



T O O L I N G F O R P U N C H P R E S S E S



# EMX THICK TURRET

CATALOG

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# MATRIX TOOLS

TOOLING FOR PUNCH PRESSES



## A story of enthusiasm and passion

Matrix's natural vocation for innovation was amplified in 2017, when Matrix joined the Salvagnini Group, a historic manufacturer of sheet metal working machinery, thus establishing itself as an international tool manufacturer.



## Our value is our team

Each and every day, our energy and competence transform our customers' needs into immediate and lasting added value. The tools we produce are the result of decades of experience and reflect our spirit for exploration.



## Each customer is special

We want to go beyond product quality and excellent service.

Our mission is to make our customers more competitive in their own sectors.

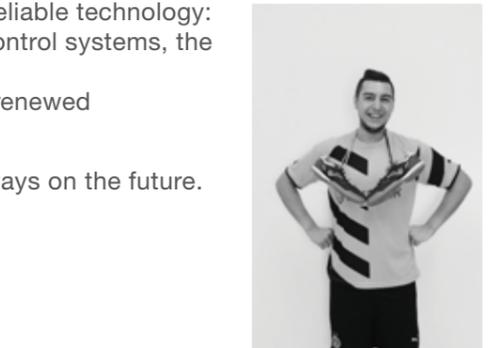
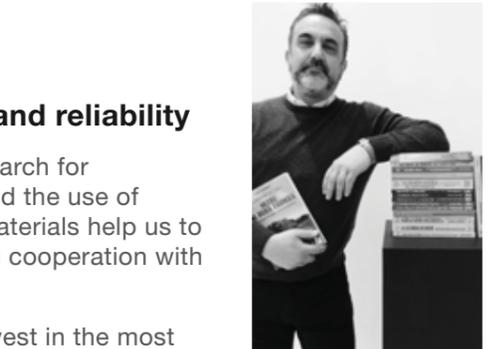


## Technology and reliability

The constant search for improvement and the use of excellent raw materials help us to establish lasting cooperation with our customers.

Each day we invest in the most advanced and reliable technology: sophisticated control systems, the latest software and constantly renewed machinery.

Our focus is always on the future.



## EMX LINE

The new EMX line arose from our customers' need to have a range of top quality, high-performance punching tools available in a short time. We offer the B, C, D and E punch-holders for the classic integral punch or in the innovative iEM insert version, with traditional or guided strippers. The guided extractor is recommended for heavy-duty machining (high tonnage and/or thickness) or for small punches that require stroke guidance for greater precision and rigidity.

EMX is MATRIX's Thick Turret line. It is the result of decades of experience in the sector and is compatible with the tools most commonly used on the market.

It is designed to facilitate our customers' choice by offering a complete and long-lasting product that can be sharpened as and when necessary.

Maximum efficiency is achieved using the innovative iEM inserts.

See pages 9 to 15.



### W, G and R Series punch-holders Maximum compatibility

Matrix has developed three series of punch-holders for the EMX line: the W, G and R Series. All three series can use the new iEM inserts, directly in the punch-holder or via the specific adapters.

The W Series punch-holder is compatible with the most common tool types on the market. Flexible, simple and universal, it guarantees high performance and can be adjusted up to 12 mm.

The W Series is also available for Amada style tools, both standard and Air Blow (AB) (pages 46, 48 and 50 to 55), and for W90 tools (pages 57 to 62).

The G Series punch-holder is the top of the Matrix range. It has the same characteristics of flexibility and compatibility as the W Series, but with the additional possibility of speedily changing the strippers in the largest stations (C, D and E) without using a wrench.

The R Series punch-holder was developed by Matrix to meet the needs of customers looking for maximum cost-effectiveness. It is available in both lubricated and non-lubricated versions, and is compatible with both standard and Air Blow Amada style punches (AB, pages 47 and from 49 to 55).

The R Series is the best choice for heavy-duty machining.



## iEM INSERTS

### iEM inserts and adapters Thick Turret B Station

The iEM insert system guarantees excellent performance and cost-effective tool management.

The insert-holder adapters are manufactured from suitably treated steel so as to resist the stress present during machining and to maximize tool life. The inserts are produced with the quality that has always distinguished Matrix.

They offer significant savings when purchasing spare parts and changing shape, as well as the same reliability and precision as traditional integral punches.

Moreover, the 180° rotation of the shape increases the possibilities for orienting the insert with respect to the standard punch, thus giving customers maximum flexibility.

For perfect compatibility, the dimensions of both the adapter with insert and those of the cutting part (diameter/maximum diagonal 31.7 mm) remain the same as those of the integral punch.



### iEM inserts and adapters Thick Turret C, D and E Stations

The advantages developed for the B station can also be found in the upper stations, where the adapter can be integrated directly into the punch-holder or purchased separately (page 31).

The reduction in weight and raw material makes tool management easy and cost-effective even in the largest stations. The iEM inserts also deliver all the characteristics of resistance and precision offered by traditional integral punches.



Patent pending

## JETFORM

Forming modifies the flatness of the sheet. The JETFORM range of tools can do just this, for even more efficient punching machine use. Many types of forming operation are possible and can be combined with parting operations such as extrusion and coining.

The JETFORM insert-holder range is available for B, C, D and E stations. It follows the punch-holder philosophy of using interchangeable inserts to minimize the cost of new forming operations.

Matrix offers two different types of insert-holder, so as to better satisfy different customer needs.

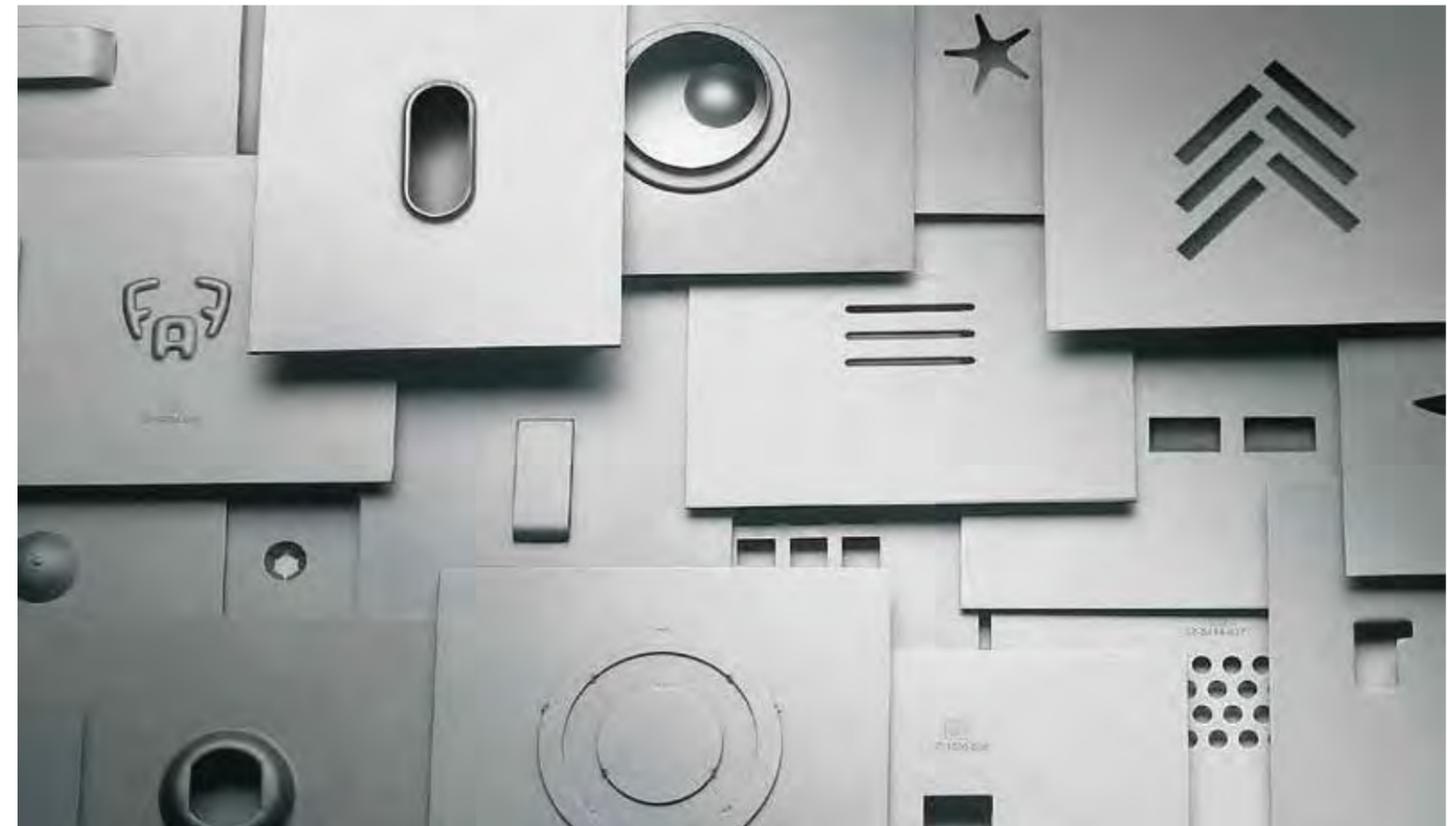
The G series features precise tool height adjustment in steps, making it the best choice for punching machines where stroke adjustment is unpredictable or absent.

