

System 3R – Tooling

# DelphinShort frames for Makino WEDM

W32FB / W53FB / UPV-3 / UPV-5



System 3R

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. System 3R equips world-class electrical discharge machines (EDM), Laser texturing and Additive Manufacturing through to first-class Milling by Tooling, Automation and software systems — all backed by unrivalled customer service and support — we, help you raise your game and increase your competitive edge.

# System 3R design and quality



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## Frames for MAKINO WEDM

# Large palletising systems adapted to the WEDM machine table dimensions



### Frames

The rugged design enables large workpieces to be clamped and changed in the WEDM machine with repeatable accuracy.

Adjusting/designing the clamping bars to the specific workpieces significantly reduces the clamping and alignment effort.

### Components

The basic frame equipment comprises the following components:

- + Machine equipment
- + Pneumatic control
- + Frame
- + Clamping bars



### Options

The frame equipment can be complemented with the following components if desired:

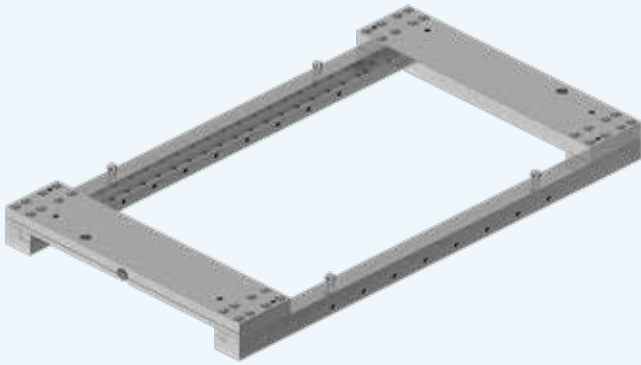
- + Gripper (to robot or lifting device)
- + Presetting station
- + Machine equipment to measuring machine

# Frames for MAKINO WEDM



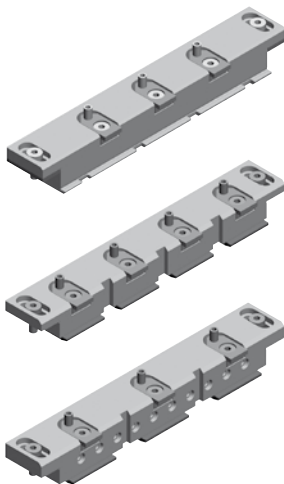
## Machine equipment

The machine equipment consist of two identical DelphinShort Twin Baseplates and where from the size of the machine table frame reasonable and feasible corner and middle Z-supports. The two DelphinShort Twin Baseplates build the reference clamping system for the DelphinShort Frame on the WEDM machine. They guarantee best possible repetition accurarcy and strong fixation of the DelphinShort Frame on the WEDM machine. The corner Z-supports are used on the table to give more stability to the on the machine clamped frame. The middle Z-supports help to reduce the deflection of a heavy loaded DelphinShort Frame.



## Frame

This is the „pallet“ in a frame equipment. It includes the reference elements which define the position of the frame on the WEDM machine table along with the chucks. It is also the carrier element for the different clamping bars.



## Clamping bars

Mounted into the frame, these provide the actual workpiece clamping, either singly or normally as a pair. System 3R provides three types of clamping bars as standard, each as single or double-sided versions.

- + Clamping bar with fixed support lips:  
workpiece can be clamped at „0“ or collision-free at „+4“ using spacer plates (included)
- + Clamping bar with screwed support lips:  
depending on the type of support lips, workpiece can be clamped at „0“ or collision-free at „+4“
- + Combi clamping bar with screwed support lips:  
workpiece is clamped at „0“ or collision-free at „+4“  
Combi clamping bars are prepared for using the 3R-239 ruler accessory.

# Frames for MAKINO WEDM



## DelphinShort reference ruler

This reference element for the machine equipment is used for the following:

- + Enables quick, simple and top-precision mounting and alignment of both DelphinShort Twin Baseplates on the WEDM machine table.
- + Checking and readjustment of the machine equipment on the WEDM machine table



## Pneumatic control system

This system is required for controlling the two DelphinShort Twin Baseplates on the machine equipment in order to clamp or release the frame on the machine. It also supplies the Z-supports with cleaning air.

All tubings and air distribution blocs are included in the machine equipment and ready to be connected to the controls of the automation.

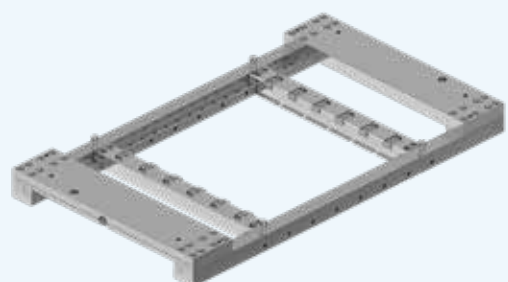
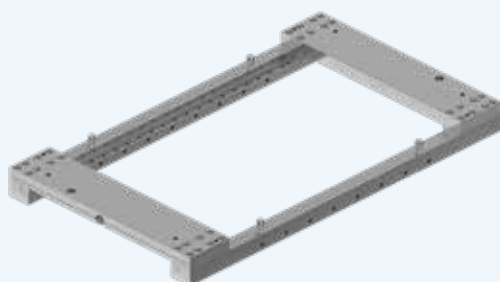
For non automated operation we have a specific manual 3-way pneumatic valve in the portfolio.

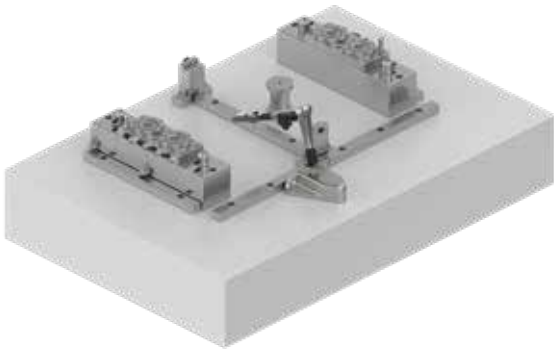


## Set of clamping screws / brackets

The clamping bars are all fitted with brackets which allow plates and workpieces of 15 – 30 mm thickness to be clamped. For clamping thinner or thicker plates and parts the set of clamping screws / brackets provides the required screws, set screws and brackets in stainless steel.

## Frames





### Presetting station

The presetting station enables the frame to be loaded and unloaded with work-pieces outside the WEDM machine. However, the main use of the presetting station is to align the workpieces very precisely level and plane-parallel to the stone plate in the frame.

The entire set-up on the stone plate can also be mounted directly on a 3D measuring machine. This enables the work-pieces to be measured while clamped in the frame.



### Gripper

A gripper fitted to the size of the frame is required for handling the frame with a robot or a handling device (automatic or manual). These grippers are purely mechanical fork or trapezoid grippers which operate without any external power.

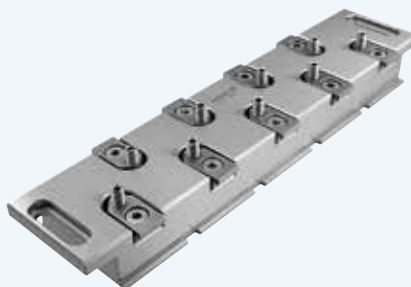


### Manual Handling

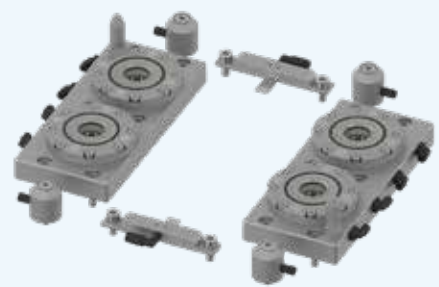
We recommend using a lifting device with an adjustment for the lifting interface on the frame when manual handling the frame.



