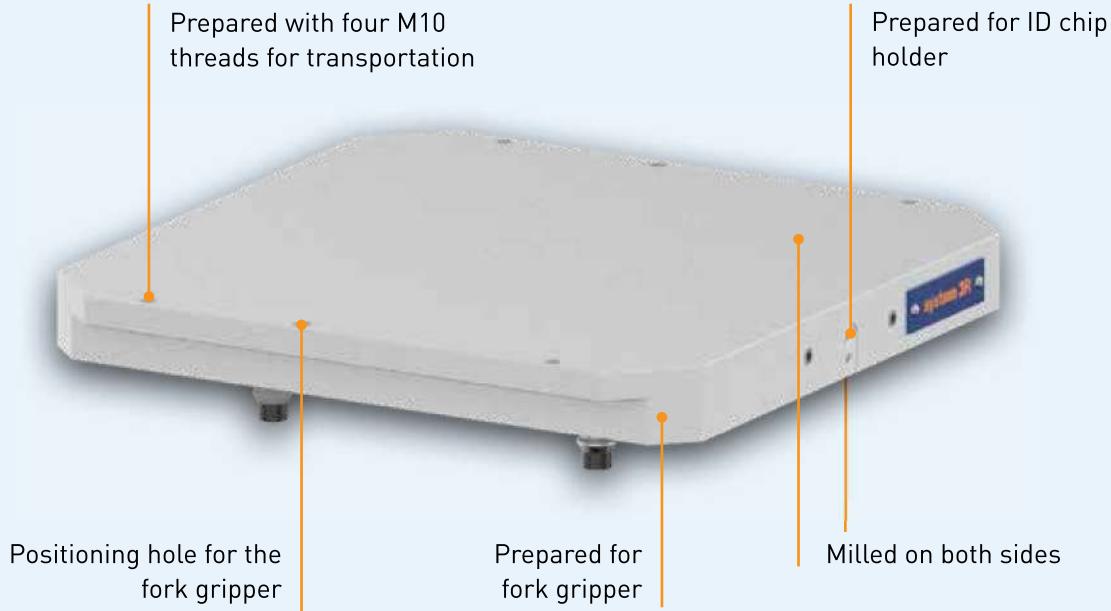
### Set with 6 drawbars

#### S 812 200

- Scope of delivery:  
1 x C 282 000 (centring on 2 axes)  
1 x C 282 100 (centring on 1 axis)  
4 x C 282 200 (without centring)



# Delphin Pallets

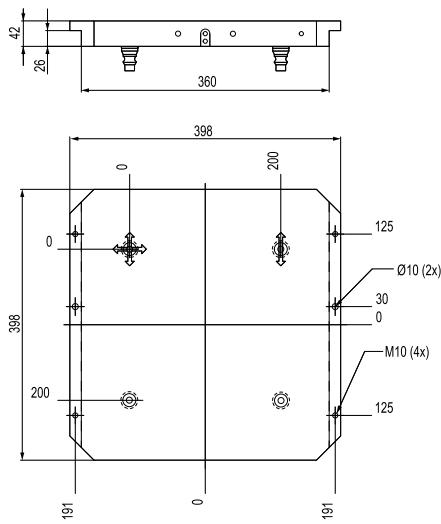


## **Pallets with 4 drawbars, Delphin, C 282 820**

- Prepared for automation
- Material: Aluminium
- Parallelism: 0.04 mm
- 4 drawbars already assembled

## **Set of pallets, S 282 820**

- C 282 820 supplied in a set of 5 pcs.