The G series features precise tool height adjustment in steps, making it the best choice for punching machines where stroke adjustment is unpredictable or absent.

All insert-holders also allow all components to be fully lubricated by adding a specific oil from the top, either automatically or manually.



**JETFORM**

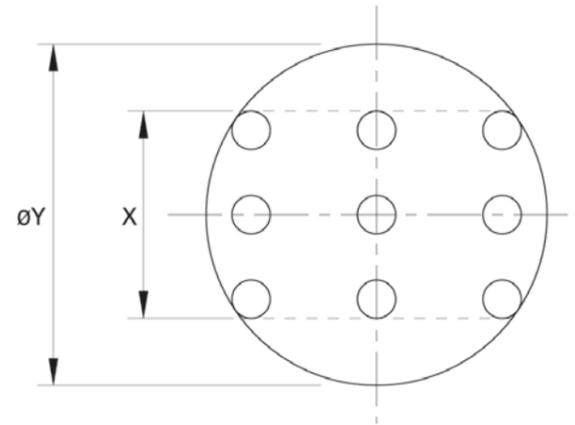


## CLUSTER TOOLS

Cluster tools make it much easier to machine large areas featuring repetitive punchings. They also guarantee a more accurate result.

Cluster tooling can take the form of integral tools or interchangeable inserts. Such inserts can deliver considerable economic savings in the medium-term.

As for other special tooling, all cluster tools (both rounds and shapes) are given codes and all their details are filed electronically before they are tested, thus guaranteeing their immediate and precise availability.



	B Station	C Station	D Station	E Station
X	21	21	56	71
øY	31.7	50.8	88.9	114.3



## PUNCH-HOLDERS AND TOOLS

The codes of the tools in this catalog are for the figure shown and may vary if the shape changes.

## EMX - W SERIES - A STATION

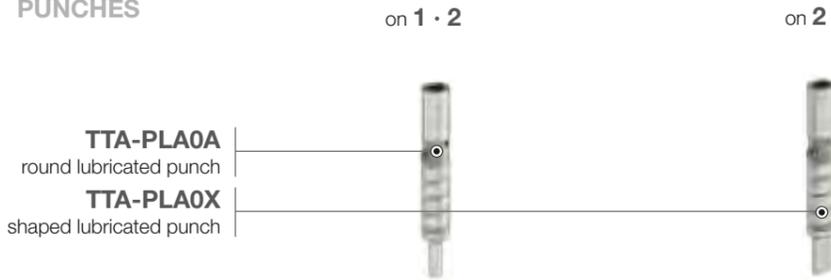
 MAX Ø  $\varnothing$  = mm 12.7

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

### PUNCH-HOLDERS



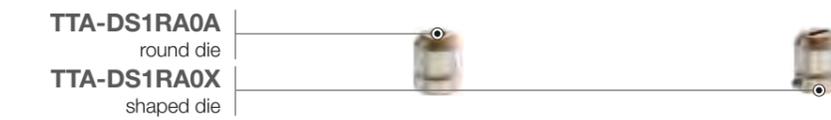
### PUNCHES



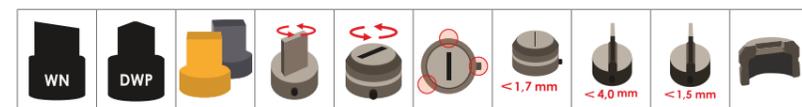
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - W SERIES - B STATION

 MAX Ø  $\varnothing$  = mm 31.7

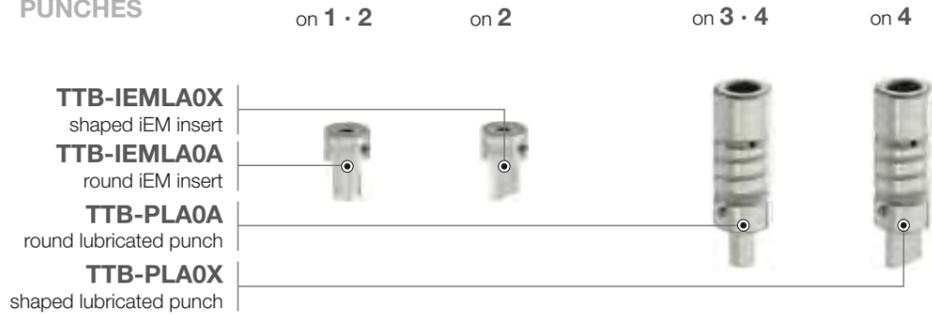
The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

iEM inserts make the system not just robust but also cost-effective.

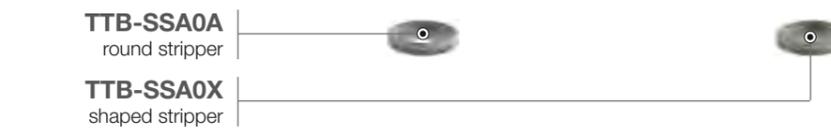
### PUNCH-HOLDERS



### PUNCHES



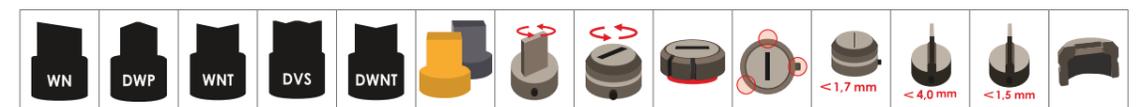
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - W SERIES - GUIDED B STATION

 MAX Ø  $\nabla$  = mm 31.7

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

Guided strippers are the ideal solution for heavy-duty machining or when great accuracy is required.

iEM inserts make the system not just robust but also cost-effective.

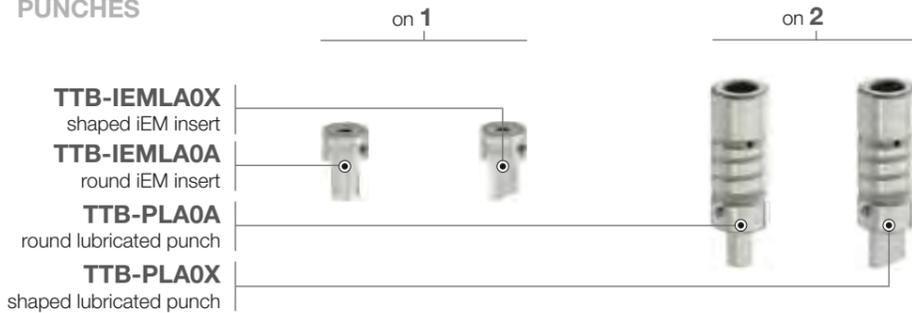
### PUNCH-HOLDERS



**TTB-HWIEMGR&S**  
EMX-W guided punch-holder  
for iEM rounds and shapes

**TTB-HWGR&S**  
EMX-W guided punch-holder  
for rounds and shape

### PUNCHES



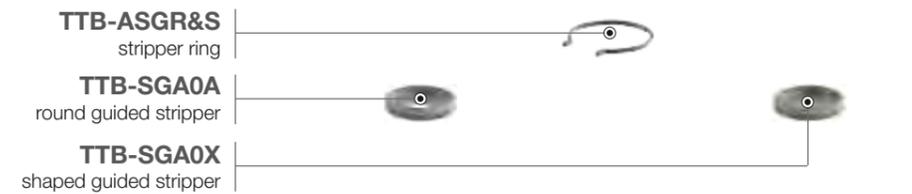
**TTB-IEMLA0X**  
shaped iEM insert

**TTB-IEMLA0A**  
round iEM insert

**TTB-PLA0A**  
round lubricated punch

**TTB-PLA0X**  
shaped lubricated punch

### STRIPPERS



**TTB-ASGR&S**  
stripper ring

**TTB-SGA0A**  
round guided stripper

**TTB-SGA0X**  
shaped guided stripper

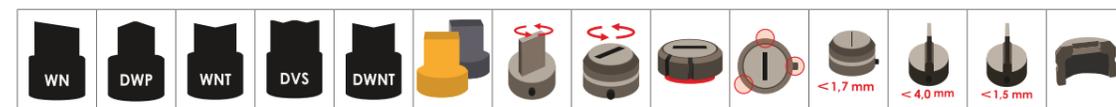
### DIES



**TTB-DS1RA0A**  
round die

**TTB-DS1RA0X**  
shaped die

## OPTIONS AND NOTES (See page 67)



## EMX - G & W SERIES - C STATION - STANDARD & iEM

 MAX Ø  $\nabla$  = mm 50.8

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench.