Single-sided clamping bar.



Double-sided clamping bar .



Machine equipment DelphinShort.

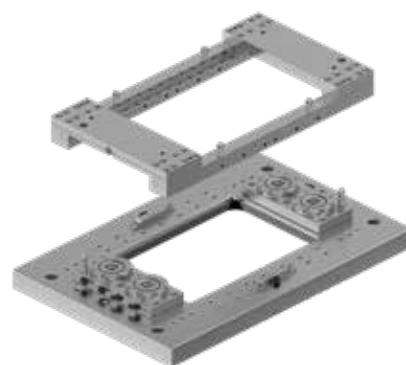
# MAKINO W32FB

Frames, accessories and layouts



## MAKINO W32FB – Basic WEDM frame tooling

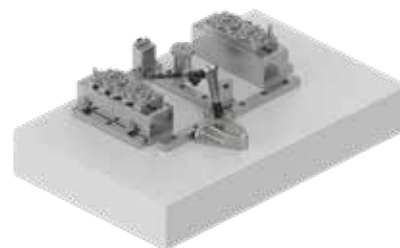
Description	Art. number
Machine equipment Makino W32FB	C 953 000
Frame Makino W32FB	C 952 240
PN valve for manual operations	C 254 960
Clamping bar 290, lips fixed, single	C 917 320
Clamping bar 290, lips fixed, double	C 917 350
Clamping bar 290, lips screwed, single	C 917 020
Clamping bar 290, lips screwed, double	C 917 050
Combi clamping bar 290, single	C 917 420
Combi clamping bar 290, double	C 917 450



W32FB – WEDM Frame tooling.

## MAKINO W32FB – WEDM frame tooling accessories

Description	Art. number
Frame presetting station	C 952 280
Stand for presetting station 1200/800	V 000 019
Reference ruler for Frames	C 952 250
Set of clamping screws / brackets	C 860 200



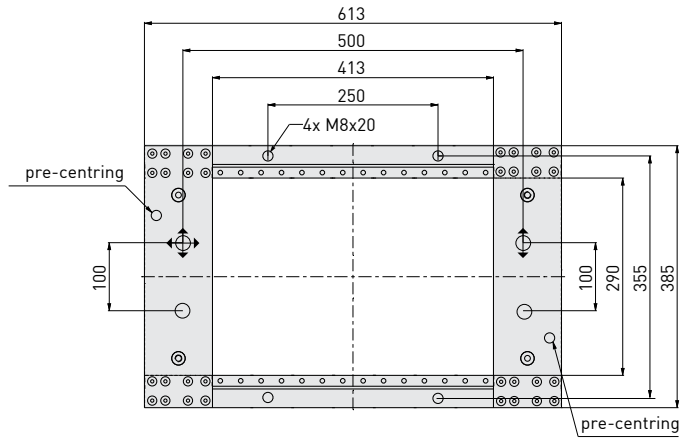
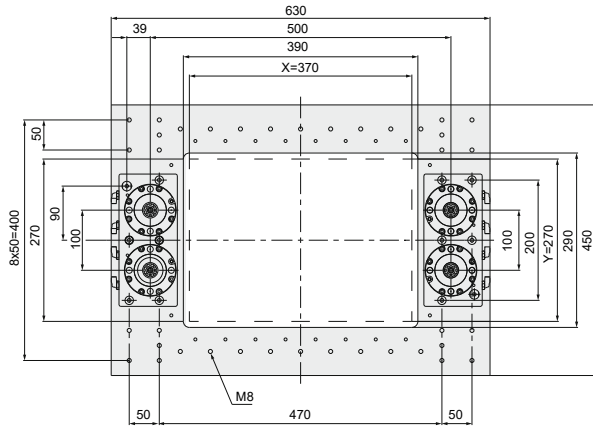
W32FB – Frame presetting station.



# MAKINO W32FB – WEDM Frame tooling

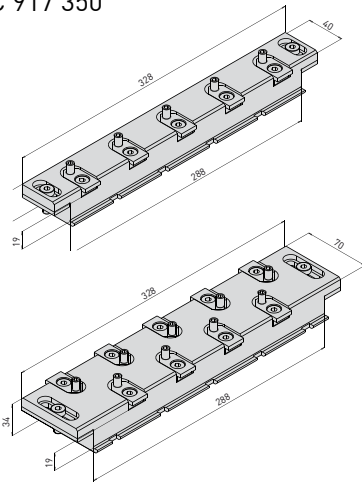
Machine equipment C 953 000

Frame C 952 240



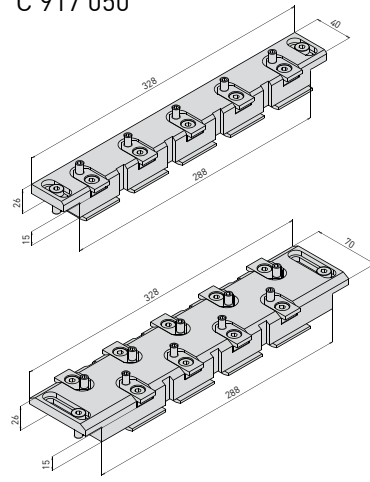
## Clamping bar 290

Lips fixed  
C 917 320  
C 917 350



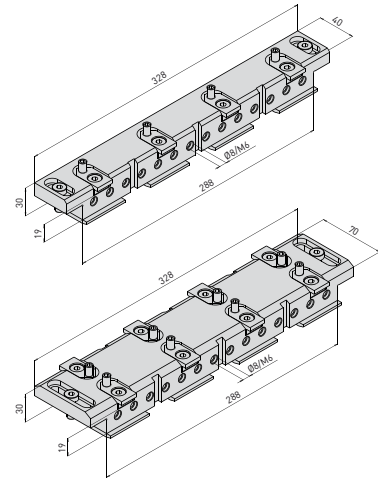
## Clamping bar 290

Lips screwed  
C 917 020  
C 917 050



## Combi clamping bar 290

C 917 420  
C 917 450



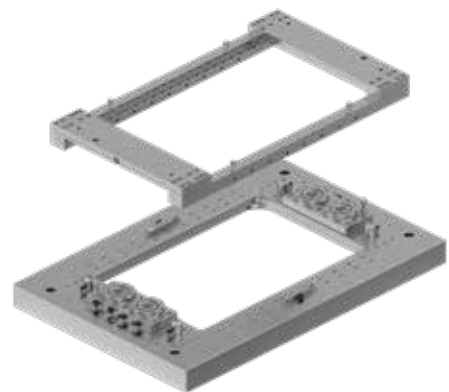
# MAKINO W53FB

Frames, accessories and layouts



## MAKINO W53FB – Basic WEDM frame tooling

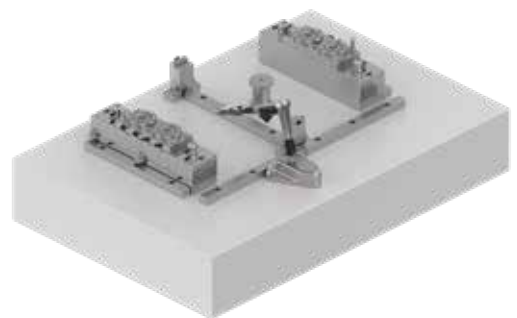
Description	Art. number
Machine equipment MAKINO W53FB	C 953 050
Frame MAKINO W53FB	C 952 140
PN valve for manual operations	C 254 960
Clamping bar 360, lips fixed, single	C 917 330
Clamping bar 360, lips fixed, double	C 917 360
Clamping bar 360, lips screwed, single	C 917 030
Clamping bar 360, lips screwed, double	C 917 060
Combi clamping bar 360, single	C 917 430
Combi clamping bar 360, double	C 917 460



W53FB – WEDM Frame tooling.

