

tooling for punch presses

TRUMPF®

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INDEX

●	COMPANY PROFILE	2
●	OUR PRODUCTS	3
●	WHAT'S NEW	4
●	MULTITRUMPF	5
●	FORMING	
	COMMON FORMING	6
	SPECIAL FORMING	7
	CONTINUOUS FORMING	8
●	CLUSTER TOOL	9
●	STANDARD SERIES	
	R SERIES	12
	SERIES 30	12
	SERIES 40/50	13
	SERIES 60/72/76	13
●	ITS SERIES	
	SERIES 30	14
	SERIES 40	14
	SERIES 60	15
	SERIES 72/76	15
●	MULTITOOL SERIES	
	SERIES 5 + TOOLS	16
	SERIES 10 + TOOLS	16
	OTHER TOOLS	17
●	ACCESSORIES	
	PARTING TOOLS	20
	DIE ADAPTORS	21
	ALIGNMENT FIXTURE	21
	ADJUSTMENT RINGS	22
	MECHANICAL STRIPPERS	22
	POLYURETHANE STRIPPERS	23
	THICK TURRET ADAPTOR	24
	LUBRICATION	25
	GRINDING	25
	OPTIONS	26
●	TRUMPF® FORMING	
	FORMING	30
	RADIUS BACK LOUVER	31
●	NOTES	32
●	MATRIX SHAPE CODING	33
●	OPTION LEGEND	34
●	GUIDE TO PRODUCT CODES - MATRIX CODING	34
●	MACHINES TRUMPF® TABLE	35

COMPANY PROFILE

A dynamic team

Matrix' products, the result of our highly qualified technicians' competence which constantly deal with problems connected to production cycles as well as specific customer's requirements.

The customer, a unique partner

Each customer deserves special care, that's why Matrix doesn't simply offer a product but also a specialized consulting service and technical support, in order to reach the high competitive level required by the market.

Punches and dies born to last

The high reliability and life lasting which characterize Matrix' products, are the result of experience, devotion, constant research and use of superior quality raw materials.

Innovative technologies for high performances

Matrix invests on the best technologies: from designing software to the most modern planning techniques, from cutting edge machineries to sophisticated control systems.

Energies oriented to the maximum accuracy

The constant investments in machineries for our production is a must in order to keep the elevate standard level required by processing.



OUR PRODUCTS

Punches

Manufactured in accordance with the most modern techniques and machineries, produced with a unique type of steel (M2), hardened with the first quality heat treatments.



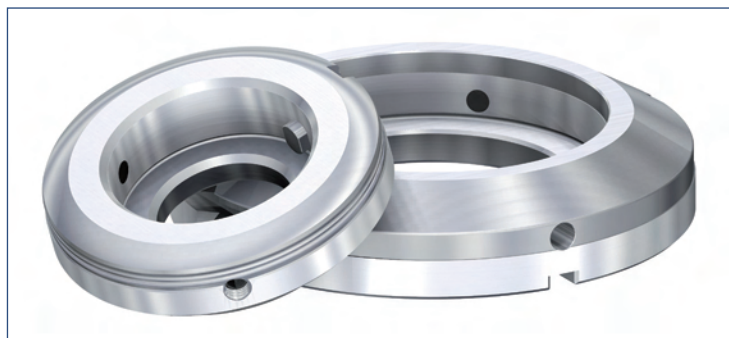
Dies

Full automatic production and control cycles guarantee to our dies a maximum level standard quality. Manufactured with high performing steels (D2) and hardened with equal value treatments for the best structural tension and endurance, we pay great attention to the dies geometry.



Adaptors

Manufactured with steels resistant to wearing and high stress and produced with the proper clearance in order to guarantee a precise fitting on the punching machine and accurate positioning of the die.



Special tools

The constant demand of special tools specific for particular processing, requires alternative and innovative solutions and reduced delivery times. Each special tool is coded for its reproduction and controlled on all production phases, from designing to testing.



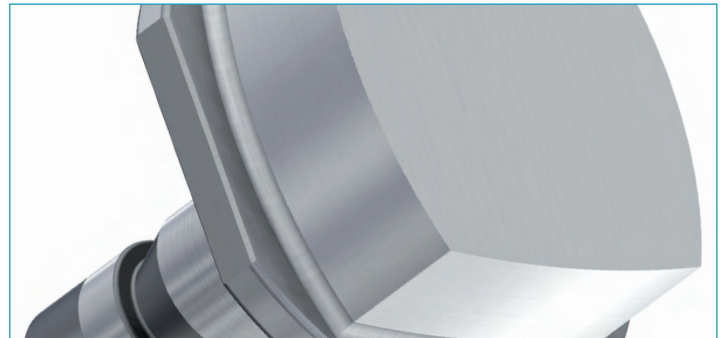
WHAT'S NEW?

New offer of multitool 5 and 10 stations, which increases the actual range of punches and dies types 4,5,6 and 10 positions. Besides the classic style tools, now we can also offer ITS series with interchangeable inserts, for a shape rotation of 45° and 90° without using specific accessories.

Quick delivery times for the most common forming tools, thanks to a wide range of predefined configurations available. All this, together with the high and well known quality which has been always characterizing Matrix' products. For any tools model, our products can satisfy any requirement as far as quality, performing and innovation.

STANDARD

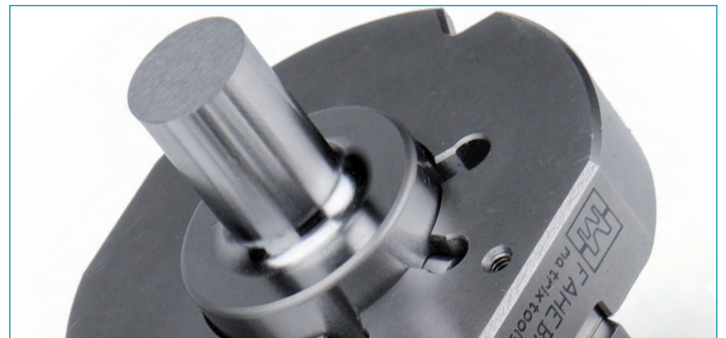
The most used system on the market for this type of punching machines, manufactured with our high quality, typical of Matrix products as well as quick deliveries. For this most common and used system, we offer plan punches either with standard or enlarged length, both adapt to the most recent punching machines.



ITS

High performance system, economic tools handling. Reduction of set up timing and connected problems, tool life increased thanks to 6 mm grinding.

We offer plan punches either with standard or enlarged length



MULTITOOL

System for a more flexible tools handling, available on 5 and 10 positions models.

This multitool is extremely advantageous in case of numerous different punching with small dimensions, thanks to the time reduction for tool change. The line is completed by punches and dies for multitool 4,5,6 and 10 positions.





MULTITRUMPF

Maximum precision and a consequent **less tool wear**, peculiar characteristics of our rotating multitool.

This tool is the **ideal solution** for processes which require to perform a great number of small punching.

The use of a multitool allows to **increase the number of tools available as well as reducing the timing for tool change**.

Matrix offers multitool 5 and 10 stations, that is the most recent introduced on the market.

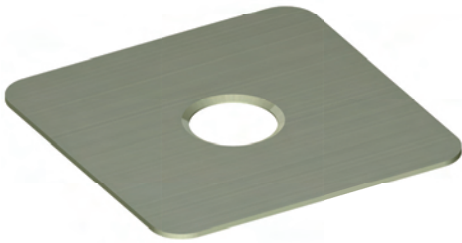
Quick delivery service for punches and dies.

	NUMBER OF TOOLS	MAX Ø SIZE	MAX THICKNESS (RECOMMENDED)
MULTITRUMPF 5	5	mm 16	mm 3 mild steel - mm 2 stainless steel
MULTITRUMPF 10	10	mm 10,5	mm 3 mild steel - mm 2 stainless steel

COMMON FORMING

The most common formings are embosses, countersinks, engravings, logos, louvers and many others.

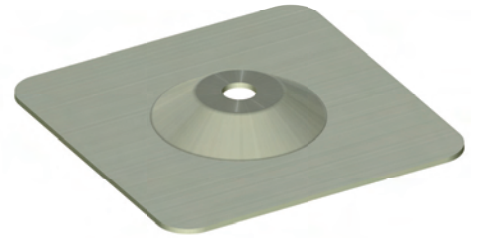
The great diffusion of these forming allows to handle a **wide offer of standardized products**, reducing drastically delivery times. This type of formings is continuously growing, so please contact our sales department for assistance.