Guided strippers are the ideal solution for heavy-duty machining or when great accuracy is required. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



**TTC-HGIEMR&S**  
EMX-G punch-holder for  
iEM rounds and shapes

**TTC-HWIEMR&S**  
EMX-W punch-holder for  
iEM rounds and shapes

**TTC-HGR&S**  
EMX-G punch-holder for  
standard rounds and shapes

**TTC-HWR&S**  
EMX-W punch-holder for  
standard rounds and shapes

### PUNCHES



**TTC-IEMLA0X**  
shaped iEM insert

**TTC-IEMLA0A**  
round iEM insert

**TTC-PSA0A**  
standard round punch

**TTC-PSA0X**  
standard shaped punch

### STRIPPERS



**TTC-SSA0X**  
shaped standard stripper

**TTC-SSA0A**  
round standard stripper

**TTC-SGA0A**  
round guided stripper

**TTC-SGA0X**  
shaped guided stripper

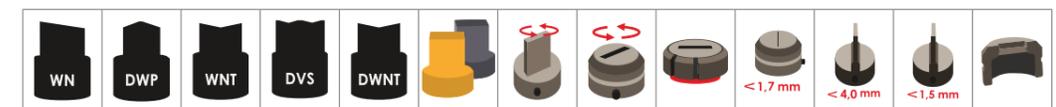
### DIES



**TTC-DSA0A**  
round die

**TTC-DSA0X**  
shaped die

## OPTIONS AND NOTES (See page 67)





T O O L I N G F O R P U N C H P R E S S E S



FORMING  
TOOLS

## COMMON FORMING

Jetform

Some of the most common sheet metal forming operations are embossing, countersinking, extrusion, engraving, louver forming and so on. The wide diffusion of these forming operations means that we can handle an extensive range of standardized products, drastically reducing delivery times. This type of forming is in continuous expansion. Please contact our sales department to find out more about what is new.



**M01**  
ENGRAVED COUNTERSINK  
FORMING

**M02**  
EXTRUDED HOLE  
FORMING

**M03**  
ROUND EMBOSS  
FORMING



**M04**  
ROUND COUNTERSINK  
FORMING

**M09**  
CLIP  
PUNCHING AND FORMING

**M12**  
CURVED-BLADE LOUVER  
PUNCHING AND FORMING



**M13**  
SHEAR BUTTON  
PUNCHING AND FORMING

**M14**  
GROUND SYMBOL  
ENGRAVING

**M23**  
DOT SCRIBER  
ENGRAVING

## SPECIAL FORMINGS

Jetform

Our technical department is able to develop the very best solutions for customer problems and requirements. Thanks to this versatility, there are practically no limits to the types of forming that can be made and we are able to satisfy the most complex and disparate requirements. The continuous search for new production solutions means that we continue to find new forming possibilities, creating three-dimensional shapes alongside normal high or low embossed logos.



**M24**  
CLIP WITH BUTTON  
PUNCHING AND FORMING

**M25**  
REINFORCED CLIP  
PUNCHING AND FORMING

**M10**  
MULTIPLE KNOCKOUT  
PUNCHING AND FORMING



**M22**  
CUSTOM LOGO  
EMBOSS

**M26**  
EMBOSS FOR CABLES  
PUNCHING AND FORMING

**M27**  
BRIDGED WITH EXTRUDED HOLE  
PUNCHING AND FORMING



**M28**  
BEND  
FORMING

**M29**  
HINGE  
FORMING

**M33**  
NON-SLIP TREAD PLATE  
PUNCHING AND FORMING

## PROGRESSIVE FORMING AND SPECIAL APPLICATIONS

Jetform

The latest technical solutions implemented in modern punching machines deliver decidedly superior tool control compared to the past. This has allowed us to develop new applications capable of fully exploiting their potential. In fact, we have developed special tools for cutting protective film, creating continuous ribs and even deburring cut parts. These are just some examples of what you can get from your punching machine when you use tools produced by Matrix!



## ROLLFORM - OFFSET

COMPLETE TOOL: TTB-JOFST

### INSERT SETS

RollFORM tools are an evolution of our JetFORM range for high-speed forming operations on punching machines.

An efficient solution for making embosses and offsets on sheet metal, the RollFORM series reduces costs by using interchangeable inserts.

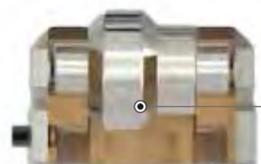
Insert sets are designed to be used with a specific material and thickness.

Standard insert sets are designed for forming operations up to 3.2 mm high, whereas special insert sets are designed for heights from 1.5 to 4.7 mm.

RollFORM tools require hydraulic or electric punching machines with adequate ram stroke control and appropriate software.



Upper Insert Holder



Lower Insert Holder

OFFSET  
Upper Insert  
Support

OFFSET  
Lower Insert



OFFSET Upper Insert



Support



OFFSET Lower Insert



Lower Insert Holder

## ROLLFORM - RIB

Complete Tool: TTB-JRB



### INSERT SETS

RollFORM tools are an evolution of our JetFORM range for high-speed forming operations on punching machines.

An efficient solution for making embosses and offsets on sheet metal, the RollFORM series reduces costs by using interchangeable inserts.

Insert sets are designed to be used with a specific material and thickness.

Standard insert sets are designed for forming operations up to 3.2 mm high, whereas special insert sets are designed for heights from 1.5 to 4.7 mm.

RollFORM tools require hydraulic or electric punching machines with adequate ram stroke control and appropriate software.



## ROLLFORM - PINCHER

Complete Tool: TTB-JPNCH



### INSERT SETS

RollFORM tools are an evolution of our JetFORM range for high-speed forming operations on punching machines.

An efficient solution for partially cutting the sheet so as to make it easier to separate the parts.

The RollFORM series guarantees reduced costs thanks to interchangeable inserts.

Insert sets are designed to be used on a wide range of materials and thicknesses.

RollFORM tools require hydraulic or electric punching machines with adequate ram stroke control and appropriate software.



# JETFORM - G SERIES

Adjustable height

The accurate tool height adjustment, in 0.08 mm steps, offered by the G Series of insert-holders maximizes the performance of punching machines offering inaccurate or no stroke adjustment.

## B station

MAX Ø  $\varnothing$  = mm 25

## C station

MAX Ø  $\varnothing$  = mm 40



# JETFORM - G SERIES

Adjustable height

A large number of tool configurations for the most common forming operations are already available for fast delivery. Please contact our sales department for an up-to-date list.

## D station

MAX Ø  $\varnothing$  = mm 70

## E station

MAX Ø  $\varnothing$  = mm 105



# JETFORM - W SERIES

Fixed height

The W Series of punch-holders make forming operations on punching machines that offering stroke adjustment extremely advantageous.

## B station

MAX Ø  $\square$  = mm 25

## C station

MAX Ø  $\square$  = mm 40



# JETFORM - W SERIES

Fixed height

A large number of tool configurations for the most common forming operations are already available for fast delivery. Please contact our sales department for an up-to-date list.