## MAKINO W53FB – WEDM frame tooling accessories

Description	Art. number
Frame presetting station	C 952 180
Stand for presetting station 1200/800	V 000 019
Reference ruler for Frames	C 952 150
Set of clamping screws / brackets	C 860 200

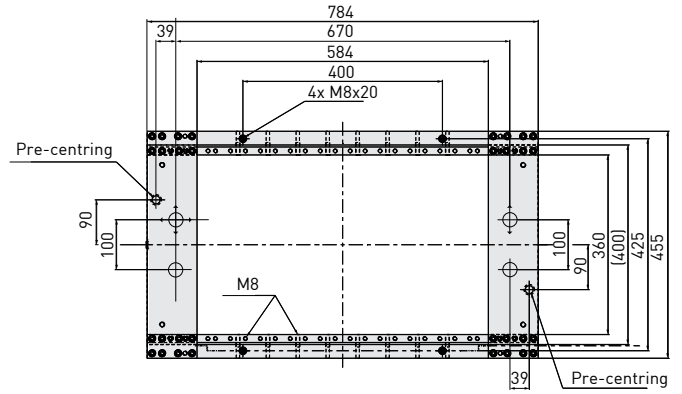
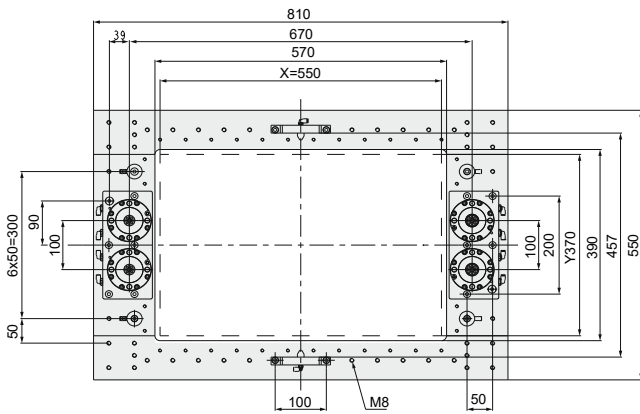


W53FB – Frame presetting station.

# MAKINO W53FB – WEDM Frame tooling

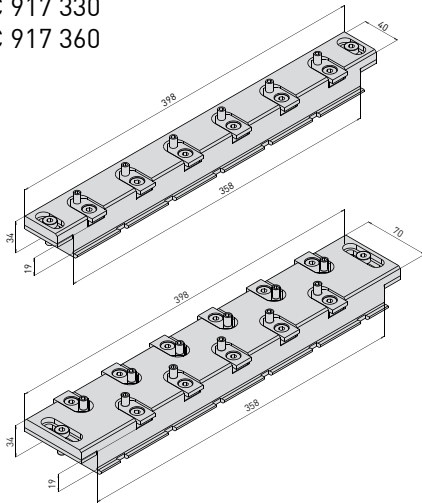
Machine equipment C 953 050

Frame C 952 140



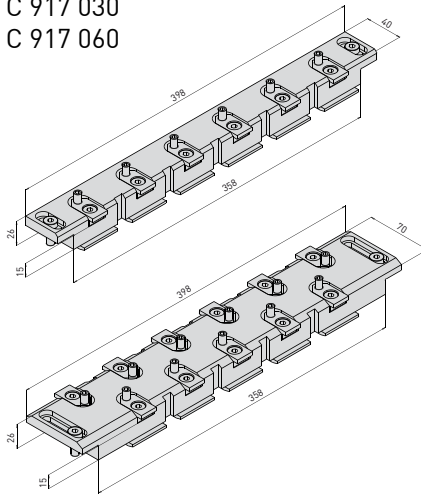
## Clamping bar 360

Lips fixed  
C 917 330  
C 917 360



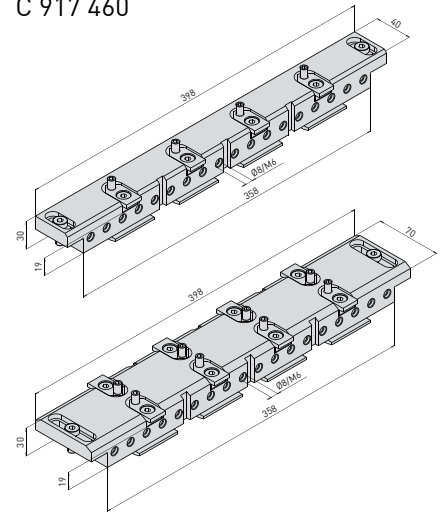
## Clamping bar 360

Lips screwed  
C 917 030  
C 917 060



## Combi clamping bar 360

C 917 430  
C 917 460



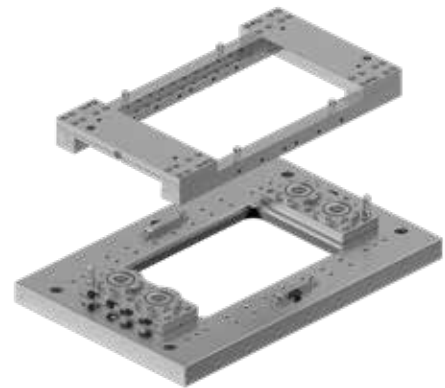
# MAKINO UPV-3

Frames, accessories and layouts



## MAKINO UPV-3 – Basic WEDM frame tooling

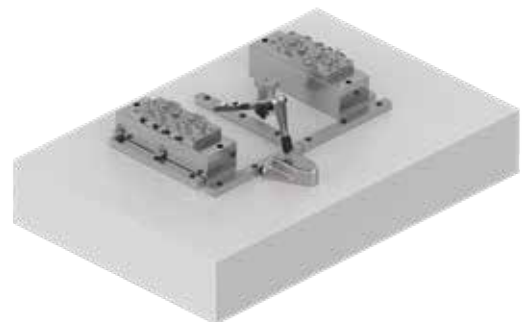
Description	Art. number
Machine equipment Makino UPV-3	C 953 000
Frame Makino UPV-3	C 952 240
PN valve for manual operations	C 254 960
Clamping bar 290, lips fixed, single	C 917 320
Clamping bar 290, lips fixed, double	C 917 350
Clamping bar 290, lips screwed, single	C 917 020
Clamping bar 290, lips screwed, double	C 917 050
Combi clamping bar 290, single	C 917 420
Combi clamping bar 290, double	C 917 450



UPV-3 – WEDM Frame tooling.

## MAKINO UPV-3 – WEDM frame tooling accessories

Description	Art. number
Frame presetting station	C 952 280
Stand for presetting station 1200/800	V 000 019
Reference ruler for Frames	C 952 250
Set of clamping screws / brackets	C 860 200

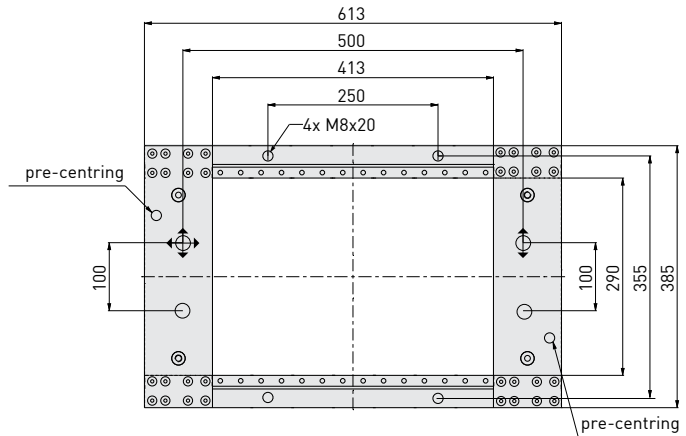
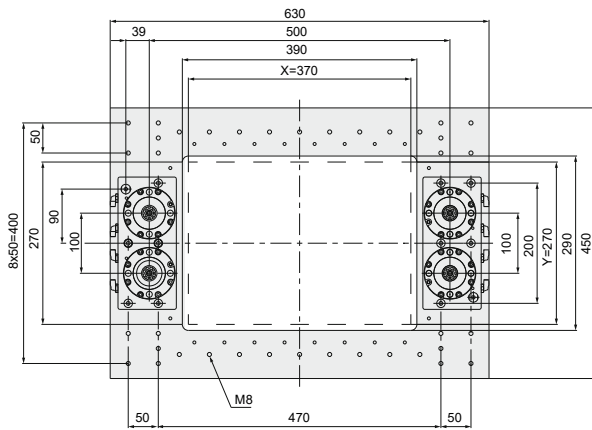


UPV-3 – Frame presetting station.