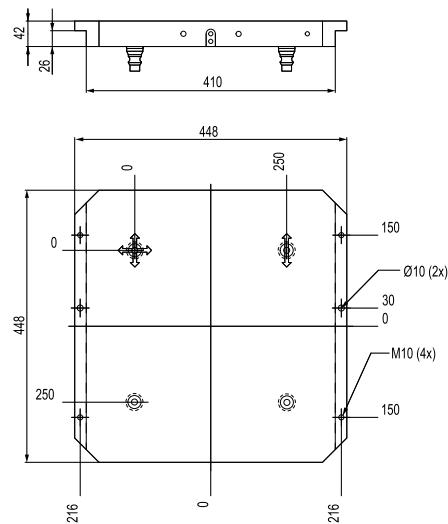
## **Pallets with 4 drawbars, Delphin, C 282 830**

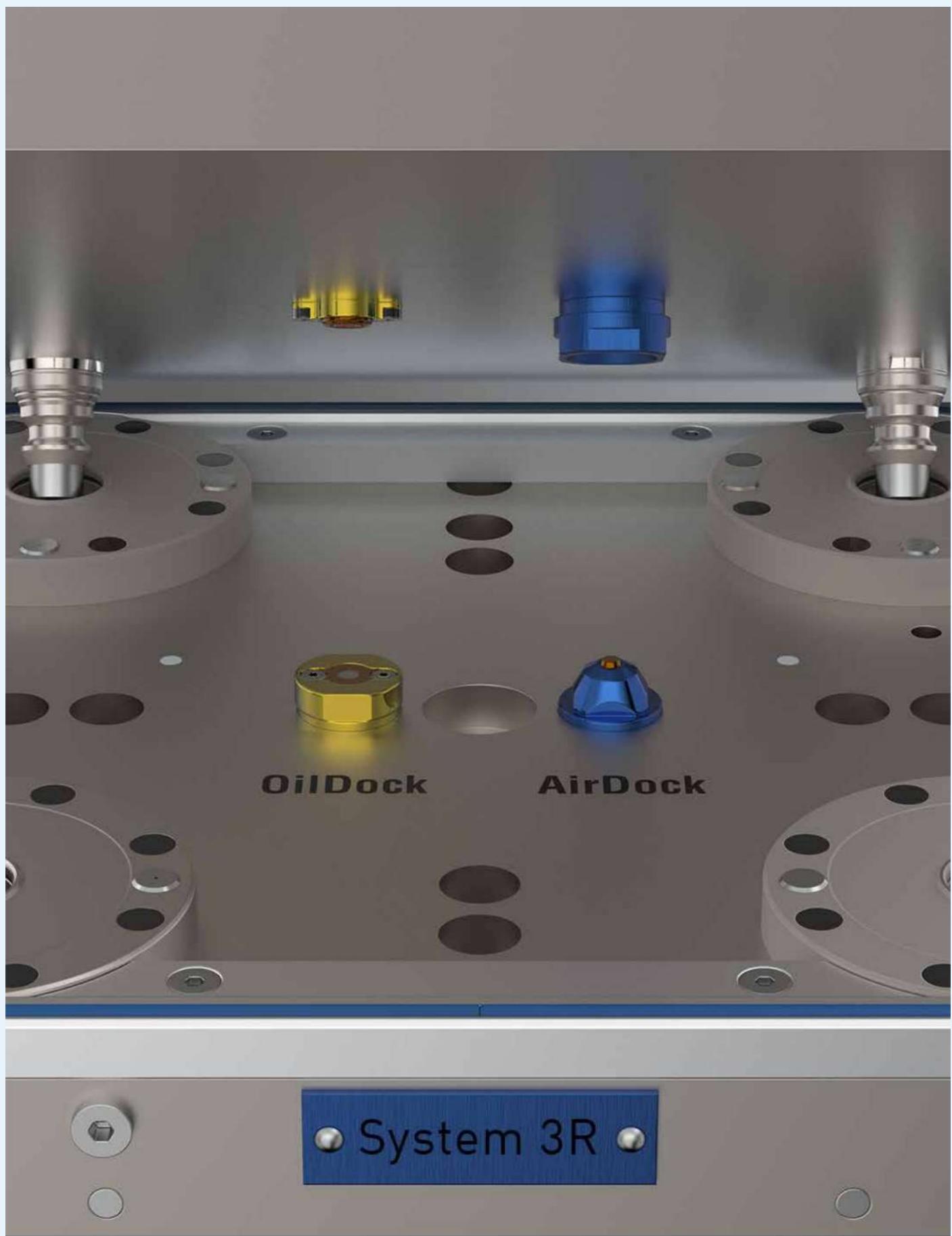
Prepared for automation

- Material: Aluminium
- Parallelism: 0.04 mm
- 4 drawbars already assembled

## Set of pallets, S 282 830

- C 282 830 supplied in a set of 5 pcs.