## D station

MAX Ø  $\square$  = mm 70

## E station

MAX Ø  $\square$  = mm 105



T O O L I N G F O R P U N C H P R E S S E S



# ACCESSORIES

# IEM UNIVERSAL ADAPTERS

B station

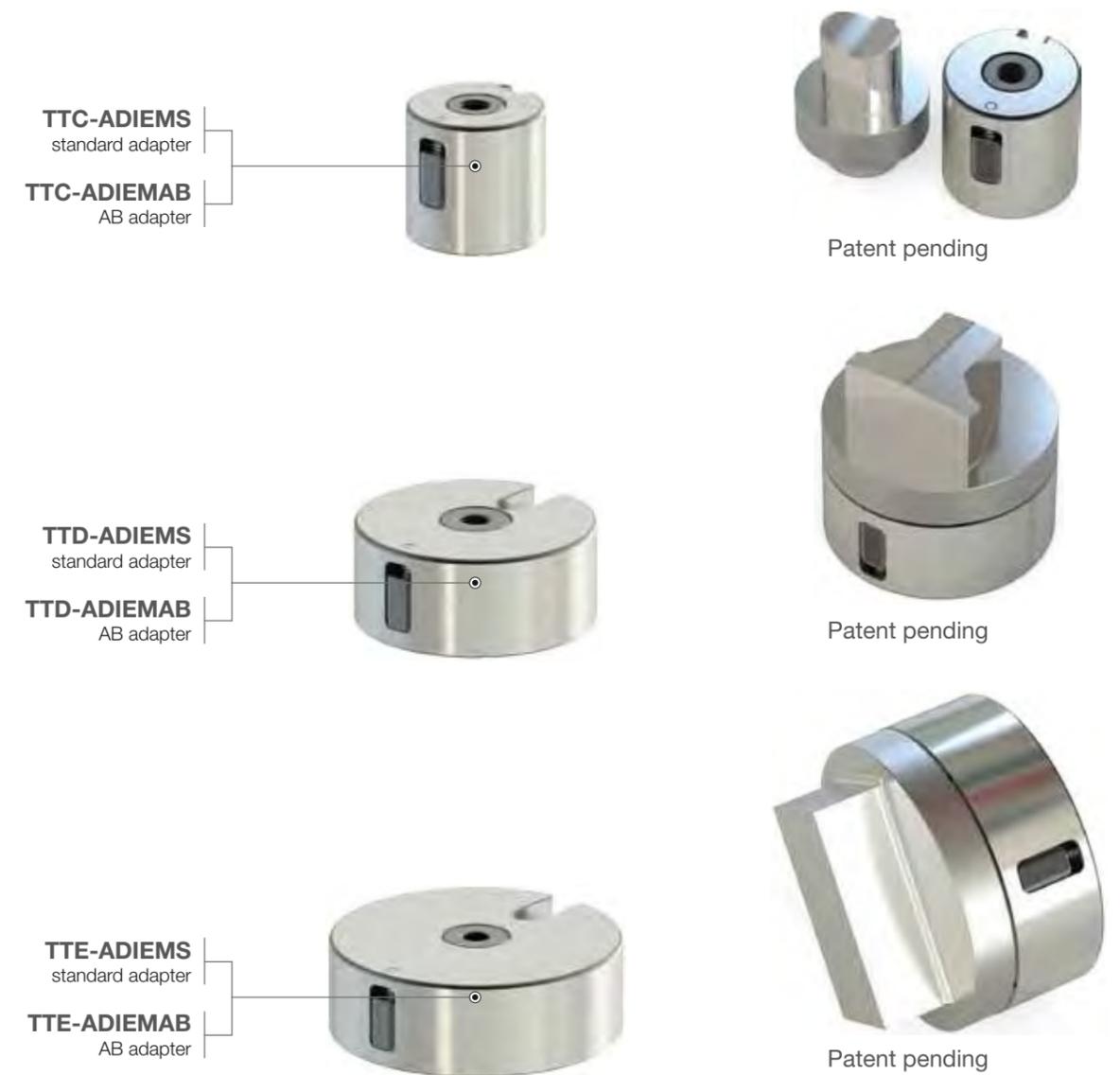
iEM inserts are universally cost-effective. They can, in fact, be used in any B station punch-holder thanks to the standard, Air Blow (AB), lubricated, W90 and lubricated W90 insert-holder adapters.



# IEM UNIVERSAL ADAPTERS

C - D - E stations

iEM inserts are universally cost-effective. Indeed, specific adapters allow them to be used with Air Blow (AB) and standard punch-holders too.



## STANDARD ADAPTERS

B - C - D stations

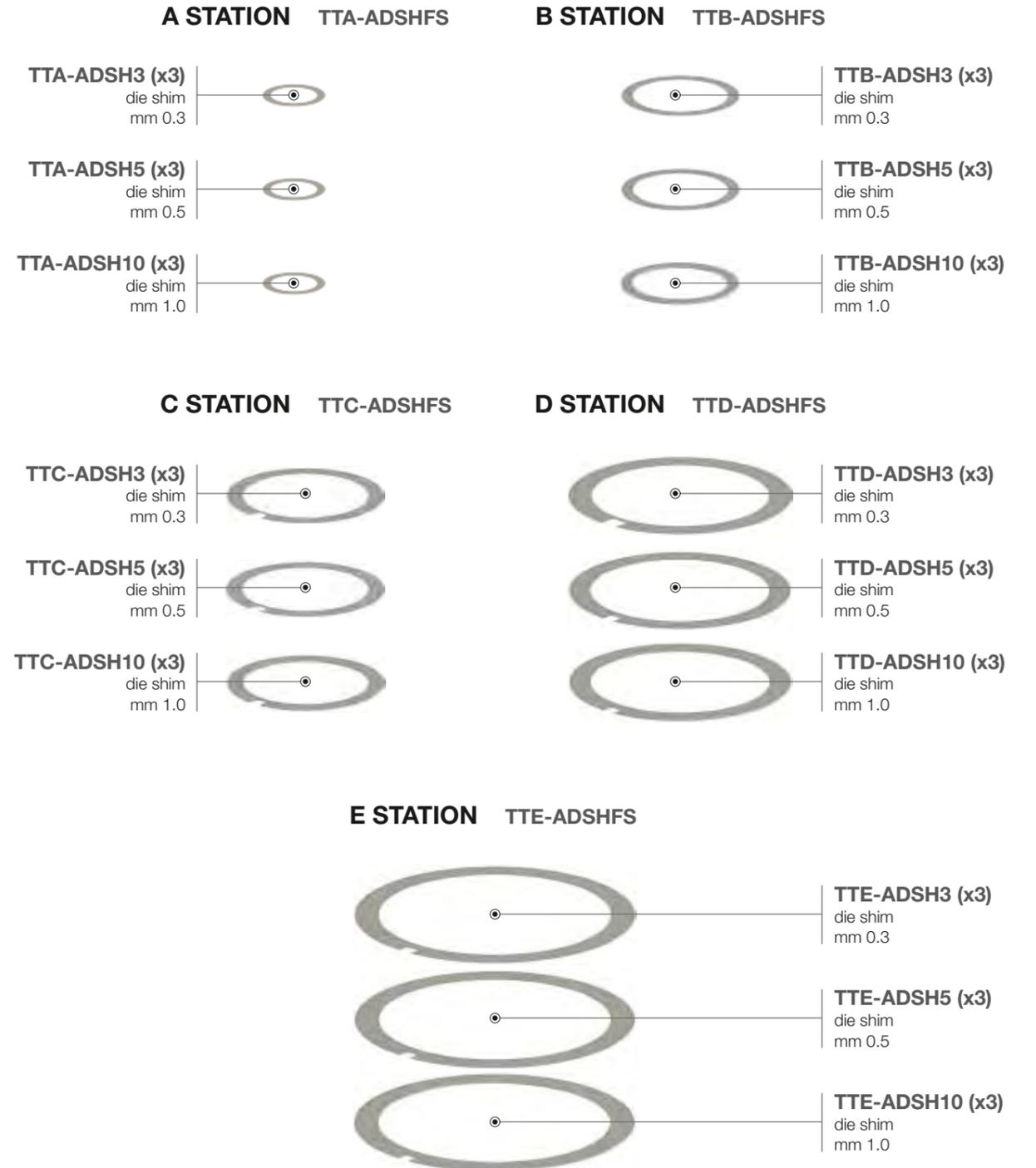
Absolutely essential in punching machines with a single punch, they deliver greater flexibility in turret machines too. In fact, specific adapters allow smaller stations to be used, even in positions created for larger dimensions.



## DIE SHIMS

A - B - C - D - E stations

Once the required sharpening operations have been performed, optimal working conditions must be restored. Punches make use of the adjustment capability offered by the W Series and G Series punch-holders, whereas specific shim sets are available for dies.



## CENTERING TOOLS

A - B - C - D stations

Great care must be taken not only to keep punch-holders and tools in good order, but also to ensure that the punching machine is perfectly centered. Specific tools for the most common stations, characterized by high precision, solve the problem of maintenance simply and quickly, aligning the upper turret with the lower one.

**A STATION** TTA-AAT



**B STATION** TTB-AAT



**C STATION** TTC-AAT



**D STATION** TTD-AAT



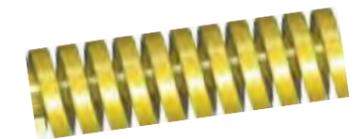
## SPECIAL SPRING PACKS

B - C - D - E stations

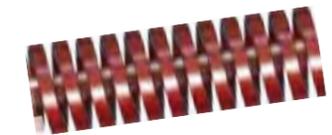
Different types of machining may require different types of punch-holder performance. This leads to the creation of specific spring configurations capable of satisfying all requirements. When punching soft material such as copper and aluminum, the pressure load must be reduced to minimize the incisions and/or marks left by the machining process. It is advisable to do the same for deep holes and/or formings, so that the stroke can be increased without the springs breaking.

In the case of very heavy-duty machining, the extraction force may need to be increased. The load that can be applied by the different types of springs is just one of the factors that need to be borne in mind. The response speed of the springs themselves is equally important, particularly during high-speed operations or nibbling.

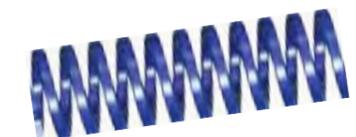
A satisfactory solution to the above is to simply replace the entire spring pack for B stations and the spring sets for upper stations.



Code	Station	Preload at rest	6 mm stroke
A0903326.404	B	3900 N	8150 N
A0903326.379	C	3560 N	8910 N
A0903326.439	D - E	9130 N	22820 N



Code	Station	Preload at rest	6 mm stroke
A0903325.404	B	2270 N	4750 N
A0903325.379	C	2600 N	6490 N
A0903325.439	D - E	6860 N	17160 N



Code	Station	Preload at rest	6 mm stroke
A0903324.404	B	1150 N	2400 N
A0903324.379	C	1160 N	2900 N
A0903324.439	D - E	3020 N	7550 N

## POM-C STRIPPERS

A - B - C - D - E stations

The ability to process polished sheet metal not protected by film, without making even the slightest mark on it, is increasingly attractive, especially when manufacturing visible parts of design products. The research carried out in this area has led us to develop special strippers made of acetal resin, a semi-crystalline copolymer that delivers excellent mechanical performance and can successfully replace traditional metals in certain applications.