# MAKINO UPV-3 – WEDM Frame tooling

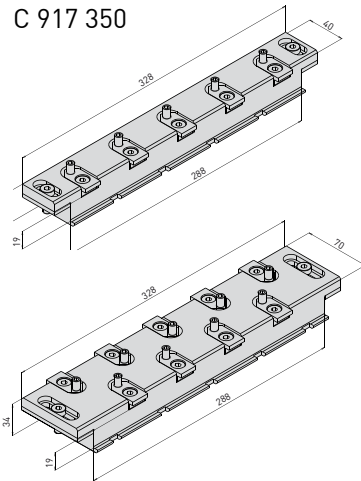
Machine equipment C 953 000

Frame C 952 240



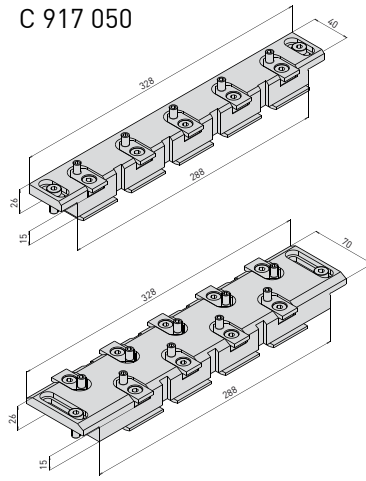
## Clamping bar 290

Lips fixed  
C 917 320  
C 917 350



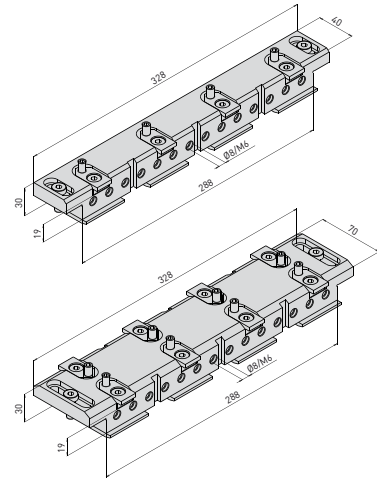
## Clamping bar 290

Lips screwed  
C 917 020  
C 917 050



## Combi clamping bar 290

C 917 420  
C 917 450



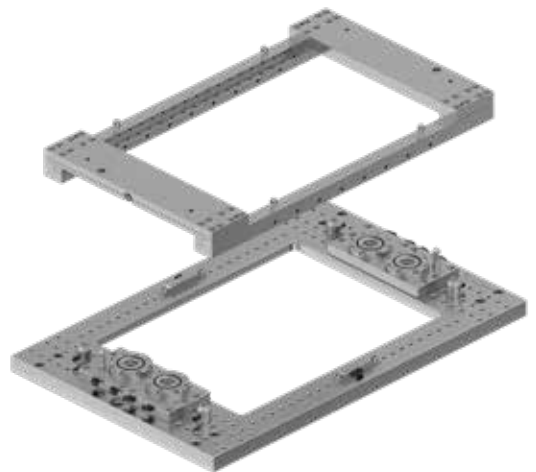
# MAKINO UPV-5

Frames, accessories and layouts



## MAKINO UPV-5 – Basic WEDM frame tooling

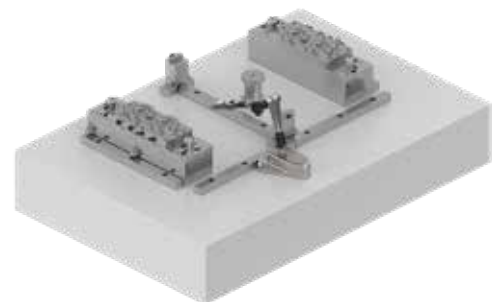
Description	Art. number
Machine equipment MAKINO UPV-5	C 953 050
Frame MAKINO UPV-5	C 952 140
PN valve for manual operations	C 254 960
Clamping bar 360, lips fixed, single	C 917 330
Clamping bar 360, lips fixed, double	C 917 360
Clamping bar 360, lips screwed, single	C 917 030
Clamping bar 360, lips screwed, double	C 917 060
Combi clamping bar 360, single	C 917 430
Combi clamping bar 360, double	C 917 460



MAKINO UPV-5 – WEDM Frame tooling.

## MAKINO UPV-5 – WEDM frame tooling accessories

Description	Art. number
Frame presetting station	C 952 180
Stand for presetting station 1200/800	V 000 019
Reference ruler for Frames	C 952 350
Set of clamping screws / brackets	C 860 200

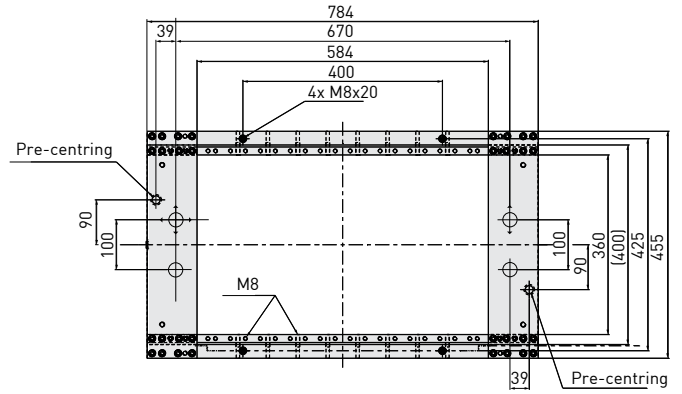
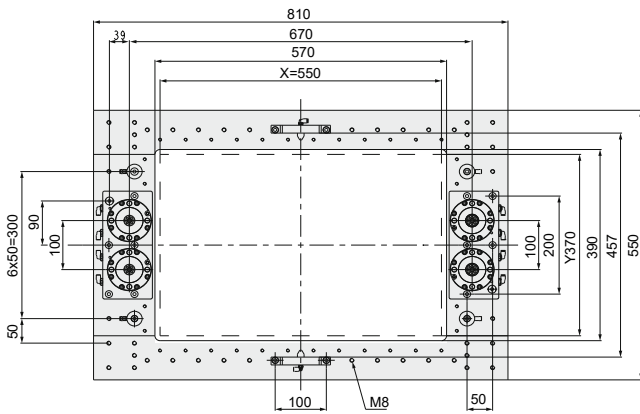


MAKINO UPV-5 – Frame presetting station.