# Delphin Accessories

## AirDock valves chuck-side, S 254 000

Needed to build chuck adapter base plates.

Suitable for vacuum application and pressure up to 8 bar.

- Set of 2.



## AirDock valves pallet-side, S 254 010

Needed to build chuck adapter pallets.

Suitable for vacuum application and pressure up to 8 bar.

- Set of 2.



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## OilDock valves chuck-side, S 254 060

Needed to build chuck adapter base plates.

Thanks to the sealed design no intrusion of cooling water is possible.

Suitable for hydraulic pressure up to 200 bar.

- Set of 2.



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## OilDock valves pallet-side, S 254 070

Needed to build chuck adapter pallets.

Thanks to the sealed design no intrusion of cooling water is possible.

Suitable for hydraulic pressure up to 200 bar.

- Set of 2.



## Delphin Accessories

### Pneumatic control unit, DelphinCompact, C 254 950

Control unit specially for DelphinCompact.

- Including 10 m tube Ø 6 mm and 2 fittings.



### Connection fittings for Baseplate, S 254 050

To be used when connecting air from the side to the Delphin Baseplate.



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### Pneumatic control unit, C 810 720

The pneumatic control unit will be used for the baseplate.

- Sliding hand valve
- Connecting fitting G 1/8
- Coupling



# Delphin Accessories



## Reference mandrel, C 288 170

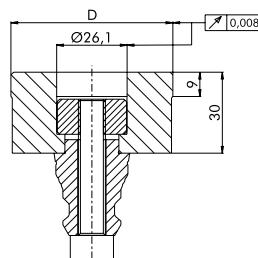
Alignment aid for chuck installation.

- Material: steel stainless, hardened and ground
- For all chucks
- Diameter D = 110 mm.

## Protective pallet Delphin, S 254 100

Chip and air pressure (turbo locking) protection for DelphinCompact and DelphinClassic chucks.

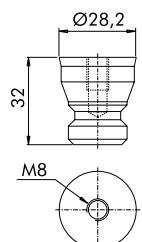
- Fits for chuck with sealing ring
- Scope of delivery:
  - 1 x C 282 000 Drawbar
  - 1 x C 266 040 Protective pallet.



## Protective Drawbar DelphinClassic, C 286 060

Chip protection for chuck, seals centre bore, Z-support of chuck remains usable.

- Material: plastic
- Dimensions: Ø28 x 32 mm
- M8 for dismounting.

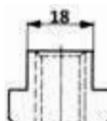
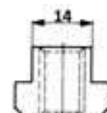


## Set accessories fixation for Baseplate

For fixing on machine table.

### C 289 130

- 6 x M12x45 cylinder head screw
- 6 x M12x55 cylinder head screw
- 6 x M12x14 T-slot nut.



### C 289 140

- 6 x M12x45 cylinder head screw
- 6 x M12x55 cylinder head screw
- 6 x M12x18 T-slot nut.



# Delphin Accessories

## **Indexing pins for indexing pallet, S 814 000**

For customer installation in indexing pallet.

- Material: steel, hardened
- Dimensions: Ø8 x 20 mm
- Scope of delivery: 4 pieces
- Require mounting device C 286 080



## **Mounting device for indexing pins, C 286 080**

For customer installation of index pins S 814 000 in pallet.