### A STATION

**TTA-SPOMA0A**  
round stripper  
in copolymer



**TTA-SPOMA0X**  
shaped stripper  
in copolymer

### B STATION

**TTB-SPOMA0A**  
round stripper  
in copolymer



**TTB-SPOMA0X**  
shaped stripper  
in copolymer

### C STATION

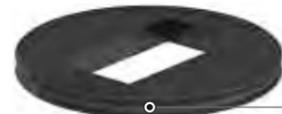
**TTC-SPOMA0A**  
round stripper  
in copolymer



**TTC-SPOMA0X**  
shaped stripper  
in copolymer

### D STATION

**TTD-SPOMA0A**  
round stripper  
in copolymer



**TTD-SPOMA0X**  
shaped stripper  
in copolymer

### E STATION

**TTE-SPOMA0A**  
round stripper  
in copolymer



**TTE-SPOMA0X**  
shaped stripper  
in copolymer

## PARTING TOOLS

C - D - E stations

Tools designed to make the most common punching operations cost-effective offer the possibility of replacing just the parting inserts while preserving the support elements. Guided strippers are provided for these tools to reduce wear by increasing the rigidity of the system.

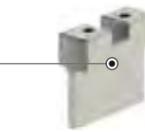
### C STATION

**TTC-PTSHS**  
insert-holder shank



**TTC-PTSHAB**  
AB insert-holder shank

**TTC-PTIA0D**  
rectangular parting insert



**TTC-PTSGA0D**  
rectangular guided stripper



**TTC-PTSABA0D**  
rectangular guided stripper AB

### D STATION

**TTD-PTSHS**  
insert-holder shank



**TTD-PTSHAB**  
AB insert-holder shank

**TTD-PTIA0D**  
rectangular parting insert



**TTD-PTSGA0D**  
rectangular guided stripper



**TTD-PTSABA0D**  
rectangular guided stripper AB

### E STATION

**TTE-PTSHS**  
insert-holder shank



**TTE-PTSHAB**  
AB insert-holder shank

**TTE-PTIA0D**  
rectangular parting insert

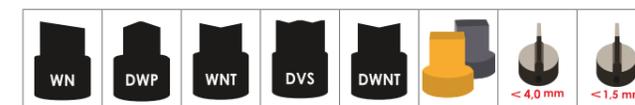


**TTE-PTSGA0D**  
rectangular guided stripper



**TTE-PTSABA0D**  
rectangular guided stripper AB

## OPTIONS AND NOTES (See page 67)



## PARTING TOOLS - CLOSE TO CLAMP

D station

Used to part the sheet near the clamp, the tool has a specially shaped stripper that acts as a blade guide, reducing wear and increasing system rigidity.



### OPTIONS AND NOTES (See page 67)



## PARTING TOOLS - CLOSE TO CLAMP

E station



### OPTIONS AND NOTES (See page 67)



## MGM-150A: GRINDING

the importance of maintenance



Watch  
the video



**FBE4840000**

MGM-150A Automatic Sharpening Machine

## MGM-150A: GRINDING

the importance of maintenance

Professional maintenance and sharpening guarantees constant and more durable punching tool performance. All of this can now be done by the punching machine operators themselves, using sharpening machines and accessories that make these operations simple, quick and cost-effective. Matrix is able to satisfy these needs with its own range of machines, accessories and instructions. The relative documentation is available upon request.

The MGM-150A is the innovative Automatic Machine that MATRIX offers for all your punching tool sharpening needs.

The most important features that make the MGM-150A unique and functional are listed below:

- Innovative and easy to use.
- Automatic detection of the tool zero position.
- Fully automatic (or manual) sharpening cycle.
- Electronic system capable of automatically adapting the sharpening parameters (patent pending).
- Sharpening with a high quality CBN grinding wheel and controlled lubrication.
- Electronic detection of the flow of coolant with automatic cycle stop for excellent quality.
- Coolant filtering system easily accessible for cleaning and maintenance.
- The contaminated liquid passes through a magnetic surface, three settling tanks and a final filter before going back into circulation free from impurities.
- Self-centering four-jaw chuck for sharpening the most common tools (Trumpf, Thick Turret, Multitool, Salvagnini, etc.) without needing adapters.
- Tilting table for Whisper (WN) or Double Whisper (DWP) sharpening.
- Unique and innovative automatic system for setting the whisper sharpening angle (0°-15°) (patent pending).
- Multilingual touch interface on Mitsubishi LCD panel for fast, user-friendly management of all the required operations.
- Made by Matrix, Made in Italy.

### DIMENSIONS AND WEIGHT

Height	1710 mm
Width	686 mm
Depth	543 mm
Weight	270 kg

### POWER SUPPLY

Voltage	400V AC
Power	2 Kw

### GRINDING

CBN Grinding Wheel	150 x 4 x 5 mm
Maximum Grinding Diameter	160 mm
Maximum Grinding Height	230 mm
Solution	0.01 mm
Grinding Wheel Motor Power Supply	400V AC

### TOOL SUPPORT

Rotary Table Diameter	310 mm
Part-holder Inclination	15°
Rotary Table Motor Power Supply	400V AC

### COOLANT

Tank Capacity	28 l
Pump Flow Rate	60 l/min
Filter	Magnetic
Motor Power Supply	400V AC

### SOUND LEVEL

Acoustic Pressure level	< 80 dBA
-------------------------	----------

## OPTIONS

### SURFACE COATINGS

Punch surfaces can be coated to improve their working characteristics.

Coating considerably hardens the surface as well as making self-lubrication possible. MATRIX essentially uses two types of coating: Type A (titanium nitride) and Type B (titanium aluminum nitride).

Type A coating is golden-yellow in color. It makes the surface of the punch up to four times harder than it was initially and offers excellent self-lubrication capability with a friction coefficient of 0.44.

It is recommended for difficult machining operations, such as when there is no lubrication, for soft materials where extraction is difficult and for copper or aluminum alloys.

Type B coating is gray in color and is an evolution of Type A. It makes the surface even harder and more compact, increasing tool life. It also resists much higher temperatures (up to almost 900°).

As a result, it is recommended for use on punching presses with a high stroke rate (500 to 1000 strokes/minute) and is excellent for machining stainless steel.

### SLUG-FREE TECHNOLOGY

Slug-pulling during the punching process can create problems at various levels, from simple but costly downtime to damage to tools or the workpiece.

For this reason, MATRIX dies come with a variety of devices for minimizing the problem according to the machining concerned. MATRIX always recommends the choice of die best suited to the customer's needs.

### TYPES OF SHARPENING

With whisper sharpening, the face of the punch is sharpened at an angle. This offers the following benefits:

- Reduced noise
- Reduced vibration and

kickback in all machine components

- Reduced slug pulling
- Reduced tonnage
- Easy extraction
- Reduced sheet distortion

Using tools with special sharpening requires greater penetration into the die. This increases the load on the punch-holder springs.

The following types of sharpening are the most common:

- DVS for parting tools on thick material
- DWP for thick material and balanced loads
- DWNT for thin material and nibbling with large punch figures
- WNT for thin material and nibbling with small punch figures
- WN for thick material and for very rigid and fast machines



## MAXIMUM DIAGONAL OF THICK TURRET TOOLS

A STATION	B STATION	C STATION	D STATION	E STATION	F STATION
12.7 mm	31.7 mm	50.8 mm	88.9 mm	114.3 mm	153.5 mm

## GENERIC TONNAGE CALCULATION FORMULA

	Material	K material*
$F(kN) = \frac{P \times S \times K \times R}{1000}$ <p>P = perimeter of the figure S = thickness of the material in mm K = material shear strength R = shear strength of the material</p>	Aluminium (soft)	150 N/mm <sup>2</sup>
	Aluminium (hard)	250 N/mm <sup>2</sup>
	Copper and brass	250 N/mm <sup>2</sup>
	Mild steel	350 N/mm <sup>2</sup>
	Stainless steel	600 N/mm <sup>2</sup>

**Example:**  $\frac{40 \text{ (perimeter of 10 mm square)} \times 2 \text{ (material thickness)} \times 600 \text{ (K stainless steel)} \times 0.6 \text{ (R for DWP)}}{1000} = 28.8 \text{ kN}$

\* The table shows average coefficients for commercially available sheet metal. To calculate a specific tonnage, the exact type of material must be known.

## EFFECT OF PUNCH SHARPENING ON TONNAGE

The table below illustrates the reduction in tonnage resulting from standard-depth DWP sharpening.