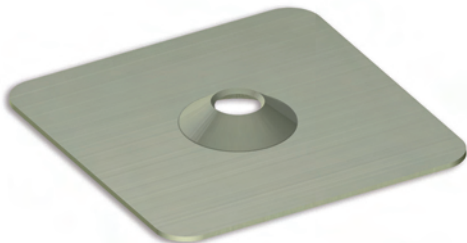
M01
ENGRAVED COUNTERSINK
FORMING



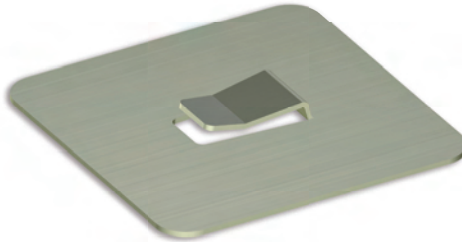
M02
EXTRUDED HOLE
FORMING



M03
ROUND EMBOSS
FORMING



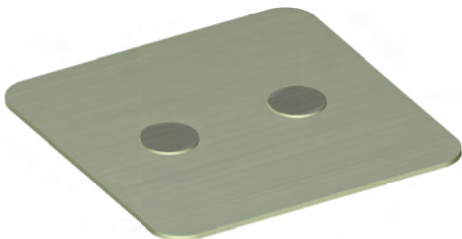
M04
ROUND COUNTERSINK
FORMING



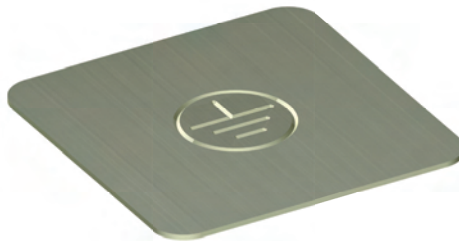
M09
SHELF CLIP
SHEARING AND FORMING



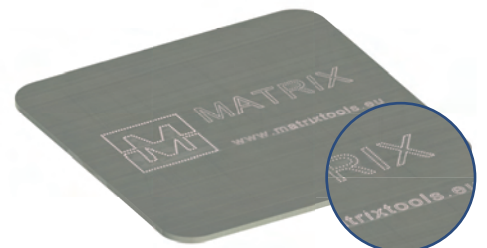
M12
RADIUS BACK LOUVER
SHEARING AND FORMING



M13
SHEAR BUTTON
SHEARING AND FORMING



M14
ENGRAVING
ENGRAVING



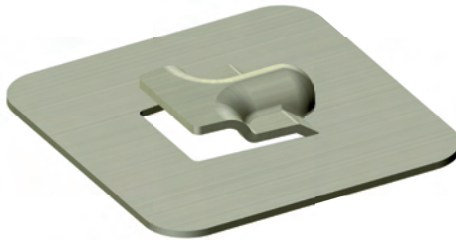
M23
DOT SCRIBER
ENGRAVING

SPECIAL FORMING

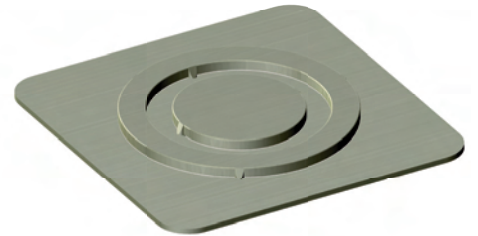
Our technical department is available to develop the **best solutions for our customer's requirements**. Thanks to this versatility we have no limits to satisfy the most complex requirements. The constant research of **new solutions** extends the possibility on the forming field, adding to normal engraving also **tridimensional images**.



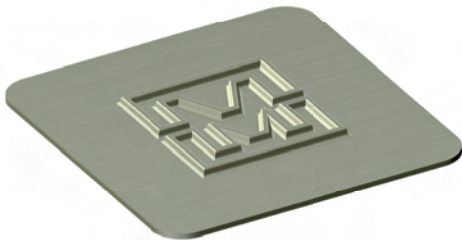
**M24 - STRENGTHENED CLIP UP
WITH SAFETY BUTTON**
SHEARING AND FORMING



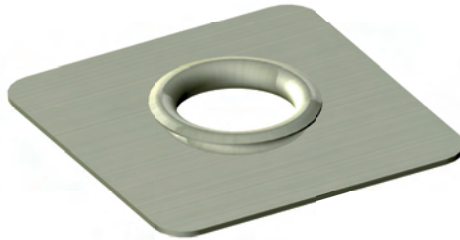
**M25
STRENGTHENED SPECIAL CLIP UP**
SHEARING AND FORMING



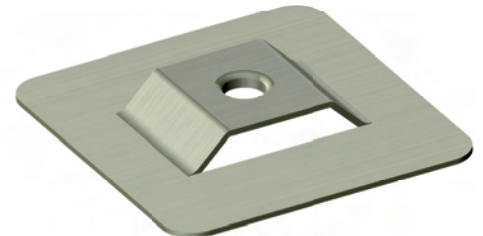
**M10
MULTIPLE KNOCKOUT**
SHEARING AND FORMING



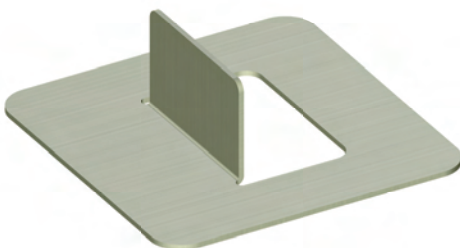
**M22
CUSTOM LOGO**
RELIEF



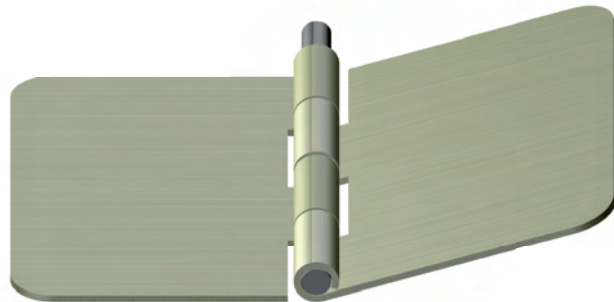
**M26
EMBOSS FOR ELECTRICAL CABLES**
SHEARING AND FORMING



**M27
BRIDGED & EXTRUDED HOLE DOWN**
SHEARING AND FORMING



**M28
BENDING TOOL**
FORMING



**M29
HINGE**
FORMING

CONTINUOUS FORMING AND SPECIAL APPLICATIONS

The most recent technical solutions implemented on the modern punching machines for **much better tools control than in the past**, gives great impulse to new applications. New special tools have been developed to shear the protecting film laid on the sheet metal or continuous embosses or to deburr sheared parts.

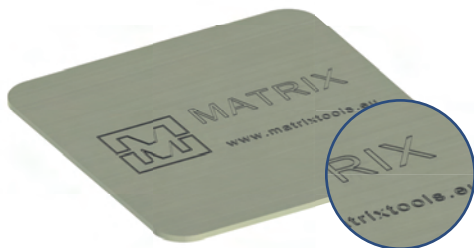
These are only some examples of what you could get from your punching machine just using Matrix products.



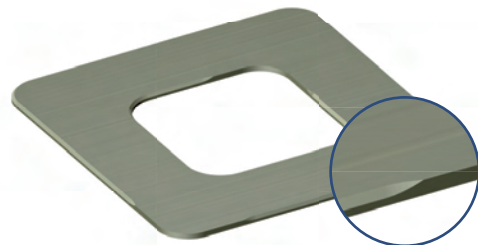
M15
CONTINUOUS RADIUS BACK LOUVER
SHEARING & FORMING



M20
CONTINUOUS OBOUND EMBOSS
FORMING



M30
SCRIBER
ENGRAVING



M31
DEBURR
ENGRAVING



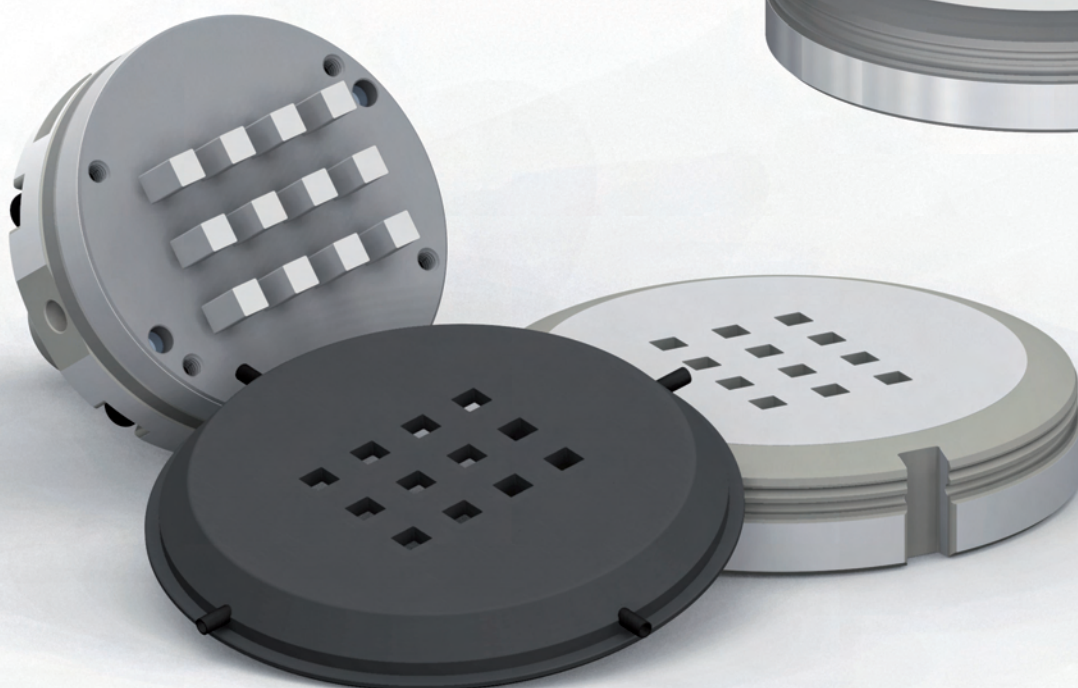
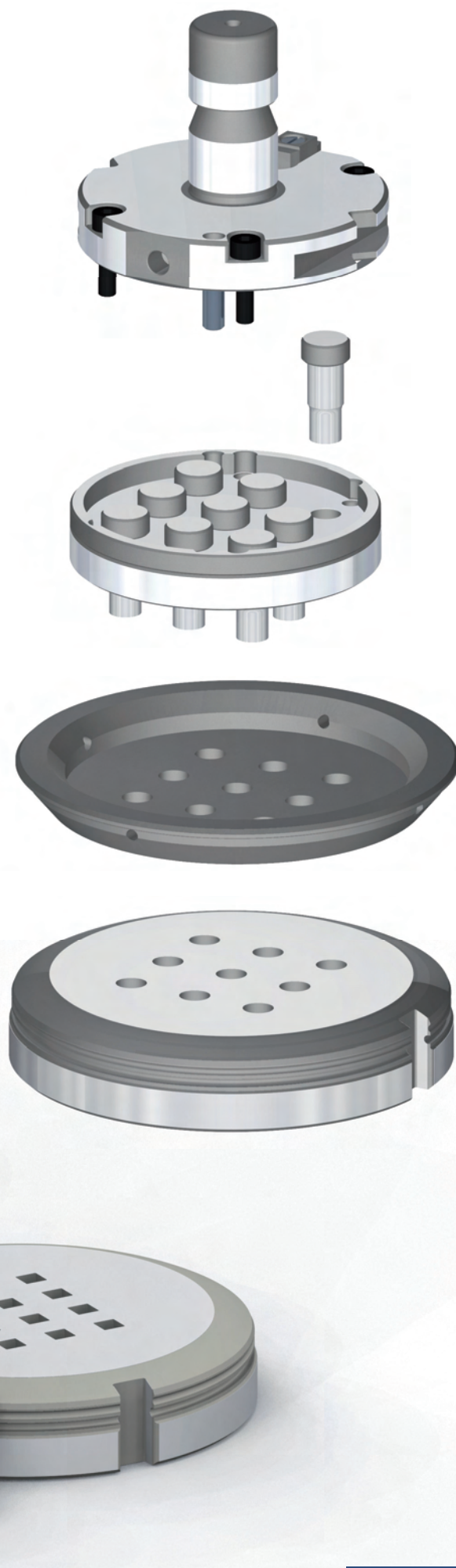
M32
FOIL SLITTING TOOL
ENGRAVING