# MAKINO UPV-5 – WEDM frame tooling

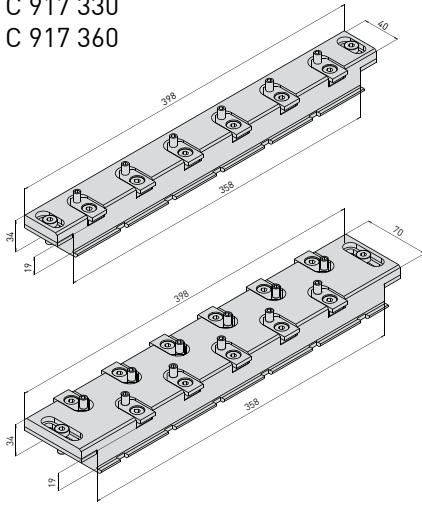
Machine equipment C 953 050

Frame C 952 140



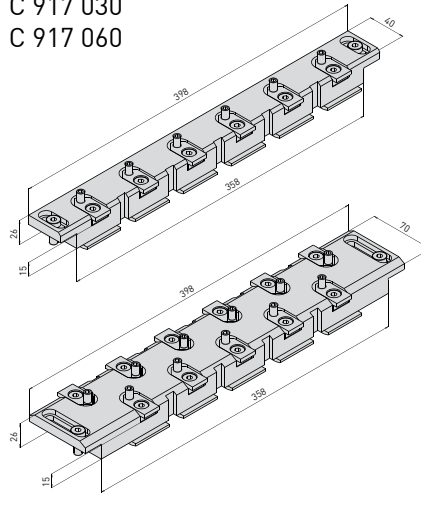
## Clamping bar 360

Lips fixed  
C 917 330  
C 917 360



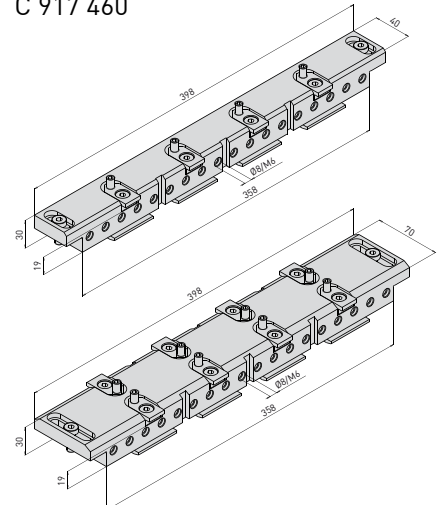
## Clamping bar 360

Lips screwed  
C 917 030  
C 917 060



## Combi clamping bar 360

C 917 430  
C 917 460



# Frame tooling accessories

## Set of clamping screws & brackets, C 860 200

Set of M8 screws & set screws in various lengths. Brackets to clamping bars for clamping of plates and parts thinner than 15 mm.



## Pneumatic control unit, DelphinShort, C 254 960

Control unit for individual DelphinShort chucks and WEDM frames with manual operation.

- Including 10 m tube  $\varnothing 6$  mm and 3 fittings.

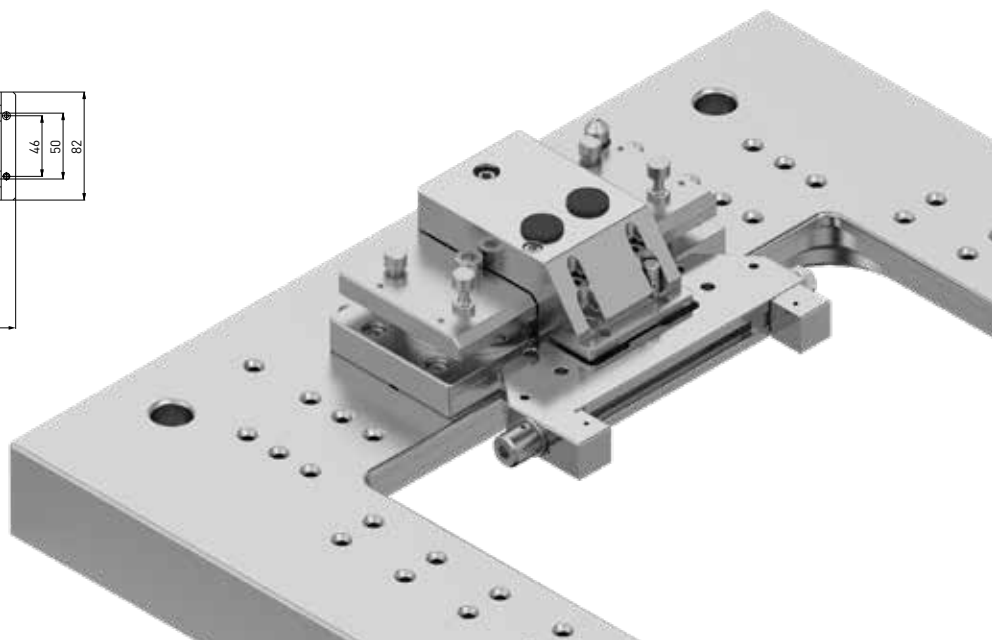
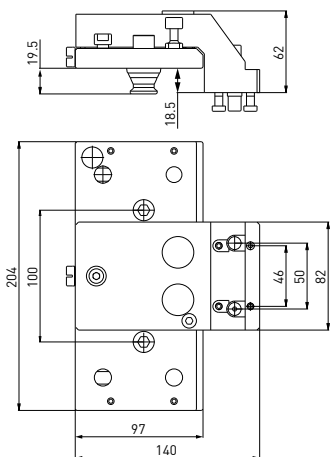


## DelphinShort Twin levelling adapter, C 952 900

For mounting SuperVice, a holder or a fixture in the DelphinShort WEDM Frames machine equipment.

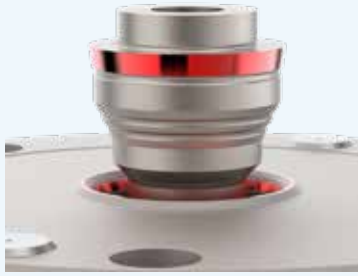
Note: All holders including HP can be mounted.

- Adjustable in three axes
- Adapted for automatic changing
- Prepared for Gripper 26937-00
- Code carrier fixture included
- Recommended maximum load 15 kg.

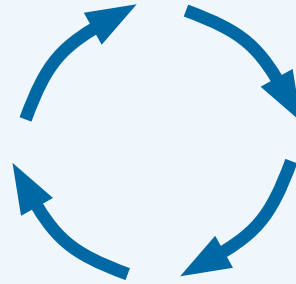




# Why Delphin?

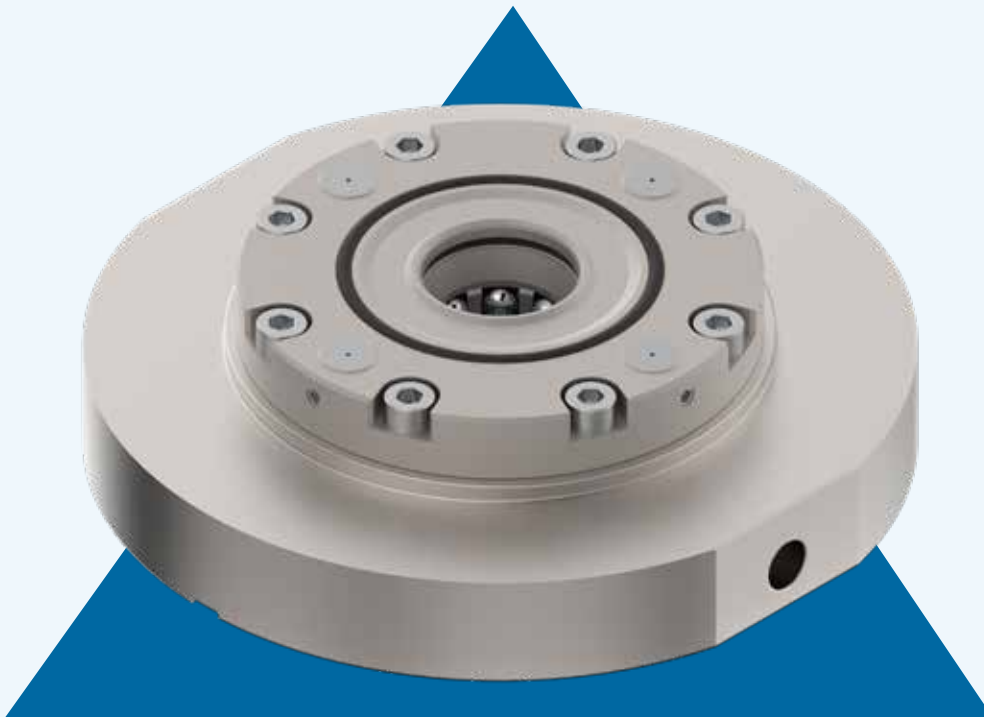


+ Highest repeatability.