Material thickness (mm)	1	1.5	2	2.5	3	4	5	6
Reduction factor (R)	0.4	0.5	0.6	0.65	0.75	0.80	0.85	0.90

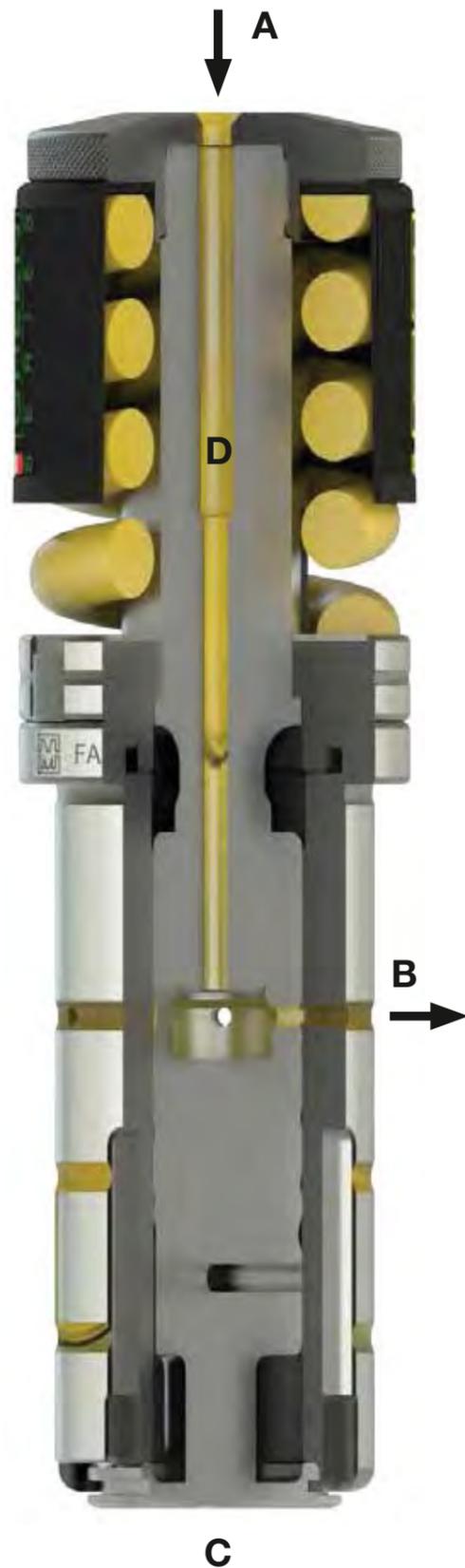
## DIE CLEARANCE AS A PERCENTAGE OF THICKNESS

Material	Thickness Range	Minimum or Blanking**	Standard	Maximum
Aluminium Copper Brass 100 to 280 N/mm <sup>2</sup>	Up to 1.4 mm	8%	14%	16%
	From 1.5 mm to 3.0 mm	10%	18%	20%
Mild steel 281 to 580 N/mm <sup>2</sup>	From 3.1 mm	12%	20%	24%
	Up to 2.4 mm	15%	18%	20%
	From 2.5 mm to 4.4 mm	18%	22%	25%
Stainless steel above 581 N/mm <sup>2</sup>	From 4.5 mm	20%	25%	30%
	Up to 1.4 mm	15%	20%	22%
	From 1.5 mm to 2.4 mm	18%	22%	25%
	From 2.5 mm	20%	25%	28%

When choosing how much clearance to apply, reference must also be made to the actual shear strength and not just to the type of material.

\*\* Blanking: when the part to be obtained is the scrap.

## LUBRICATION: INDISPENSABLE



This is one of the first rules to apply. As punching is a cutting process, lubrication in the processing area is essential for success. Lubrication plays a very important role in punching machines and, in particular, in punching tools.

When the punch passes through the material to be cut, small amounts of this material may adhere to the surface of the punch.

Appropriate lubrication increases tool life by significantly reducing both friction, and thus overheating, and material accumulation on the punch.

Should lubrication be a problem for any reason, punches with a coating suitable for the type of material used (see page 42) are the best solution. On machines without an automatic lubrication system, fill the hole in the middle with oil for sliding surfaces on a daily basis and whenever you change the setup.

When you insert a punch in the punch-holder, it is also advisable to lightly grease the punch rod with graphite grease.

Failure to do so will cause excessive wear on the punch-holders.

The diagram on the left, valid for A and B stations, shows the areas affected by the presence of lubricant.

The letters indicate respectively:

- A** Hole for adding lubricant
- B** Hole that allows the lubricant to reach the contact area between the outside walls of the punch-holder and the seat in the punching machine
- C** The lubricant also reaches the cutting part of the punch, improving shearing and extraction
- D** Lubricant tank

Matrix can supply lubricants suitable for different types of processing. Volatile oils are also available if grease residue needs to be avoided.

# MATRIX TOOLS

T O O L I N G F O R P U N C H P R E S S E S



## STANDARD AND AIR BLOW COMPATIBLE

The codes of the tools in this catalog are for the figure shown and may vary if the shape changes.

## EMX-W SERIES - A STATION - STANDARD & AB

 MAX Ø  $\nabla$  = mm 12.7

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

The Air Blow (AB) lubricated punch is available as an alternative to the standard one.

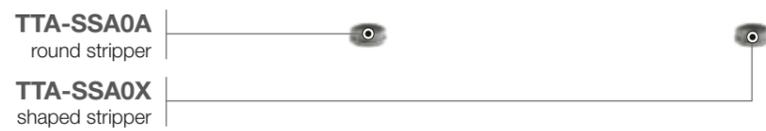
### PUNCH-HOLDERS



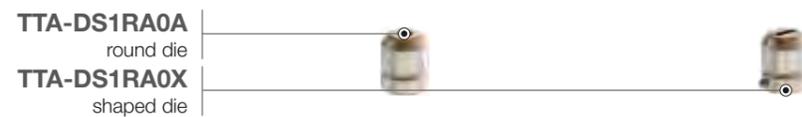
### PUNCHES



### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX-W SERIES - A STATION - STANDARD & AB

 MAX Ø  $\nabla$  = mm 12.7

The R series of punch-holders with closed guides, with or without lubrication, and with adjustable or fixed punch height, have been developed for maximum cost-effectiveness.

The Air Blow (AB) lubricated punch is available as an alternative to the standard one.

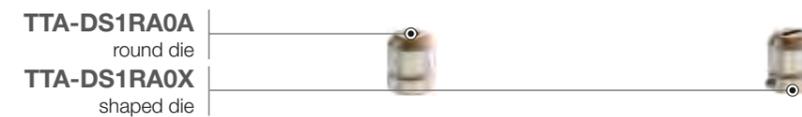
### PUNCH-HOLDERS



### PUNCHES



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX-W SERIES - B STATION - STANDARD, AB & iEM MAX Ø = mm31.7

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The Air Blow (AB) lubricated punch is available as an alternative to the standard one. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



**TTB-HWR**  
EMX-W punch-holder for rounds

**TTB-HWR&S**  
EMX-W punch-holder for rounds and shapes

### PUNCHES



**TTB-PSA0A**  
standard round punch

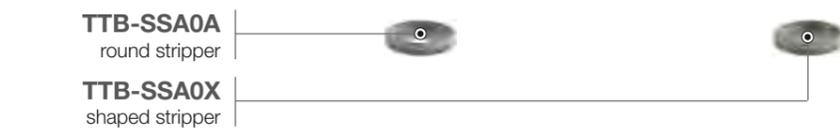
**TTB-PABA0A**  
AB round punch

**TTB-ADIEMS**  
standard adapter

**TTB-ADIEMAB**  
AB adapter

**TTB-IEMLA0A**  
round iEM insert

### STRIPPERS



**TTB-SSA0A**  
round stripper

**TTB-SSA0X**  
shaped stripper

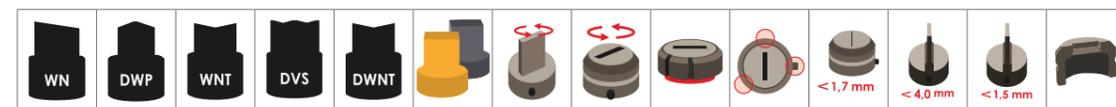
### DIES



**TTB-DS1RA0A**  
round die

**TTB-DS1RA0X**  
shaped die

## OPTIONS AND NOTES (See page 67)



## EMX-R SERIES - B STATION - STANDARD, AB & iEM MAX Ø = mm31.7

The R series of punch-holders with closed guides, with or without lubrication, and with adjustable or fixed punch height, have been developed for maximum cost-effectiveness. The Air Blow (AB) lubricated punch is available as an alternative to the standard one. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