CLUSTER TOOL

Punching of cluster holes is easier with cluster tools which grants **great accuracy of final result**.

This particular type of tools can be manufactured either as integral tool or with interchangeable inserts for a **considerable saving** already on the medium use.

As for all our specials, our cluster tools – round and shaped – are followed up to testing by mean of coding and electronic filing of all particulars, for a **quick and precise availability**.

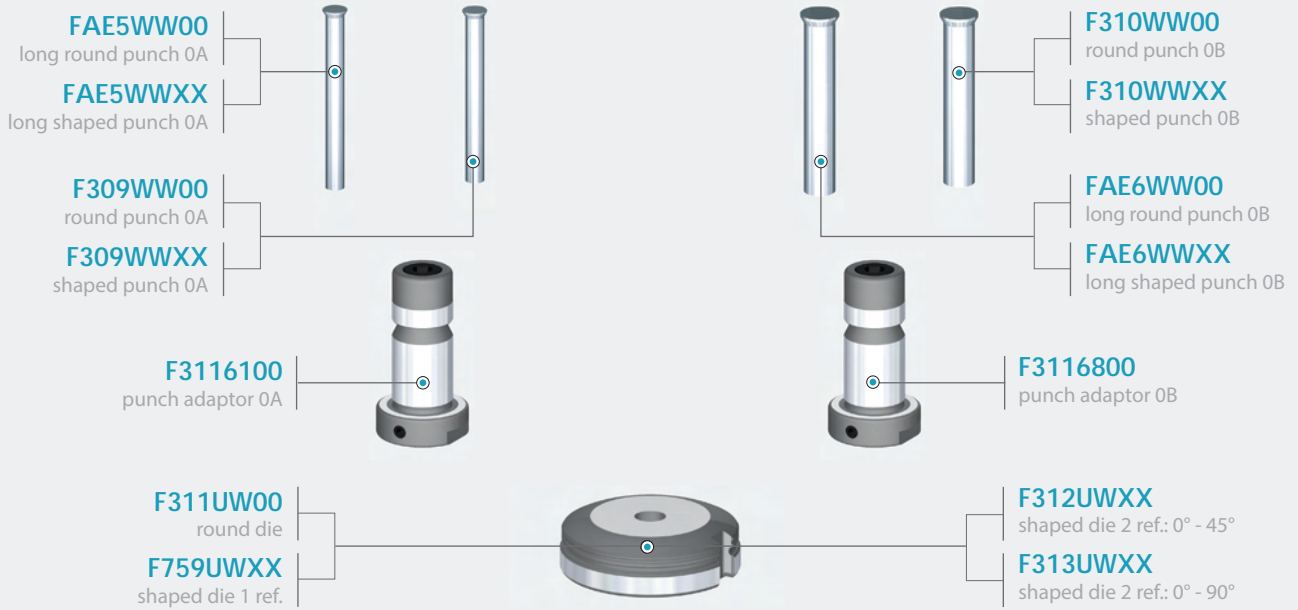




TOOLS

Tools codes indicated in our catalogues refer to the corresponding shape and can vary accordingly.

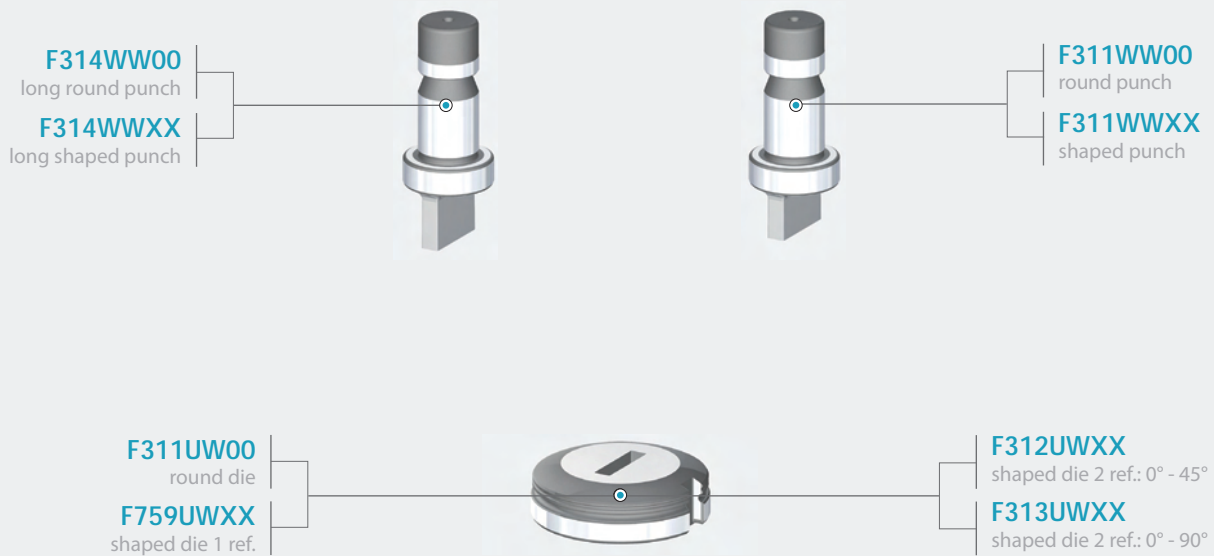
R SERIES - Size 0A - MAX Ø ∅ = mm 6,0 - Size 0B - MAX Ø ∅ = mm 10,5



OPTIONS AND NOTES



SERIES 30 - Size I - MAX Ø ∅ = mm 30,0



OPTIONS AND NOTES



SERIES 40/50 - Size II - MAX Ø ∅ = mm 40,0 / mm 50,0

F318WW00
long round punch 40 mm

F318WWXX
long shaped punch 40 mm

F322WW00
long round punch 50 mm

F322WWXX
long shaped punch 50 mm

F315WW00
round punch 40 mm

F315WWXX
shaped punch 40 mm

F319WW00
round punch 50 mm

F319WWXX
shaped punch 50 mm

F327UW00
round die

F760UWXX
shaped die 1 ref.

F328UAXX
shaped die 2 ref.: 0° - 45°

F329UAXX
shaped die 2 ref.: 0° - 90°

OPTIONS AND NOTES



SERIES 60/72/76- Size II - MAX Ø ∅ = mm 60,0 / mm 72,0 / mm 76,0

F326WW00
long round punch 60 mm

F326WWXX
long shaped punch 60 mm

F330WW00
long round punch 72 mm

F330WWXX
long shaped punch 72 mm

F931WW00
long round punch 76 mm

F931WWXX
long shaped punch 76 mm

F323WW00
round punch 60 mm

F323WWXX
shaped punch 60 mm

F327WW00
round punch 72 mm

F327WWXX
shaped punch 72 mm

F930WW00
round punch 76 mm

F930WWXX
shaped punch 76 mm

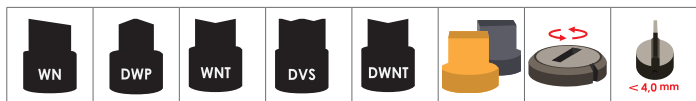
F327UW00
round die

F760UWXX
shaped die 1 ref.