Example application



## **Sealing Cords for Frames**

### **Sealing Cord 4 m, S 817 200**

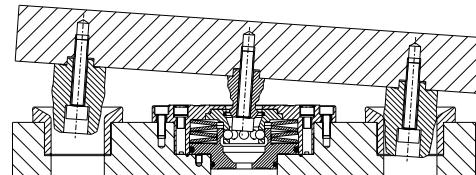
### **Sealing Cord FKM 4 m, S 817 220**

- Sealing cord for the most Delphin sealing frames.
- Suitable for: C 252 210, C 252 260
- Length: 4 m

## **Pre-centring pin / Pre-centring bush**

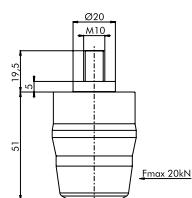
Pre-centring for mid-sized to large workpieces.

Should always be used wherever possible.



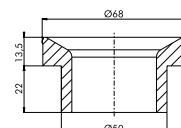
## **C 286 160**

Pre-centring pin for the pallet / device



## **C 286 250**

Pre-centring bush for DelphinCompact and DelphinClassic



## **Spare Parts**

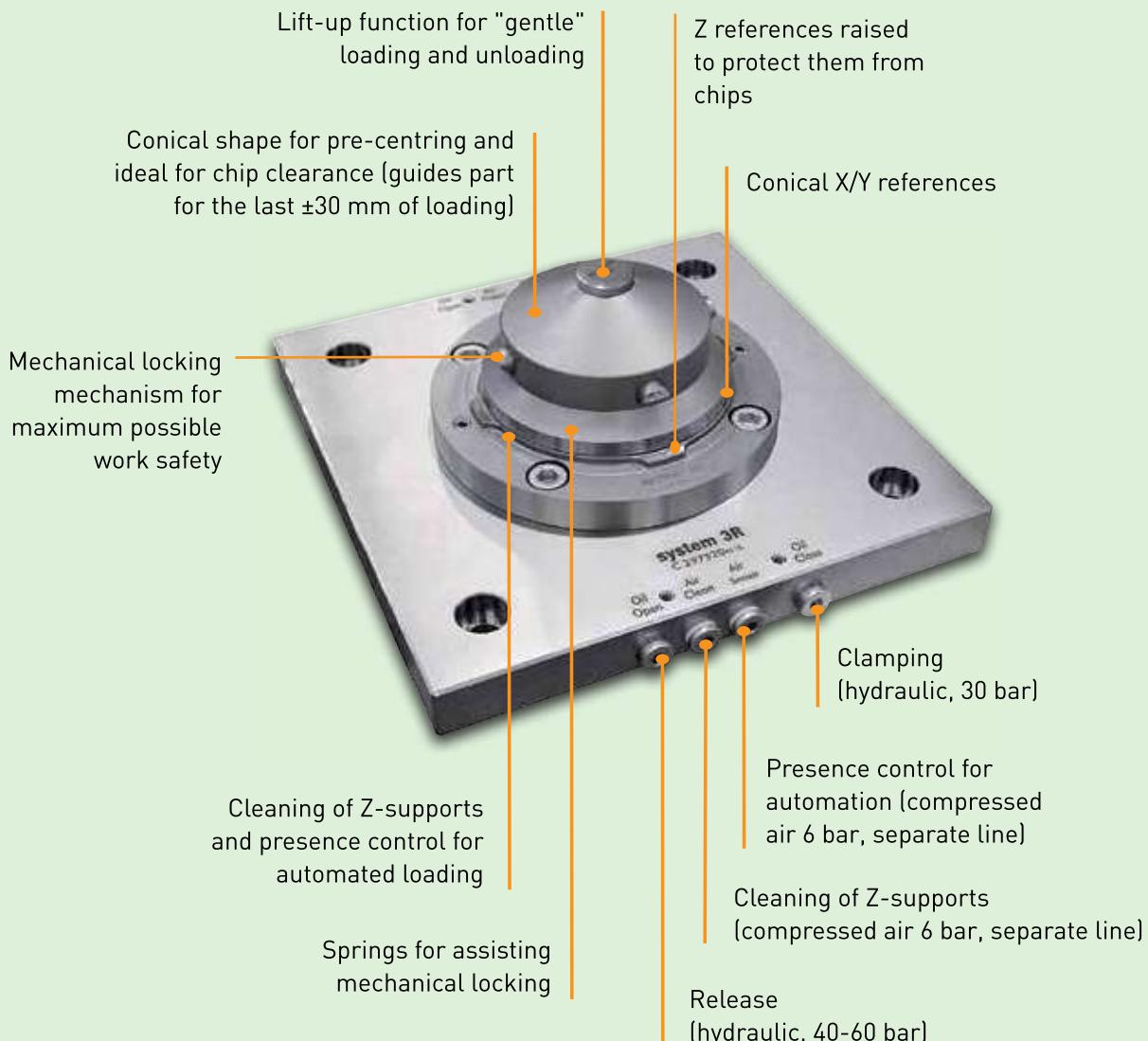
For Delphin chucks. Includes O-rings, compression springs or disc springs, balls, screws, screw cover and assembly tool.