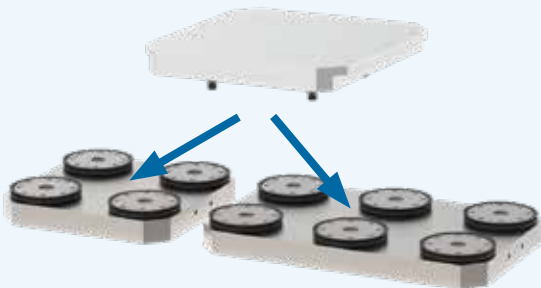


+ Highest process reliability.

Quality



Flexibility



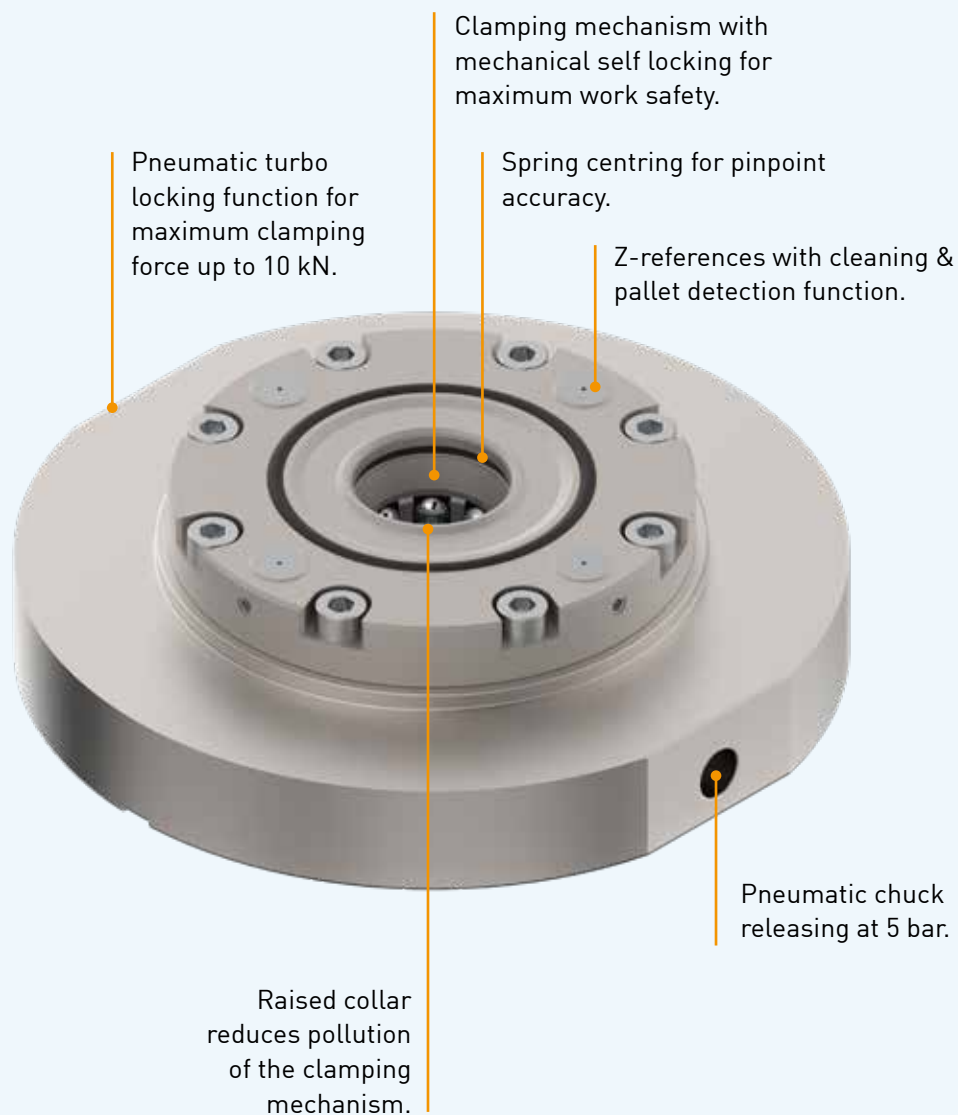
- + The Delphin clamping system is modular and adapts to your machine
- + Standardized interface for all machines.

Productivity



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

# DelphinShort chuck



## Key Facts

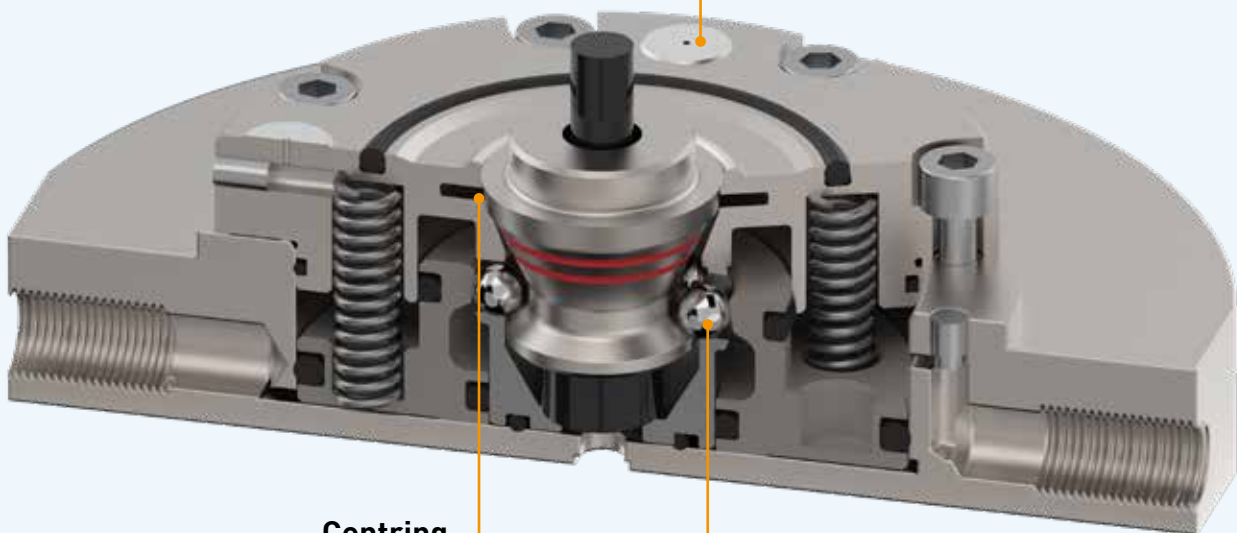
- + Very compact design: outer diameter 86 mm, low height
- + Stainless steel - mainly to be used in WEDM or in EDM, turning, grinding and milling with limited space
- + High clamping force (up to 10 kN with turbo locking)
- + Pneumatic opening at 5 bar
- + A special designed DelphinShort drawbar is needed. The DelphinShort drawbars are not compatible with the standard Delphin drawbars.