**TTB-HSRA0A**  
EMX-R punch-holder set for rounds

**TTB-AHSRA0A**  
EMX-R adjustable punch-holder set for rounds

**TTB-HSRA0X**  
EMX-R punch-holder set for shapes

**TTB-AHSRA0X**  
EMX-R adjustable punch-holder set for shapes

### PUNCHES



**TTB-PSA0A**  
standard round punch

**TTB-PABA0A**  
AB round punch

**TTB-ADIEMS**  
standard adapter

**TTB-ADIEMAB**  
AB adapter

**TTB-IEMLA0A**  
round iEM insert

### DIES



**TTB-DS1RA0A**  
round die

**TTB-DS1RA0X**  
shaped die

## OPTIONS AND NOTES (See page 67)



## EMX - C STATION - STANDARD & iEM

MAX Ø  $\varnothing$  = mm 50.8

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



### PUNCHES



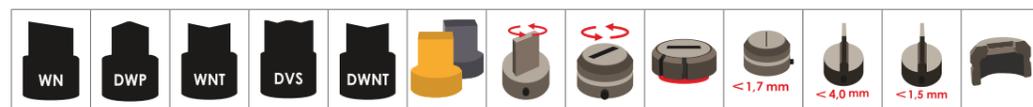
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - C STATION - AB & iEM

MAX Ø  $\varnothing$  = mm 50.8

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. The Air Blow (AB) lubricated punch is available as an alternative to the standard one. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



### PUNCHES



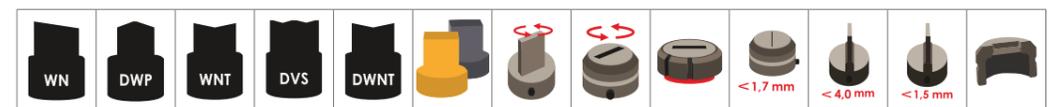
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - D STATION - STANDARD & iEM

 MAX Ø  $\nabla$  = mm 88.9

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



### PUNCHES



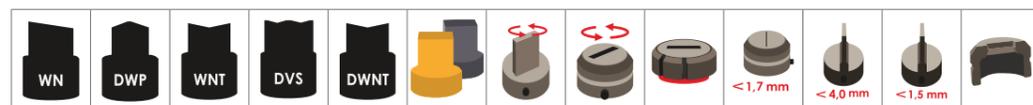
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - D STATION - AB & iEM

 MAX Ø  $\nabla$  = mm 88.9

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. The Air Blow (AB) lubricated punch is available as an alternative to the standard one. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



### PUNCHES



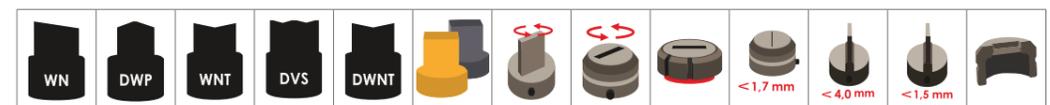
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - E STATION - STANDARD & iEM

 MAX Ø  $\nabla$  = mm 114.3

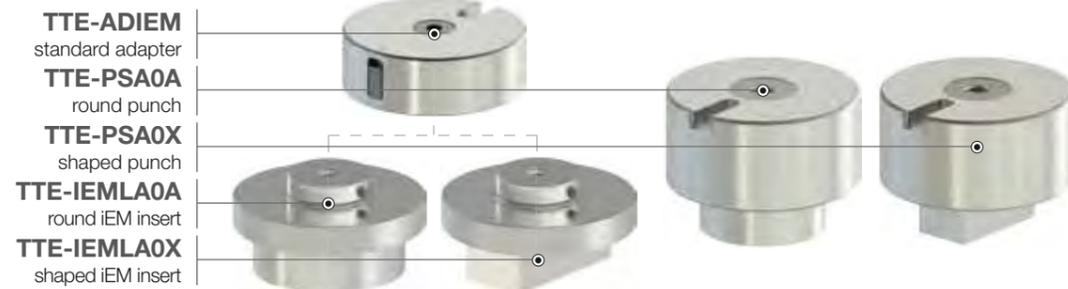
The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



on 1 · 2 · 3

### PUNCHES



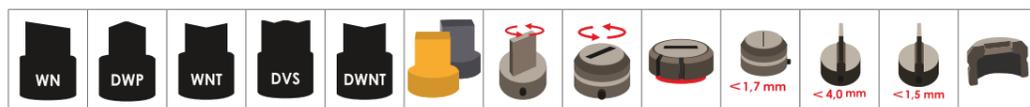
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - E STATION AB & iEM

 MAX Ø  $\nabla$  = mm 114.3

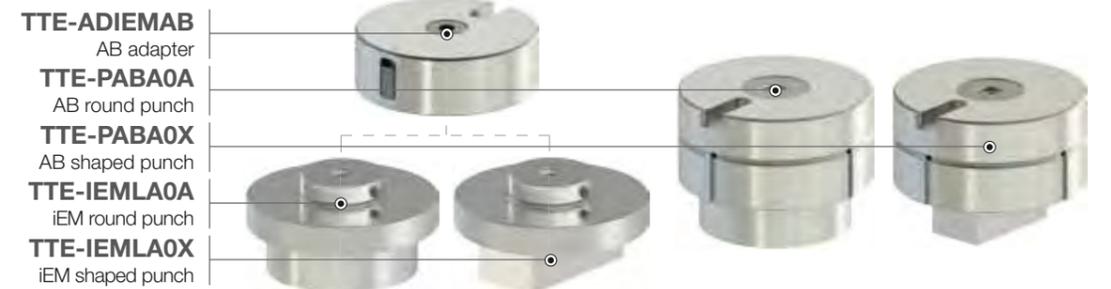
The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm. The G series of punch-holder is an alternative that allows the stripper to be replaced quickly, without using a wrench. The R series of punch-holders, with or without lubrication, and with fixed punch height, have been developed for maximum cost-effectiveness. The Air Blow (AB) lubricated punch is available as an alternative to the standard one. iEM inserts make the system not just robust but also cost-effective.

### PUNCH-HOLDERS



on 1 · 2 · 3

### PUNCHES



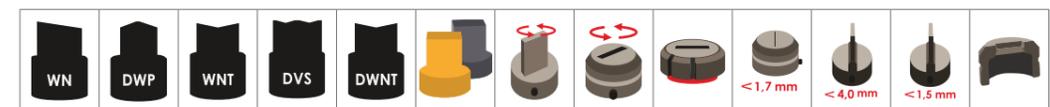
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



T O O L I N G F O R P U N C H P R E S S E S



COMPATIBLE  
W90

The codes of the tools in this catalog are for the figure shown and may vary if the shape changes.

## EMX - W SERIES - A STATION - W90

 MAX Ø  $\nabla$  = mm 12.7

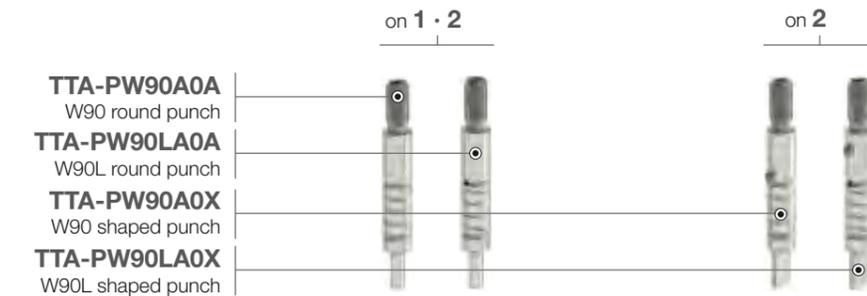
The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

The lubricated punch (W90L) is available as an alternative to the standard one (W90).

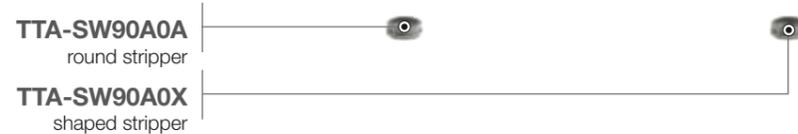
### PUNCH-HOLDERS



### PUNCHES



### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - W SERIES - B STATION - W90

 MAX Ø  $\nabla$  = mm 31.7

The W series of punch-holders guarantee maximum performance and durability, with continuous adjustment of the punch height up to 12 mm.

The lubricated punch (W90L) is available as an alternative to the standard one (W90). iEM inserts make the system not just solid but cost-effective too.

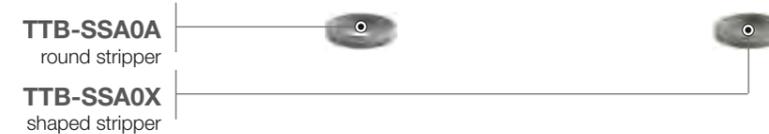
### PUNCH-HOLDERS



### PUNCHES



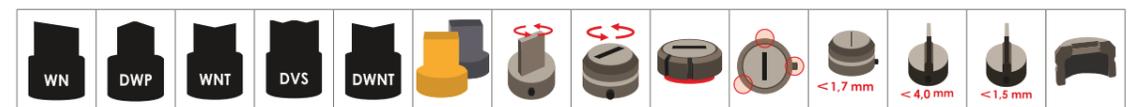
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - C STATION - W90

 MAX Ø  $\varnothing$  = mm 50.8

All the Matrix punch-holder series (W, G and R: see the descriptions on page 4) can be configured with the W90 range of tools.