F328UAXX
shaped die 2 ref.: 0° - 45°

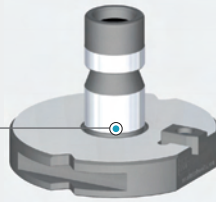
F329UAXX
shaped die 2 ref.: 0° - 90°

OPTIONS AND NOTES

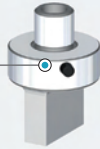


ITS SERIES 30 - MAX Ø ∇ = mm 30,0

FAHEBA00
 upper insert holder
 with this code we supply the upper insert holder with thickness mm 3,00 (FAHE7300) for height restore



FAHEWW00
 long round punch
FAHEWWXX
 long shaped punch



FAL4WW00
 round punch
FAL4WWXX
 shaped punch

F311UW00
 round die
F759UWXX
 shaped die 1 ref.



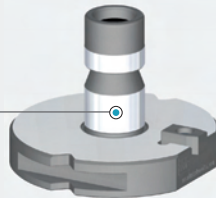
F312UWXX
 shaped die 2 ref.: 0° - 45°
F313UWXX
 shaped die 2 ref.: 0° - 90°

OPTIONS AND NOTES

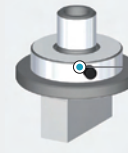


ITS SERIES 40 - MAX Ø ∇ = mm 40,0

FAHEBA00
 upper insert holder
 with this code we supply the upper insert holder with thickness mm 3,00 (FAHE7300) for height restore



FAM0WW00
 long round punch
FAM0WWXX
 long shaped punch



FAM1WW00
 round punch
FAM1WWXX
 shaped punch

F327UW00
 round die
F760UWXX
 shaped die 1 ref.



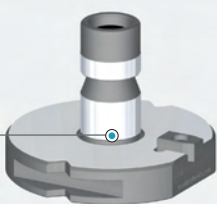
F328UAXX
 shaped die 2 ref.: 0° - 45°
F329UAXX
 shaped die 2 ref.: 0° - 90°

OPTIONS AND NOTES

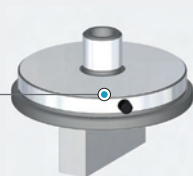


ITS SERIES 60 - MAX Ø \varnothing = mm 60,0

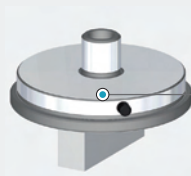
FAHFBA00
upper insert holder
with this code we supply the upper insert holder with thickness mm 3,00 (FAHF7300) for height restore



FAM20000
long round punch
FAM2WWXX
long shaped punch



FAM30000
round punch
FAM3WWXX
shaped punch



F327UW00
round die
F760UWXX
shaped die 1 ref.



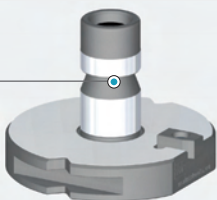
F328UAXX
shaped die 2 ref.: 0° - 45°
F329UAXX
shaped die 2 ref.: 0° - 90°

OPTIONS AND NOTES

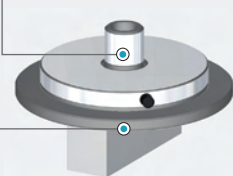


ITS SERIES 72/76 - MAX Ø \varnothing = mm 72,0 / mm 76,0

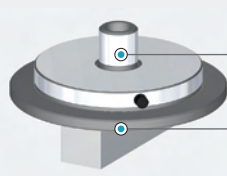
FAHFBA00
upper insert holder
with this code we supply the upper insert holder with thickness mm 3,00 (FAHF7300) for height restore



FAHFWW00
long round punch 72 mm
FAHFWWXX
long shaped punch 72 mm



FAL5WW00
round punch 72 mm
FAL5WWXX
shaped punch 72 mm



FAM4WW00
long round punch 76 mm
FAM4WWXX
long shaped punch 76 mm

FAM5WW00
round punch 76 mm
FAM5WWXX
shaped punch 76 mm

F327UW00
round die
F760UWXX
shaped die 1 ref.

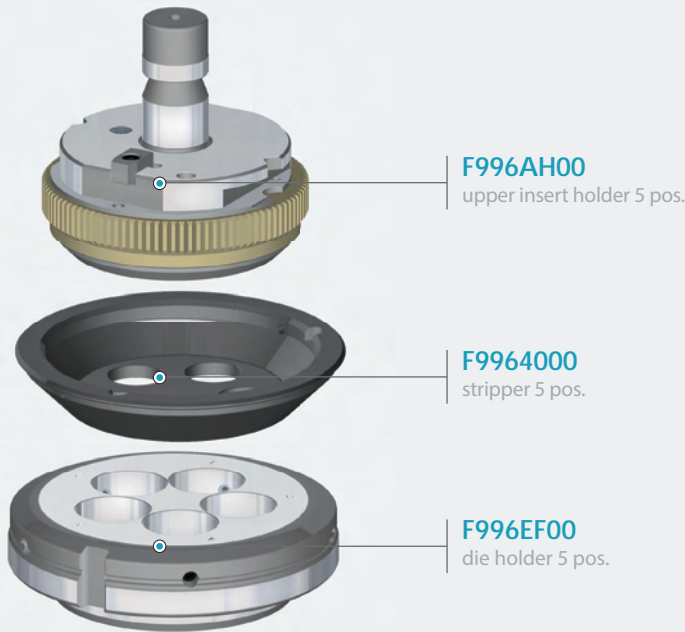


F328UAXX
shaped die 2 ref.: 0° - 45°
F329UAXX
shaped die 2 ref.: 0° - 90°

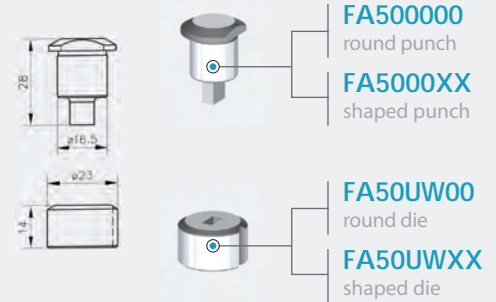
OPTIONS AND NOTES



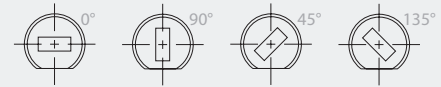
MULTITOOL SERIES 5 - 5 x MAX Ø ∅ = mm 16,0