# DelphinShort chuck



## Cleaning of Z-support

Perfectly balanced Z-support surface for the best possible cleanliness against dirt and for detection.



## Centring

Conical spring centring for absolutely zero play between drawbar and chuck. It results the highest repeatability, excellent rigidity and less vibration.

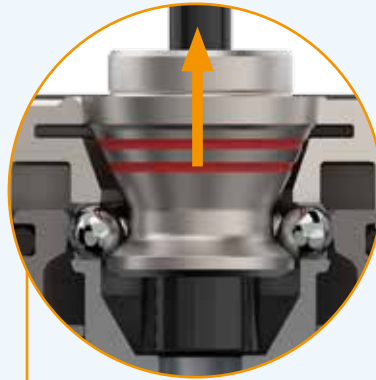


## Dirt insensitive

Floating ball cage allows a larger angular deviation between pallet and chuck during loading and unloading. In addition the design is dirt insensitive.



# DelphinShort chuck

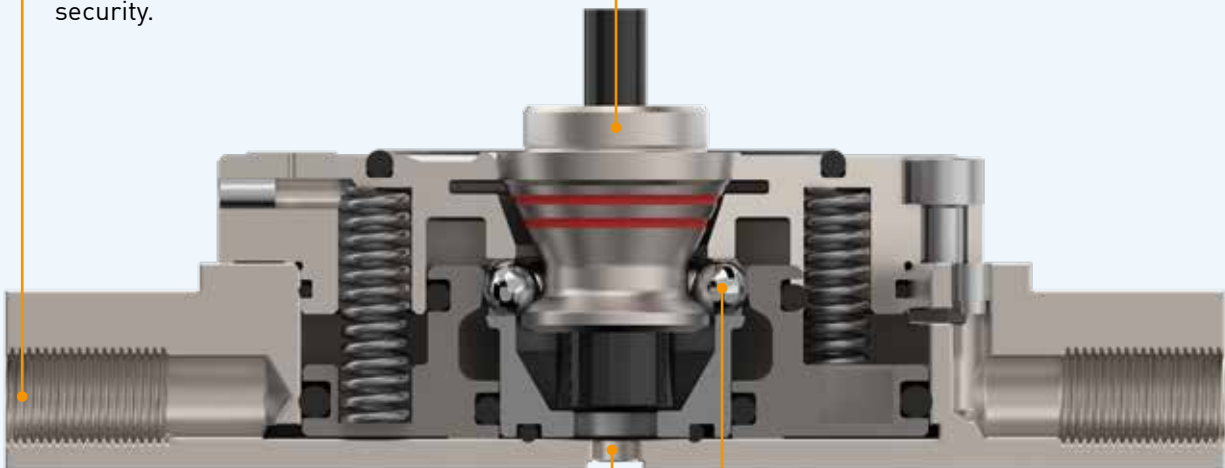


## Required air pressure

Many clamping systems need compressed air with minimum 6 bar. The DelphinShort chuck requires only 5 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. DelphinShort chucks have a minimum holding force of 20 kN.

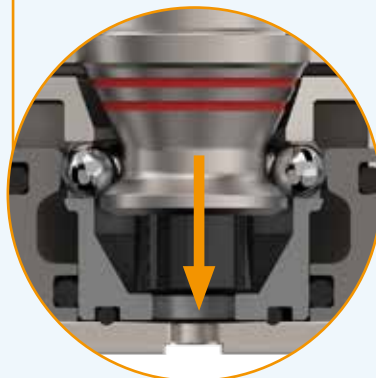
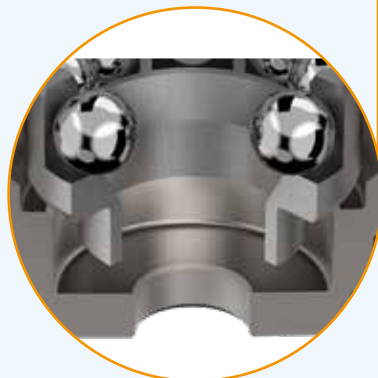


## Drain hole

When unloading a pallet, it can happen that dirt and water pass into the clamping system. The DelphinShort 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 centring, it is responsible for the stability and rigidity of a system.



# DelphinShort – for automation and manual applications

## Technical data

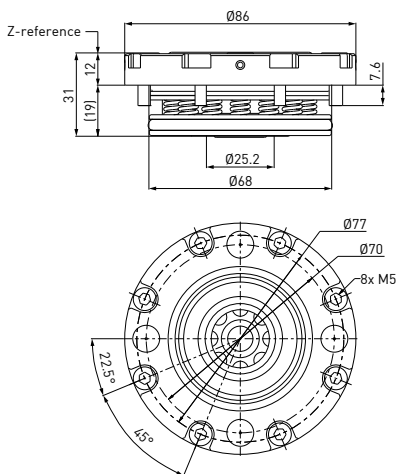
- + Clamping force with Turbo 6 bar: 10 kN
- + Clamping force without Turbo : 5 kN
- + Holding forces:
  - Drawbar screw M8 A4-80: 20 kN
  - Drawbar screw M8 12.9: 35 kN
- + Air pressure open: 5–10 bar
- + Repeatability: within 0.003 mm
- + Material: hardened stainless steel.

Suitable for:



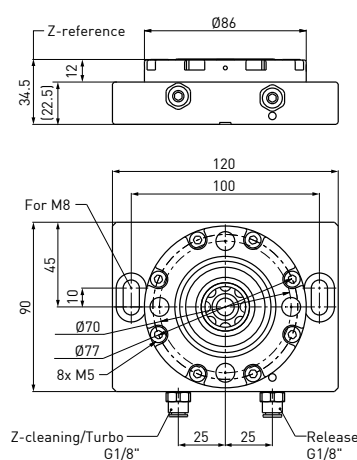
### Built-in chuck, DelphinShort, C 225 000

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



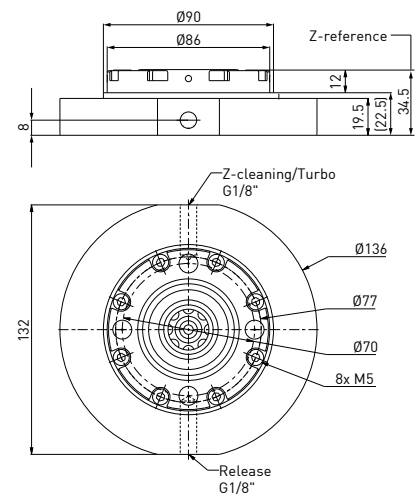
### Built-up chuck, DelphinShort, WEDM flange, C 225 300

For simple installation on WEDM machine tableframe.