### PUNCH-HOLDERS



### PUNCHES



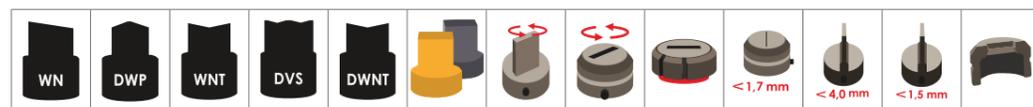
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



## EMX - D STATION - W90

 MAX Ø  $\varnothing$  = mm 88.9

All the Matrix punch-holder series (W, G and R: see the descriptions on page 4) can be configured with the W90 range of tools.

### PUNCH-HOLDERS



### PUNCHES



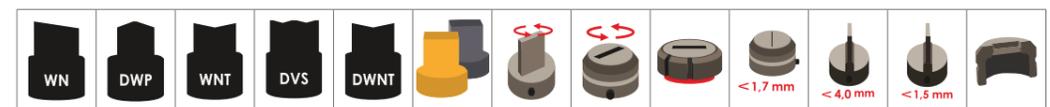
### STRIPPERS



### DIES



## OPTIONS AND NOTES (See page 67)



# EMX - E STATION - W90

MAX Ø  $\nabla$  = mm 114.3

All the Matrix punch-holder series (W, G and R: see the descriptions on page 4) can be configured with the W90 range of tools.

## PUNCH-HOLDERS



## PUNCHES



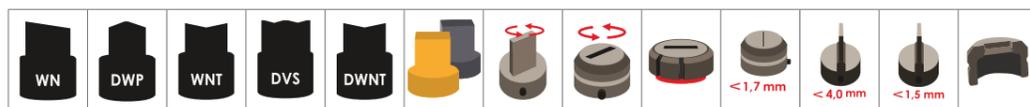
## STRIPPERS



## DIES



## OPTIONS AND NOTES (See page 67)



## MULTIMATRIX

MultimATRIX is the multitool developed by Matrix with patented solutions to maximize system rigidity and minimize tool wear.

Various models are available:

- number of tools: variable from 4 to 10;
- tool diameter: variable from 16 to 31.7 mm;
- rotating and indexable.

	NUMBER OF TOOLS	MAX Ø DIMENSION	MAX WORKING LIMITS
MULTIMATRIX Series 24 MMX	6	mm 24	max. tonnage 15 tons
MULTIMATRIX Series 10/18 MMX	10	mm 18	max. tonnage 12 tons
MULTIMATRIX Series 8/16 MMX	8	mm 16	max. tonnage 10 tons
MULTIMATRIX 4/B MMX	4	mm 31.7	max. tonnage 15 tons
MULTIMATRIX 6/24-6 E-MMX	6	mm 24	max. tonnage 15 tons



## MULTITOOL TOOLING

Multimatrix

### MULTIMATRIX tools

MultimATRIX tools offer better axial stability than common multitools. They were designed by Matrix, the first company to offer the market long-guide tooling for Thick Turret multitools.

### Multimt tools

Tools for the most common multitools on the market, made to the usual high quality standards typical of Matrix products, and with extremely rapid delivery times.

### Adjustable tool

Matrix first marketed this patented solution for Thick Turret multitools in 2007, tripling tool life. In the Multimatrix 10/18 AR and 6/24 AR Series and the Multimt 6/24-6 AR Series, the combined use of a universal head and a punch with threaded end allow the total height of the assembly to be adjusted in just a few seconds without using a wrench.



# MATRIX TEMPLATE CODES

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

# KEY TO OPTIONS

	<b>DWP Sharpening</b> for thick material and balanced loads (See page 42)		<b>Shaped dies with 3 references</b> references at 0°, -90° and -225°
	<b>WN Sharpening</b> for thick material and very rigid and fast machines (See page 42)		<b>Punches with small shapes ≥1.5 mm</b> ≥ 1.5 mm < 4.0 mm
	<b>DVS Sharpening</b> for tools for parting thick material (See page 42)		<b>Punches with small shapes &lt;1.5 mm</b> < 1.5 mm
	<b>DWNT Sharpening</b> for thin material and for nibbling with large punch figures (See page 42)		<b>Dies with small figures</b> < 1.7 mm including clearance
	<b>WNT Sharpening</b> for thin material and for nibbling with small punch figures (See page 42)		<b>Reinforced shaped die</b> for machining thick material
	<b>Coating for standard and shaped punches</b> the tool surfaces can be coated to improve their working characteristics. Requires 5 more working days. (See page 42)		<b>Standard outer references</b>
	<b>Punches with rotated figures</b>		<b>Slug-free technology</b> available on dies with clearance of 0.13 or more (See page 42)
	<b>Punch-guides with rotated figures</b>		<b>Air Blow®</b> tool range offered by Amada Holdings Co., Ltd.
	<b>Dies with rotated figures</b>		<b>90 Series®</b> tool range offered by Wilson Tool International

# TOOL CODES

KEY XXYYY-AAABBBDDD E F G H I L		EXAMPLES	
<b>XX</b>	Technology	<b>IWFCP-P404A0A</b>	<b>IW</b> (Shear) <b>FCP</b> (Ficep) - <b>P</b> (Punch) <b>404</b> (Serie 404) <b>A0A</b> (Forma Standard A0A Tondo)
<b>YYY</b>	Series/Station		
<b>AAA</b>	Type	<b>TTMMX-24PA0A</b>	<b>TT</b> (Thick Turret) <b>MMX</b> (MultiMATRIX Series) - <b>24</b> (24 Series) <b>P</b> (Punch) <b>A0A</b> (Standard Shape A0A Round)
<b>BBB</b>	Characteristic		
<b>DDD</b>	Shape	<b>TTB-PLA0A</b>	<b>TT</b> (Thick Turret) <b>B</b> (B Station) - <b>P</b> (Punch) <b>L</b> (Lubricated) <b>A0A</b> (Standard Shape A0A Round)
<b> E </b>	Size A		
<b> F </b>	Size B	<b>TTA-HGRLR&amp;S</b>	<b>TT</b> (Thick Turret) <b>A</b> (A Station) - <b>H</b> (Punch-holder) <b>G</b> (G Series) <b>L</b> (Lubricated) <b>R&amp;S</b> (for Rounds and Shapes)
<b> G </b>	Size C		
<b> H </b>	Clearance	<b>TTB-PLA0A 23 1A</b>	<b>TT</b> (Thick Turret) <b>B</b> (B Station) - <b>P</b> (Punch) <b>L</b> (Lubricated) <b>A0A</b> (Standard Shape A0A Round) <b> 23 </b> (Diameter measurement 23 mm) <b> 1A </b> (Sharpening 1 DVS) <b>A</b> (Type A Coating)
<b> I </b>	Sharpening: 1=DVS, 2=DWP, 3=DWNT, 4=WNT, 5=WN		
<b>L</b>	Type of coating		

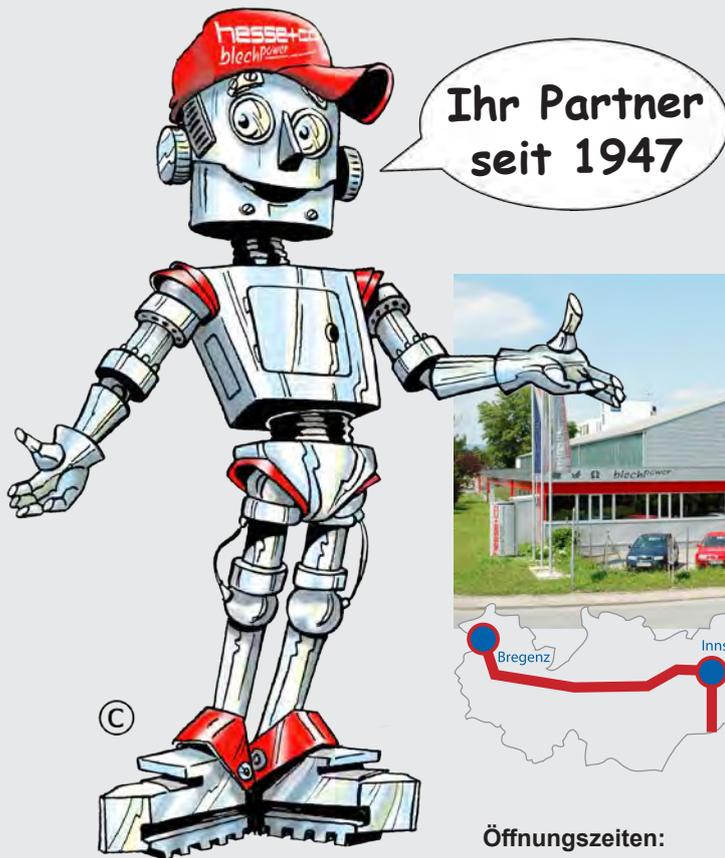
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