TOOLING FOR MULTITOOL SERIES 5



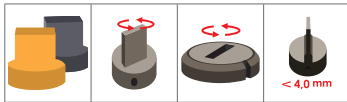
Punch orientation



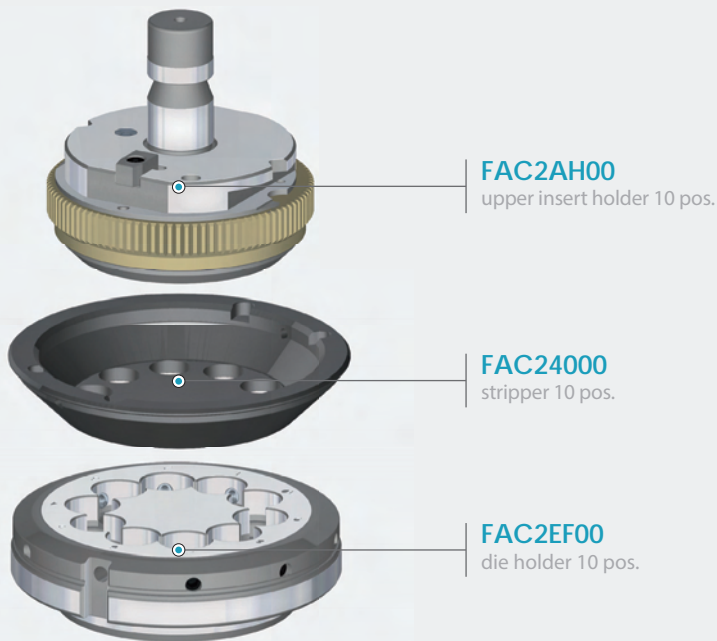
Die orientation



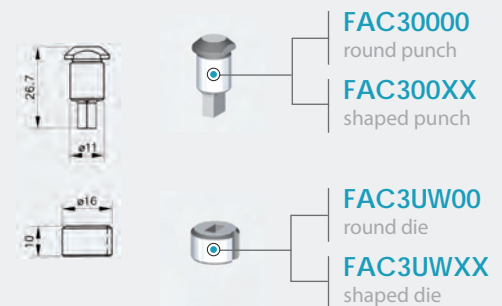
OPTIONS AND NOTES



MULTITOOL SERIES 10 - 10 x MAX Ø ∅ = mm 10,5



TOOLING FOR MULTITOOL SERIES 10



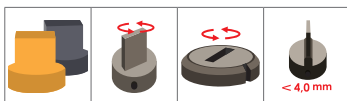
Punch orientation



Die orientation

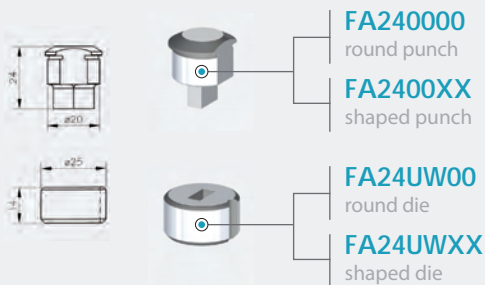


OPTIONS AND NOTES



OTHER TOOLING

TOOLING FOR MULTITOOL SERIES 4 MAX Ø ∇ = mm 16,0



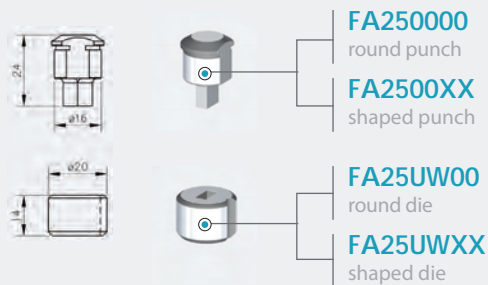
Punch orientation



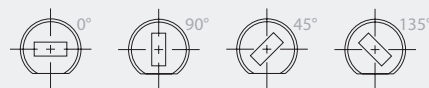
Die orientation



TOOLING FOR MULTITOOL SERIES 6 MAX Ø ∇ = mm 10,5



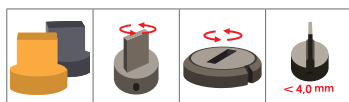
Punch orientation



Die orientation



OPTIONS AND NOTES



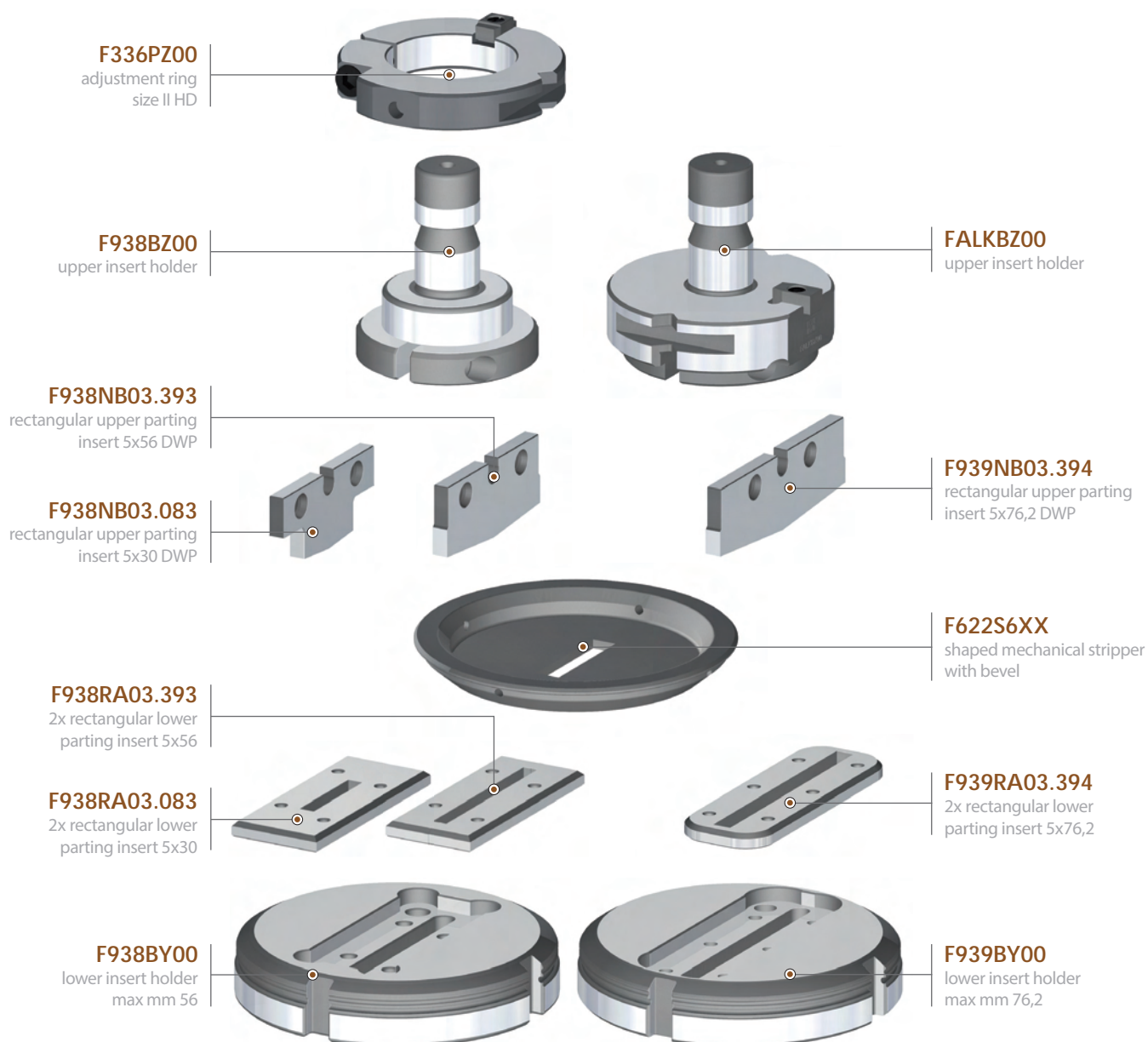


ACCESSORIES



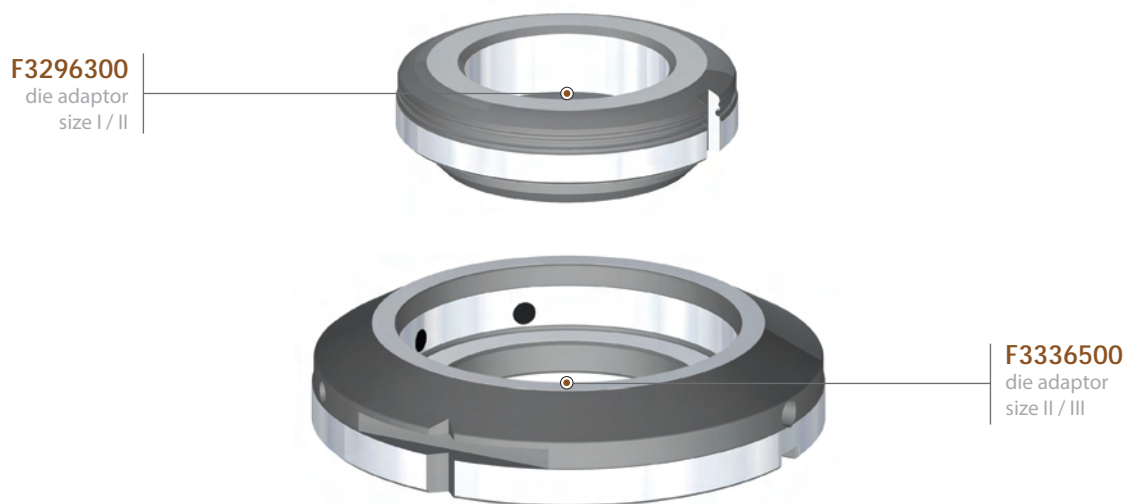
SHEARING TOOLS

Replaceable shearing inserts systems which preserves the support elements, designed specifically for an economical and advantageous use of the most common punching tool.



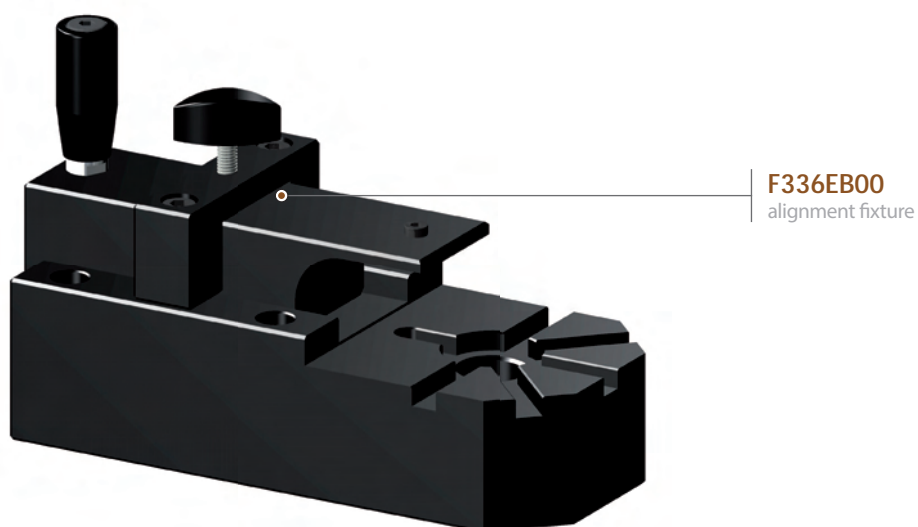
DIES ADAPTORS - Size II / III

Two models of dies adaptors either for Size I on machines with die housing for Size II, or Size I and Size II on machines with housing for Size III.



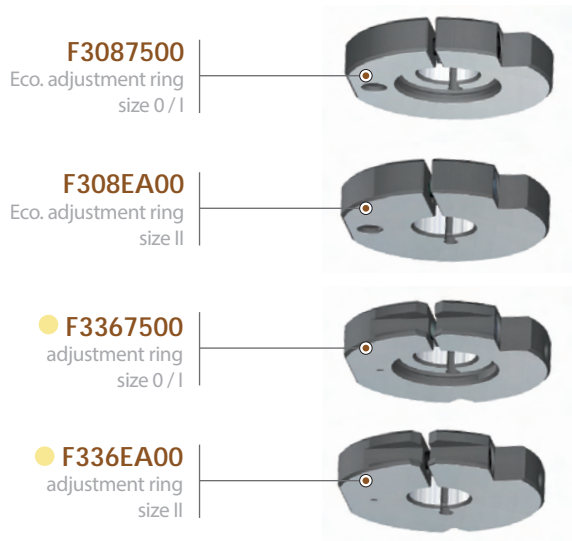
ALIGNMENT FIXTURE

Designed for aligning the punch to its adjusting ring and for orienting the punch shape, with a quick and economical preparation of the tool to be used.