### Built-up chuck, DelphinShort, C 225 310

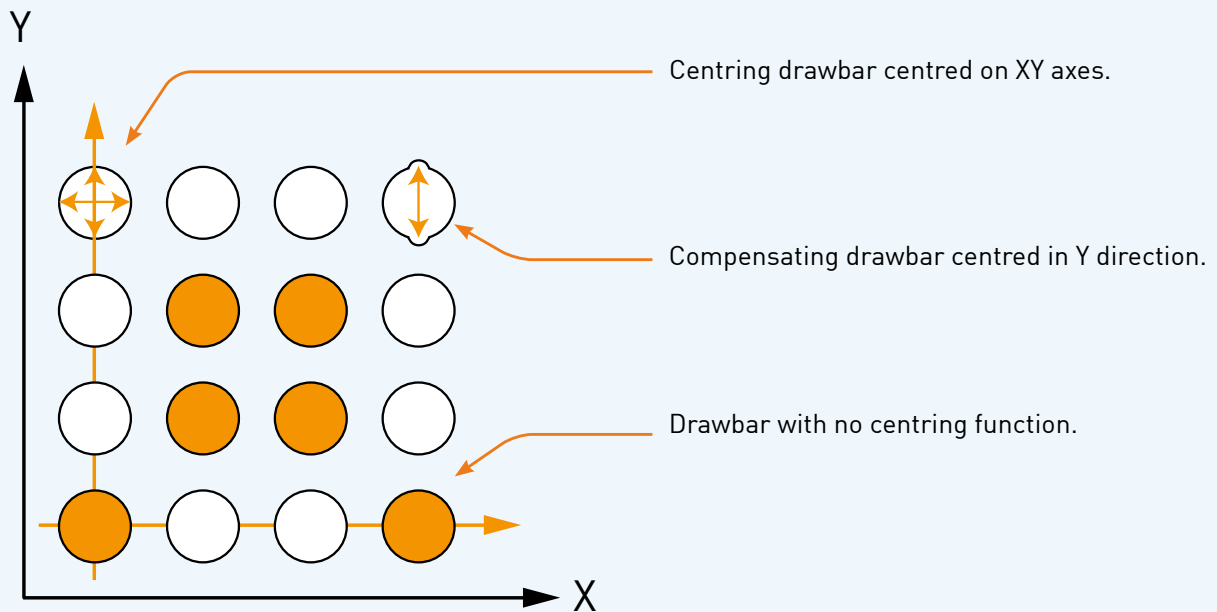
For direct installation on a machine table. Mounting holes to be drilled at installation.



# 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 centring in one axis. All other drawbars have no centring, only clamping function.



For centring in 2 axes  
= zero point.



For centring in 1 axis  
= angle definition.



No centring  
= only clamping.



# DelphinShort Drawbars

## DelphinShort Drawbar, centring in 2 axes, C 226 000

Fixed in WEDM frame or pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in:  $\varnothing 26 \times 27.5$  mm.



## DelphinShort Drawbar, centring in 1 axis, C 226 100

Fixed in WEDM frame or pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in:  $\varnothing 26 \times 27.5$  mm.



## DelphinShort Drawbar – without centring, C 226 200

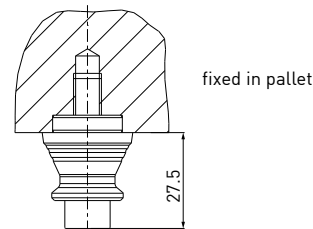
Fixed in WEDM frame or pallet

- Material: stainless steel, hardened and ground
- Dimensions, screwed in:  $\varnothing 26 \times 27.5$  mm.

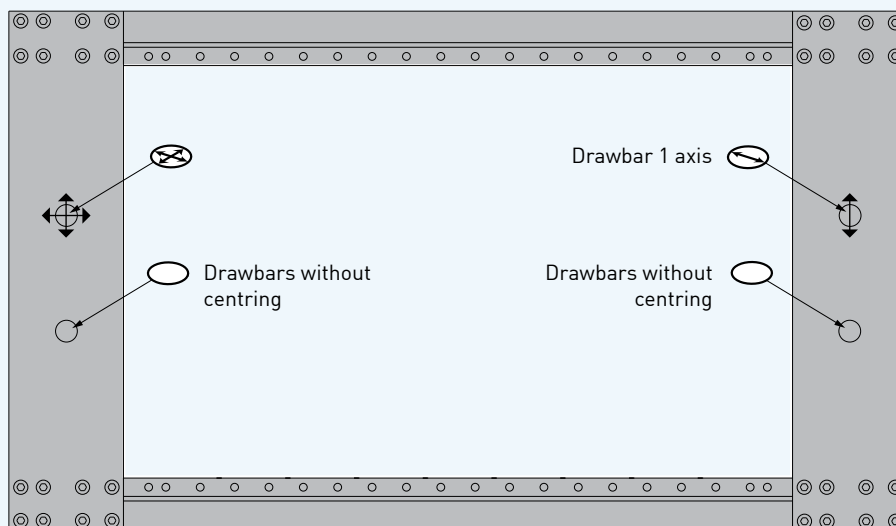


## Function of the Delphin drawbars

- centring on 2 axes
- centring on 1 axis
- without centring



## Drawbar positions in WEDM Frames

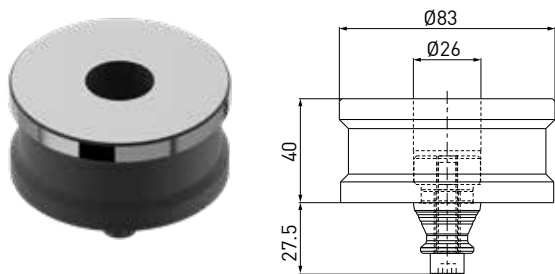


# DelphinShort Accessories

## DelphinShort Reference mandrel, C 226 310

Alignment aid for chuck installation.

- Material: steel stainless, hardened and ground
- Drawbar C 226 000 included
- Diameter D = 83 mm.



## DelphinShort protective pallet, C 226 320

Chip and air pressure (turbo locking) protection for DelphinShort chuck.

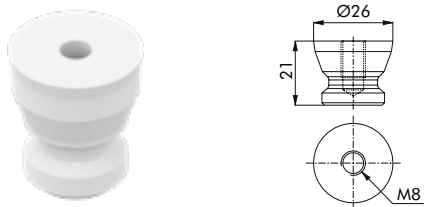
- Fits also for chucks with sealing ring
- Includes drawbar C 226 000
- Diameter D = 104 mm.



## DelphinShort protective drawbar, C 226 300

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

- Material: plastic
- Dimensions: Ø26x21 mm
- M8 for dismounting.



## DelphinShort chuck sealing ring, C 226 390

To be used on built-in chucks C 225 310.  
Not recommended on C 225 300.



## Pneumatic control unit, DelphinShort, C 254 960

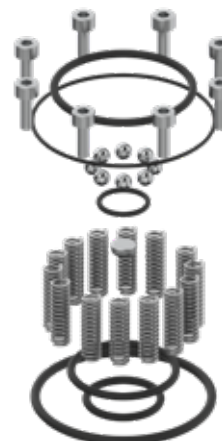
Control unit for individual DelphinShort chucks and WEDM frames with manual operation.

- Including 10 m tube Ø6 mm and 3 fittings.



## Spare parts, DelphinShort, S 225 005

For DelphinShort chucks. Includes O-rings, compressions springs, balls, screws and assembly tool.





# Contents

C 225 000.....	21	C 917 330.....	10, 11, 14, 15	C 952 380.....	14
C 225 300.....	21	C 917 350.....	8, 9, 12, 13	C 952 900.....	16
C 225 310.....	21	C 917 360.....	10, 11, 14, 15	C 254 960.....	8, 10, 12, 14
C 254 960.....	8, 10, 12, 14, 16, 24	C 917 420.....	8, 9, 12, 13	C 953 000.....	12, 13
C 226 000.....	23	C 917 430.....	10, 11, 14, 15	C 953 050.....	10, 11, 14, 15
C 226 300.....	24	C 917 450.....	8, 9, 12, 13	C 953 200.....	12
C 226 310.....	24	C 917 460.....	10, 11, 14, 15	S 225 005.....	24
C 226 320.....	24	C 952 140.....	10, 11, 14, 15	V 000 019.....	8, 10, 12, 14
C 226 390.....	24	C 952 150.....	10		
C 860 200.....	8, 10, 12, 14, 16	C 952 180.....	10		
C 917 020.....	8, 9, 12, 13	C 952 240.....	8, 9, 12, 13		
C 917 030.....	10, 11, 14, 15	C 952 250.....	8, 12		
C 917 050.....	8, 9, 12, 13	C 952 280.....	8, 12		
C 917 060.....	10, 11, 14, 15	C 952 300.....	15		
C 917 320.....	12, 13	C 952 350.....	14		

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