### **Table chuck type item No.**

DelphinClassic	S 272 000
DelphinCompact	S 250 000
HCP	S 840 040
HSP	S 840 000
HHP	S 840 010
HHPA	S 840 060
PSP	S 840 030
PHP	S 840 020
PHPA	S 840 050



# DelphinBIG Chuck



## Key Facts

- + Can be used for large workpieces
- + High clamping force (up to 50 kN with turbo locking)
- + Release by hydraulic, with lift-up function of 2 500 kg at 60 bar.
- + Simple loading thanks integrated pre-centring
- + Thermal expansion of the workpieces of up to  $\pm 0.4$  mm can be accommodated

# DelphinBIG – for automation and manual applications

## Technical data

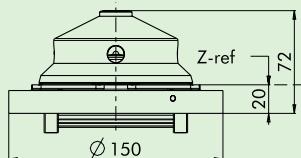
- + Clamping force with 30 bar turbo pressure: up to 50 kN
- + Holding force: 100 kN
- + Oil pressure release: Max 30-60 bar
- + Lift-up function: 2 500 kg, 2 mm at 60 bar release pressure
- + Repeatability: within 0.005 mm
- + Material: steel, hardened

## Suitable for:

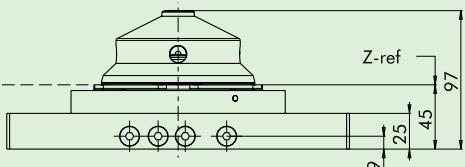


Milling

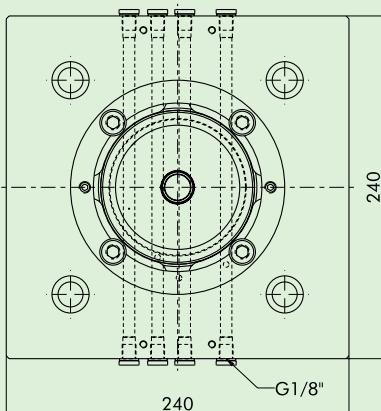
## Chuck built-in (into machine table or base plate)



## Chuck built-up (on machine table)



with mounting bores



## Built-in chuck, DelphinBIG, C 297 000

For simple installation in the machine table.



## Built-up chuck, Delphin BIG, C 297 310

Mounting holes can be made by customer

**Recommendation: at least 4 chucks per application**

- Chuck C 297 000



## Spare Parts DelphinBIG, S 850 000

For Delphin BIG chucks. Includes O-rings, compression springs or disc springs, balls, screws, screw cover and assembly tool.

## Ring centring in 2 axes, DelphinBIG, C 298 010

including fixation screws



## Ring centring in 1 axis, DelphinBIG, C 298 110

including fixation screws



## Ring without centring, Delphin BIG, C 298 210

including fixation screws



## About GF Machining Solutions

# Multi-technology solutions provider

Our commitment to you and your specific applications is proven by the value-adding intelligence, productivity and quality delivered by our multi-technology solutions. Your success is our chief motivator. That's why we are continuously advancing our legendary technical expertise. Wherever you are, whatever your market segment and whatever the size of your operation, we have the complete solutions and the customer-centric commitment to accelerate your success—today.