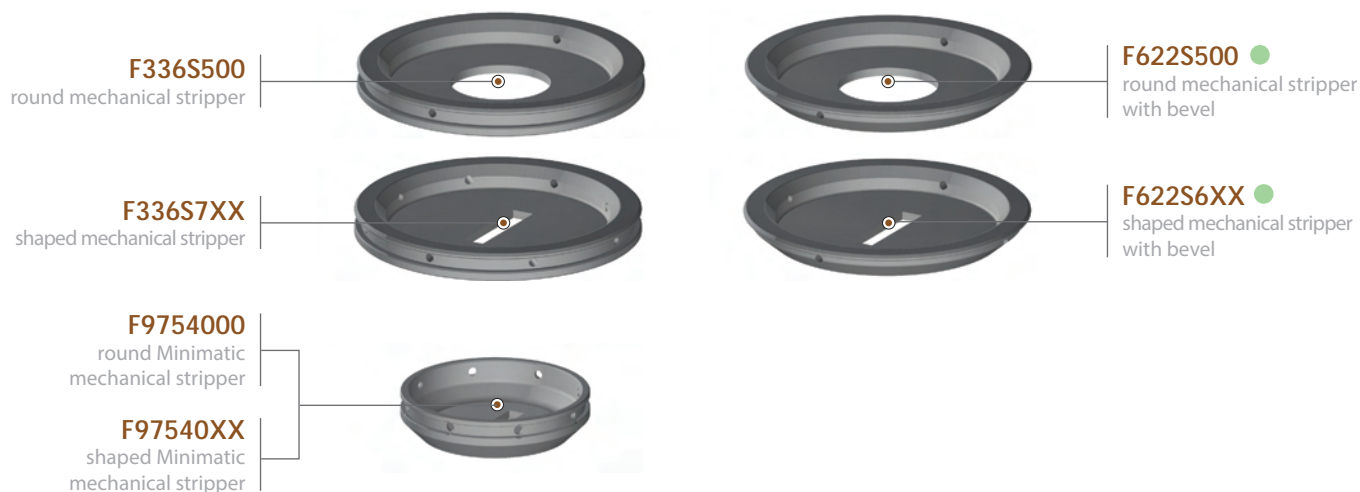
ADJUSTMENT RINGS

One of the main components of Trumpf® tools system, for a correct orientation of the punch.
 On machines equipped with automatic tools change, the adjustment rings are necessary to keep the punch on the cartridge and to grant the correct machine functioning.



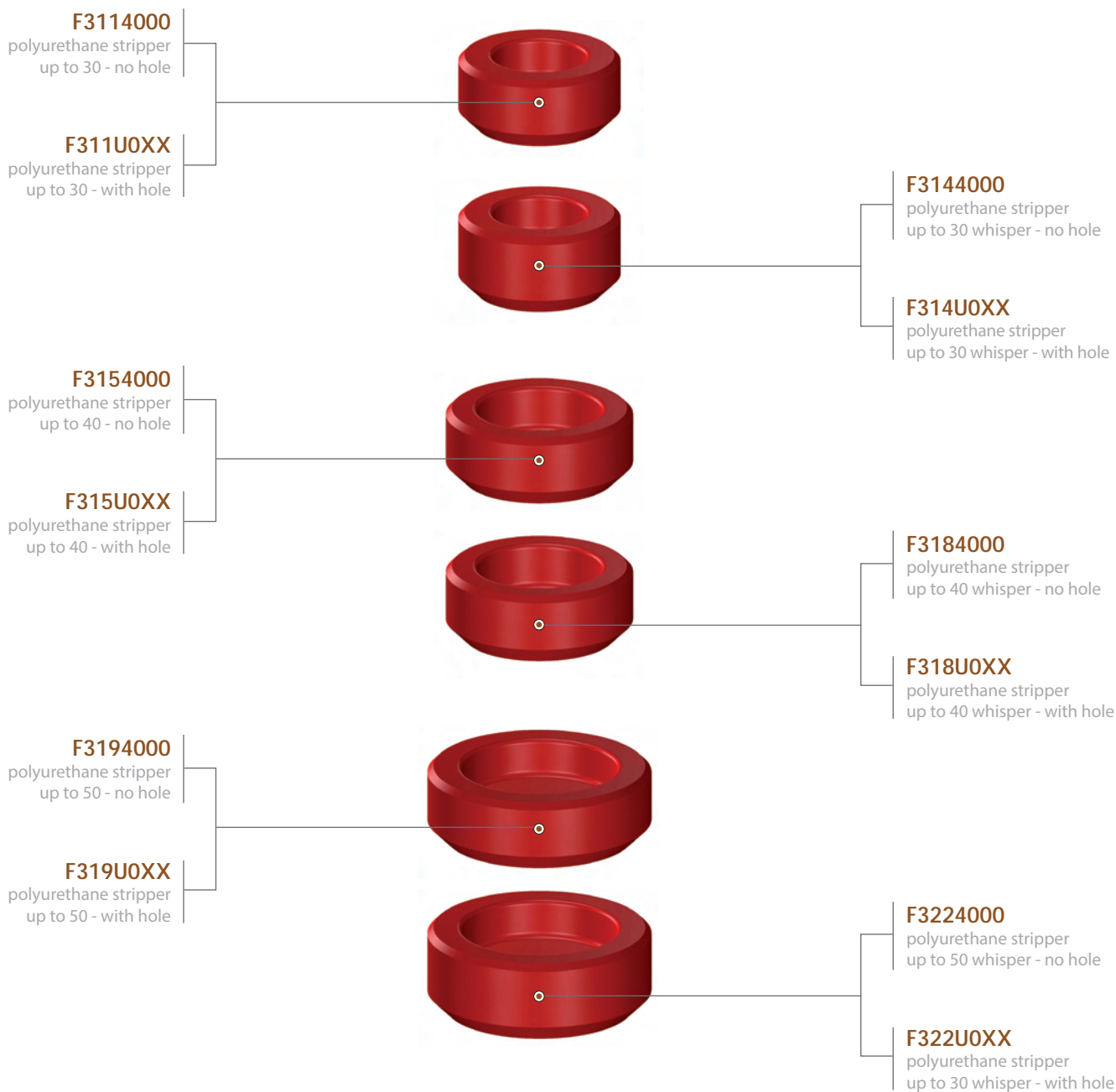
MECHANICAL STRIPPERS

Mechanical strippers are used for several functions according to the type of punching machine used. When possible or according to the machine functions, the mechanical stripper, by touching the sheet metal and pushing the die, helps to pull up the punch, improving this way the quality of processing and the positioning precision.



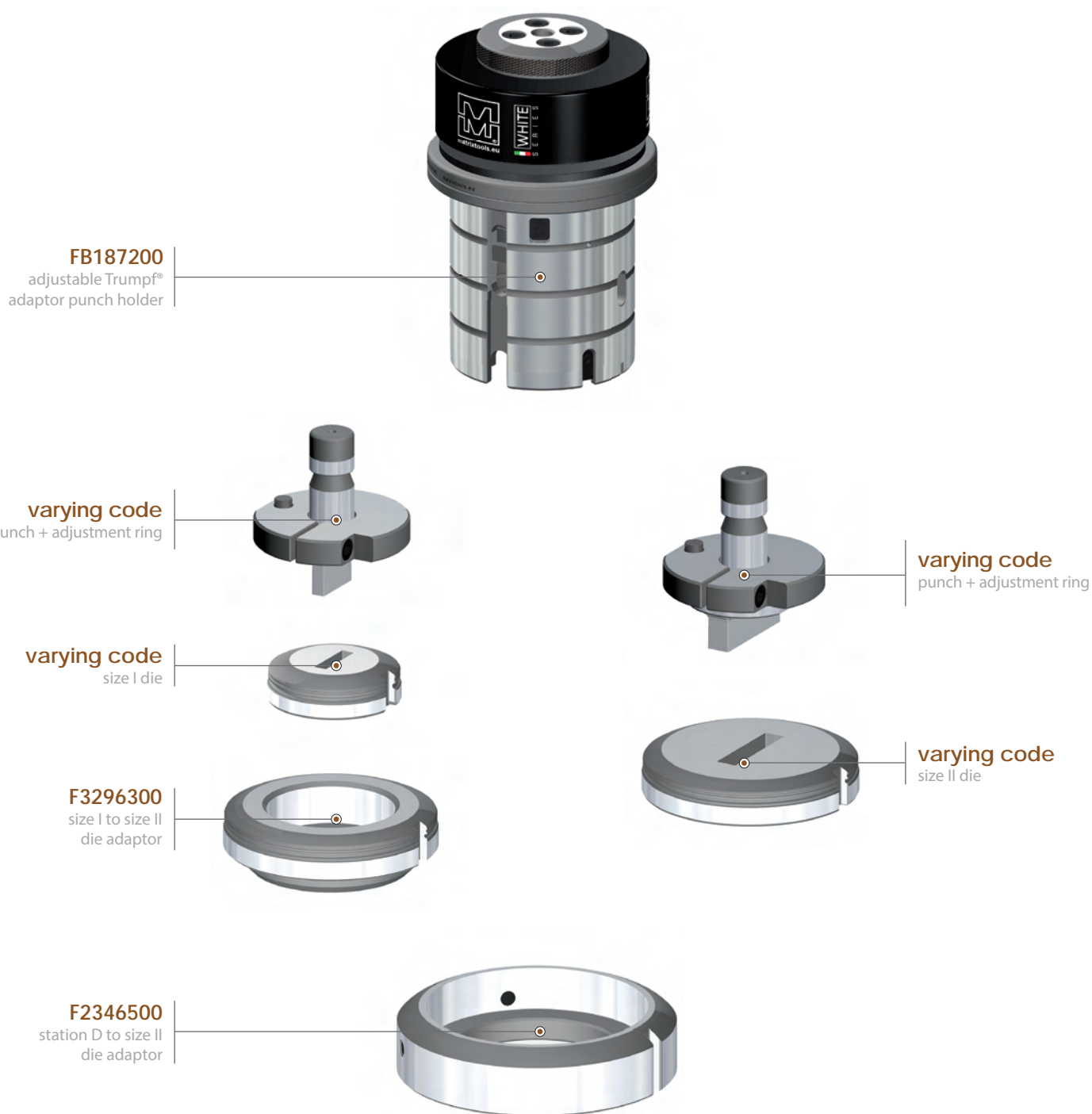
POLYURETHANE STRIPPERS

The polyurethane strippers by stopping the sheet metal from moving while punching, reduce to minimum the scratches left on the sheet metal and foster working processes less noisy