### EDM (Electrical Discharge Machining)



#### Wire-cutting EDM

GF Machining Solutions' wire-cutting EDM is fast, precise and increasingly energy efficient. From ultraprecise machining of miniaturized components down to 0.02 mm to powerful solutions for demanding high-speed machining with respect to surface accuracy, our wire EDM solutions position you for success.

#### Die-sinking EDM

GF Machining Solutions is revolutionizing die-sinking EDM with features like iGAP technology to dramatically boost machining speed and reduce electrode wear. All of our die-sinking systems offer fast removal and deliver mirror finishes of Ra 0.1 µm (4 µin).

#### Hole-drilling EDM

GF Machining Solutions' robust hole-drilling EDM solutions enable you to drill holes in electrically conductive materials at a very high speed—and, with a five-axis configuration, at any angle on a workpiece with an inclined surface.

### Tooling and Automation



#### Tooling

Our customers experience complete autonomy while maintaining extreme accuracy, thanks to our highly accurate System 3R reference systems for holding and positioning electrodes and work pieces. All types of machines can easily be linked, which reduces set-up times and enables a seamless transfer of workpieces between different operations.

#### Automation

Together with System 3R, we also provide scalable and cost-effective Automation solutions for simple, single machine cells or complex, multi-process cells, tailored to your needs.

### Milling



#### Milling

Precision tool and mold manufacturers enjoy a competitive edge with our Mikron MILL S solutions' fast and precise machining. The Mikron MILL P machines achieve above-average productivity thanks to their high performance and Automation. Customers seeking fastest return on investment benefit from the affordable efficiency of our MILL E solutions.

#### High Performance Airfoil Machining

Our Liechti turnkey solutions enable the highly dynamic manufacturing of precision airfoils. Thanks to the unique performance and our expertise in airfoil machining, you increase productivity by producing at the lowest cost per part.

#### Spindles

As part of GF Machining Solutions, Step-Tec is engaged in the very first stage of each machining center development project. Compact design combined with excellent thermal and geometric repeatability ensure the perfect integration of this core component into the machine tool.

### Software



#### Digitalization solutions

To drive its digital transformation, GF Machining Solutions acquired symmedia GmbH, a company specialized in software for machine connectivity. Together, we offer a complete range of Industry 4.0 solutions across all industries. The future requires the agility to adapt quickly to continual digital processes. Our intelligent manufacturing offers embedded expertise, optimized production processes, and workshop Automation: solutions for smart and connected machines.

### Advanced manufacturing



#### Laser texturing

Aesthetic and functional texturing is easy and infinitely repeatable with our digitized Laser technology. Even complex 3D geometries, including precision parts, are textured, engraved, microstructured, marked and labeled.

#### Laser micromachining

GF Machining Solutions offers the industry's most complete line of Laser micromachining platforms optimized for small, high-precision features to meet the increasing need for smaller, smarter parts to support today's leading-edge products.

#### Laser Additive Manufacturing (AM)

GF Machining Solutions and 3D Systems, a leading global provider of additive manufacturing solutions and the pioneer of 3D printing, have partnered to introduce new metal 3D printing solutions that enable manufacturers to produce complex metal parts more efficiently.

### Customer Services



#### Worldwide for you

Ensuring the best performance throughout the lifetime of our customers' equipment is the goal of our three levels of support. Operations Support offers the complete range of original wear parts and certified consumables. Machine Support includes spare parts, technical support, and a range of preventive services to maximize machine uptime. Business Support offers customer-specific business solutions.

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- + Maximizing the return on your System 3R investments.
- + Extending the product lifetime of your System 3R equipment while maintaining optimum precision.
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