THICK TURRET ADAPTOR - MAX Ø ∇ = mm 76,2

For Trumpf® tools to be used on Thick Turret D station. For standard and sharpened tools, standard strippers. After sharpening, for a longer life the tools height is restored by step adjustment and without modifying the punch press stroke. Quick tools replacement, tools oriented from 0° to 360° with 45° steps. All this, for great performances.



LUBRICATION: A MUST

It is the first rule to apply; being punching a shearing and extrusion processing, the shearing area lubrication is a must to obtain a good result. Lubrication is very important on punching machines and particularly on punching stamps.

When a punch shears the sheet, small quantities of material lays on the punch surface.

A lubricant with proper characteristics creates a barrier between punch and material, reducing significantly either friction or stratification of material on the punch surface, improving therefore the punch life.

If for some reasons lubrication is a problem, Titanium coating on punches could help.

Matrix offers lubricants adapt to different working requirements as well as volatile oils whenever oil residual must be avoided.

GRINDING: THE IMPORTANCE OF MAINTENANCE

Professional maintenances and grinding grant constant and more durable performances to the punching tools.

To the first wearing sign it is recommended to grind the tools considering that the material removal will be minimum:

wearing grows progressively, reducing the total number of hits performable with one single tool.

After sharpening it is recommended to demagnetize the tools to avoid scraps pulling and it is furthermore necessary to restore the punch height, in case it is adjustable or, otherways, the machine stroke.

All this can be done by machine operators with grinding machines and accessories for an easy, quick and economical operation.

Matrix can satisfy these requirements with a range of machines, accessories, lubricants and instructions. Specific documentation available on demand.



OPTIONS

SURFACE COATINGS (PVD)

In order to improve working characteristics, the surface of all punches can be coated; this treatment gives to the tool surface a considerably greater hardness and self-lubrication. MATRIX uses two types of coatings, Type A (Titanium Nitrite) and type B (Titanium-Aluminum Nitrite).

Type A coating yellow-gold coloured, provides to the punch a higher surface

hardness up to four times the initial one and an optimal self-lubrication capability with a friction coefficient equal to 0,44. It's recommended for exacting working processes, without lubrication or with dough materials difficult to be pulled, such as copper or aluminum alloys.

Type B coating grey-blue coloured, is an evolution of the previous one which, besides

imparting a higher hardness on tool surface, is more solid and its endurance increases; this coating resists to higher temperature, little lower than 900°.

Thanks to these characteristics, it's recommended in case of high speed punching machines (500:1000 strokes per minute) and it's also excellent for STAINLESS STEEL processing.

SHEAR SHARPENING

For punch shear sharpening we mean various geometry of their faces which grants several benefits such as:

- Noise Reduction
- Reduction of vibration and counterstrokes of all machine components

- Slug pulling reduction
- Tonnage reduction
- Easy pulling

On the other hand, tools with special shear provides punch holders springs a harder functioning.

Shear types most commonly offered are:

- **DVS** for shearing tools and high thicknesses
- **DWP** for balanced loadings and high thicknesses
- **DWNT** for thin thicknesses - nibbling processes with big shapes
- **WNT** for thin thicknesses - nibbling processes with small shapes
- **WN** for thin thicknesses - nibbling processes with small shapes



PUNCH GRINDING EFFECTS ON TONNAGE

Find here below an illustrative table concerning tonnage reduction, considering DWP shear with standard depth.

Material thickness in mm	1	1,5	2	2,5	3	4	5	6
Tonnage reduction in %	60	50	40	35	25	20	15	10

TONNAGE GENERAL FORMULA

$$P \times S \times K$$

28,3

P = shape perimeter
S = material thickness
K = material coefficient

Material	K material
Aluminum	0.6
Copper	0.6
Brass	0.6
Mild steel	1
Stainless steel	1.5

Exemple:

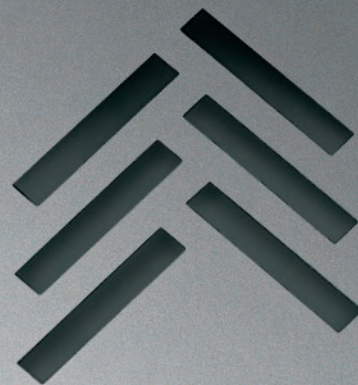
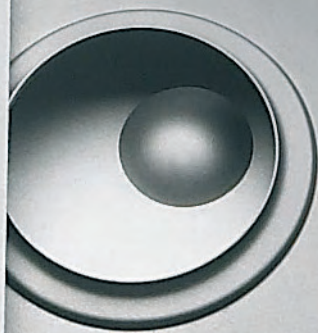
$$40 \text{ (square perimeter of mm 10 edge)} \times 2 \text{ (material thickness in mm)} \times 1,5 \text{ (K stainless steel)} = 4,24 \text{ (tonnage)}$$

28,3

DIES TOLERANCE IN PERCENTAGE TO THICKNESS

Material	Thickness Range	Minimum or Blanking*	Standard	Maximum
Aluminum Copper Brass 20÷25% Kg/mm ²	Up to mm 2	8%	10%	12%
	From to mm 2 mm 4	10%	12%	15%
	Over mm 4	12%	15%	20%
Mild steel 30÷40% Kg/mm ²	Up to mm 2,5	15%	18%	20%
	From to mm 2,5 mm 5	18%	22%	25%
	Over mm 5	20%	25%	30%
Stainless steel 60÷80% Kg/mm ²	Up to mm 1,5	15%	20%	22%
	From to mm 1,5 mm 3	18%	22%	25%
	Over mm 3	20%	25%	28%

* Blanking: when the scrap is the requested part.



087-080



MATRIX

TRUMPF® FORMINGS

07-5414-407



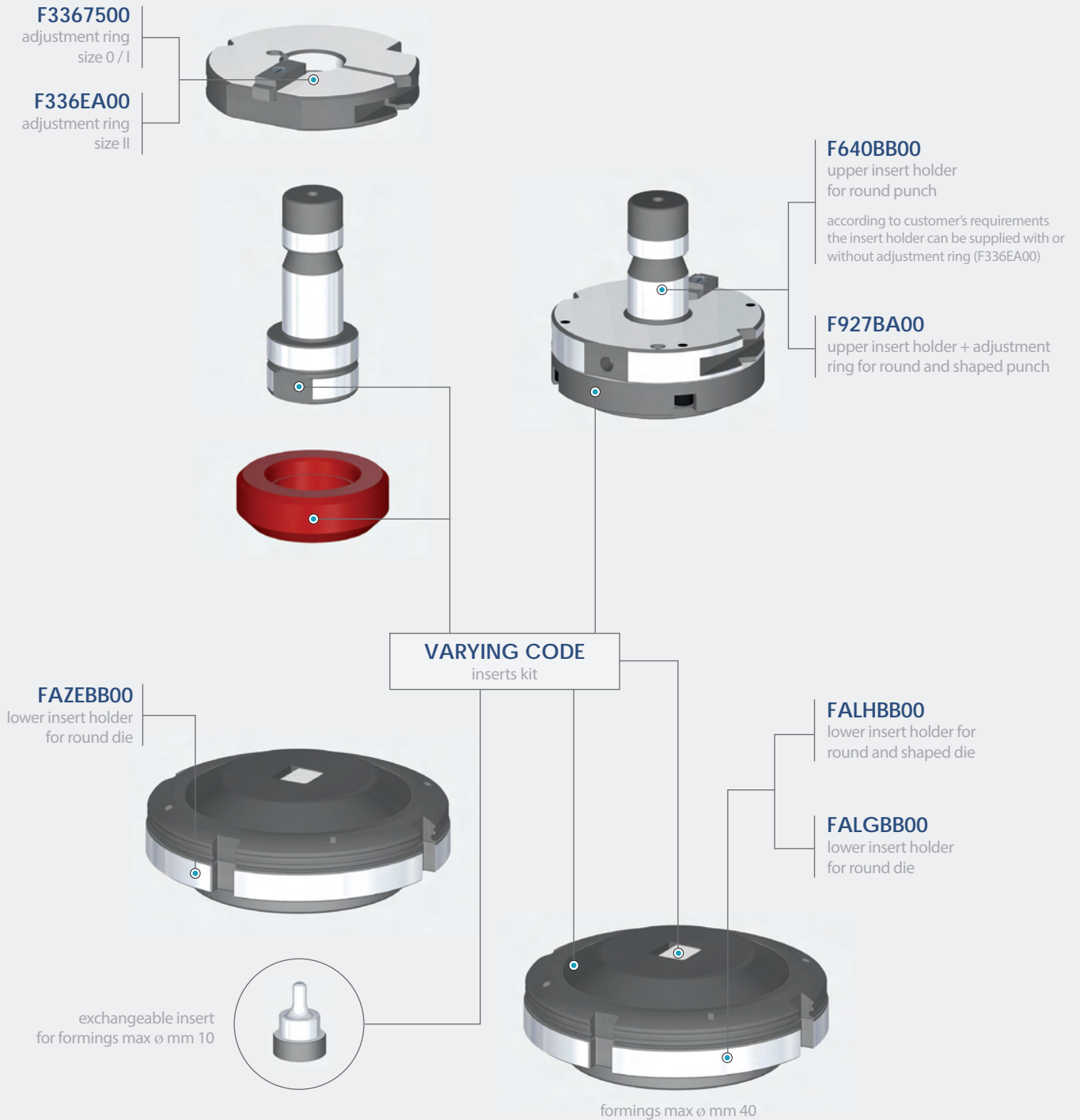
07-1396-096



06-3793-302



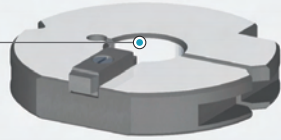
TRUMPF® - FORMING - SIZE II



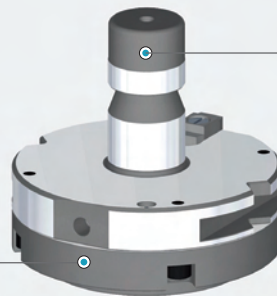
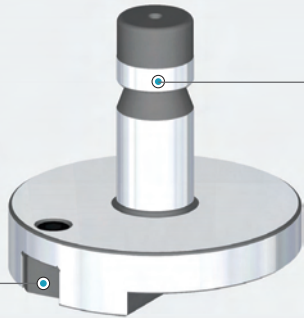
Forming is a procedure to **modify the sheet metal planarity**. The possible forming are several and can combine shearing, **extrusion or embossing**. For this tool we can also offer a lower insert holder just for round.

TRUMPF® - RADIUS BACK LOUVER - SIZE II

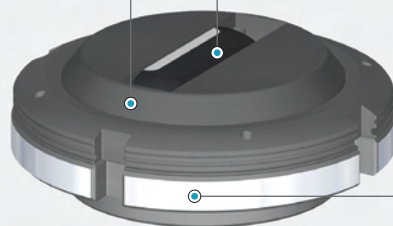
F336EA00
adjustment ring
size II



F639CP00
upper parting insert



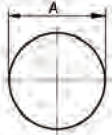
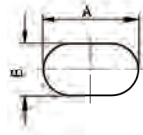
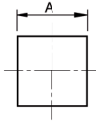
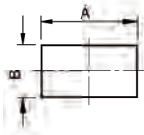
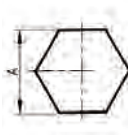
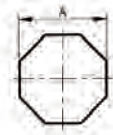
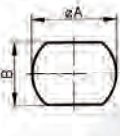

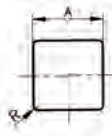
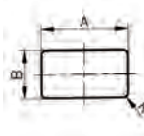

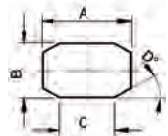
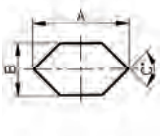
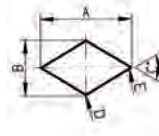
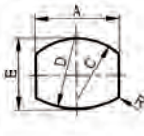
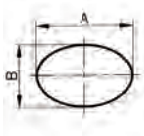

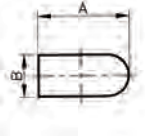
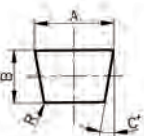




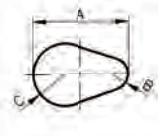

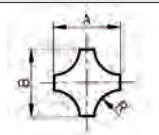
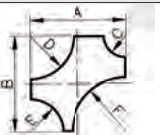
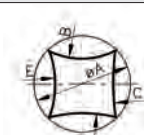

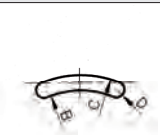
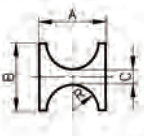

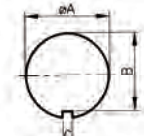
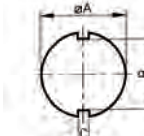
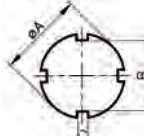
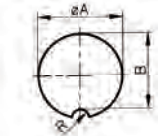
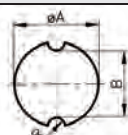
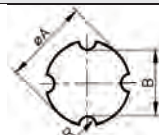
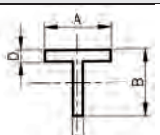
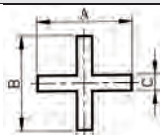
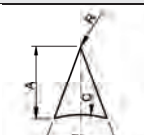
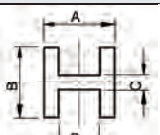
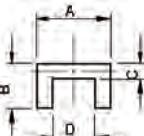
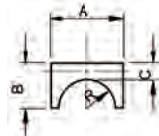
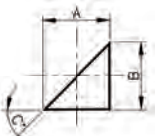
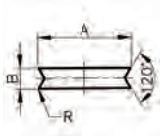

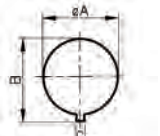
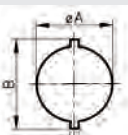
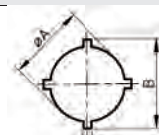
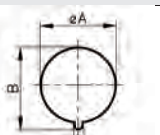
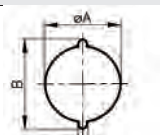
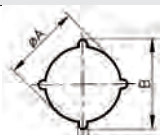
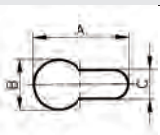

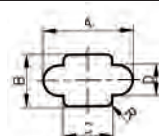
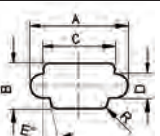
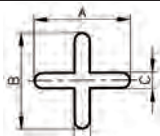

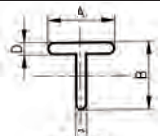
VARYING CODE
inserts kit



F639BY00
lower insert holder for
round and shaped die

Tools for the most common formings, with quick deliveries.
Our sales department is at your complete disposal to provide you with updated list.

MATRIX SHAPE CODING

					
A0A	A0B	A0C	A0D	A01	A02
					
A03	A04	A05	A06	B01	B02
					
B03	B04	B05	B06	C01	C02
					
C03	C04	C05	C06	C07	C08
					
C09	C10	C11	C12	C13	C14
					
C15	C16	D01	D02	D03	D04
					
D05	D06	E01	E02	E03	E04
					
E05	E06	F01	F02	G01	H01
					
H02	H03	H04	H05	H06	H07
					
H08	H09	H10	H11	H12	H13

MACHINE TRUMPF® TABLE

Trumpf® machines are divided into homogenous groups according to functioning characteristics and type of tools. The below table shows these groups, extremely important to correctly individuate the necessary tools for the own punching machine.

GROUPS	A	B	C	D	E	F	G	H	I	S
	CN 700	CN 901E	CN 1200A	20	150K	150W	20aW	190R	1000R	100
	CN 701	CN 902	CN 1200S	20A	151K	152W	202W	200R	2000R	120R
	CN 900	CS 75	CS 15	202M	152K	180W	300W	500R	2010R	160
	CN 901	CS 75.2	CS 20		180K	180.2W	300LW	600L	2020R	
			CS 20A		180.2K	180R	300PW		3000R	
			MP 25		180KD	180LW	300top		3000L	
			MP 25D		180LK	180.2LW	400W		5000R	
					180.2LK	ELX/SWIFT			6000L	
					202K	185			TruPunch 1000	
					225K	240			TruPunch 2020	
					235K	240R			TruPunch 3000	
					300K	250			TruPunch 5000	
					300LK	260R			TruMatic 3000	
					300PK				TruMatic 6000	
					400				TruMatic 7000	
					400 K					

The most recent punching machines belongs to groups H and I and this catalogue is focused on the tools used. The below table gathers some useful information related to the punching machines of these two groups. Colors shown on the table refers to the types of adjusting rings and mechanical strippers used, as shown at page 22.

GROUPS	MACHINE	ADJUST. RING	MECHAN. STRIPPERS	LONG FLAT PUNCH	SHORT FLAT PUNCH	WHISPER PUNCH	DIES WITH 1 ref.	MULTITOOL	MAX. Ø SIZE
H	190R	Yellow	Green	✗	✓	✓	✓	4 - 6	76,2
	200R	Yellow	Green	✗	✓	✓	✓	4 - 6	76,2
	500R	Yellow	Green	✗	✓	✓	✓	4 - 6	76,2
	600L	Yellow	Green	✗	✓	✓	✓	4 - 6	76,2
I	1000R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	2000R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	2010R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	2020R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	3000R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	3000L	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	5000R	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	6000L	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruPunch 1000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruPunch 2020	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruPunch 3000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruPunch 5000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruMatic 3000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
	TruMatic 6000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2
TruMatic 7000	Yellow	Green	✓	✗	✓	✓	5 - 10	76,2	



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