



OPERATION MANUAL 01/2021-PP-WW

ps:® multi-thread® (MT6-TFi)

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

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SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## THANK YOU VERY MUCH,

for purchasing our 6-station tapping tool **ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)**, engineered and produced by PASS Stanztechnik AG.

It is our utmost intention to guarantee you a long-term service with your new PASS product: **ps:<sup>®</sup>multi-thread<sup>®</sup>**.

Therefore, we created a detailed operation manual including a description of operation, assembly information, technical data, tool maintenance, assistance and a spare part list. You will find a summarising short manual at the end of this operation manual.

Please feel free to contact us in any case of questions.

Yours

PASS Stanztechnik AG

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# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

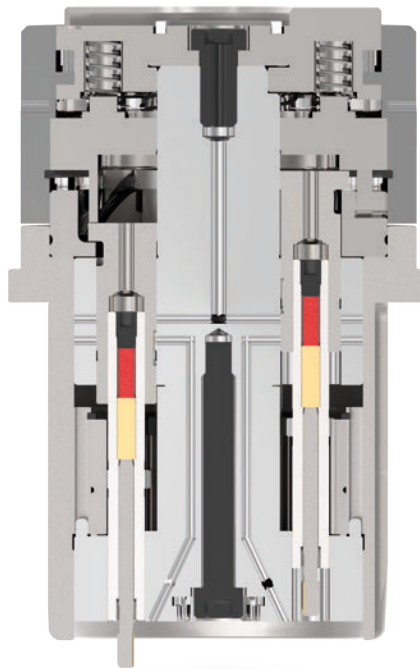
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## A. DESCRIPTION OF OPERATION

ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) is a 6-station drop-in multitool with thread modules to form threads into sheet metals (tensile strength until 800 N/mm<sup>2</sup>) up to a thickness of 8 mm or extrusions up- or downwards up to a height of 8 mm.

The tool is assembled with two opposite clutches. The clutch above (directly settled under the ram head) is disengaged in initial state. That enables the selection of particular stations by the help of the index selection cylinder. At the same time the clutch below is clutched into the initial state (beneath the planetary gear). It does not allow a drive of thread modules.





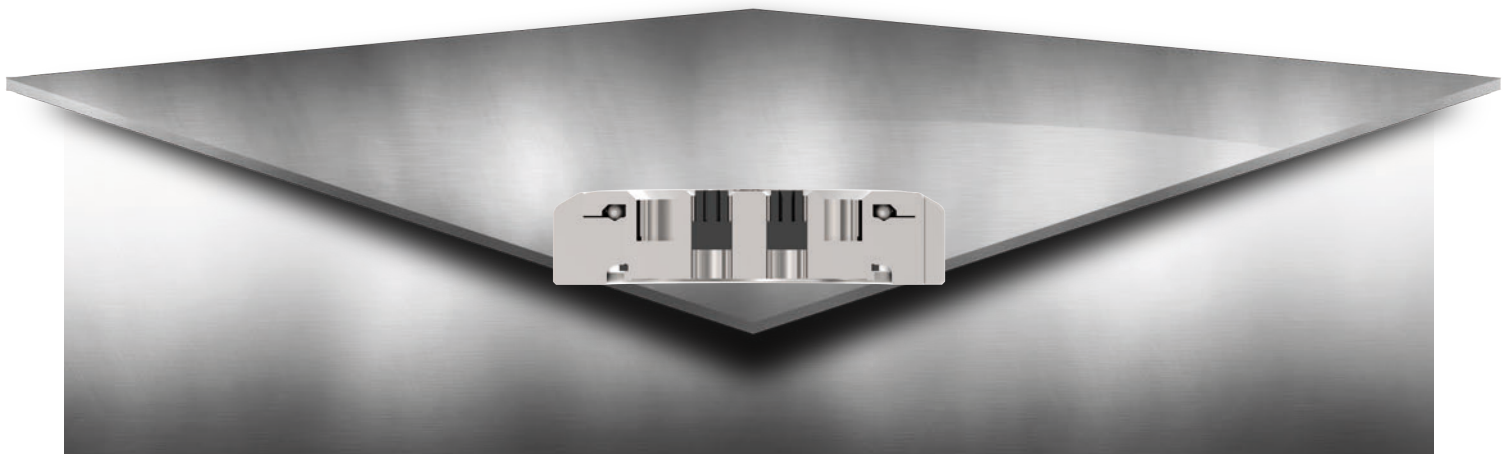
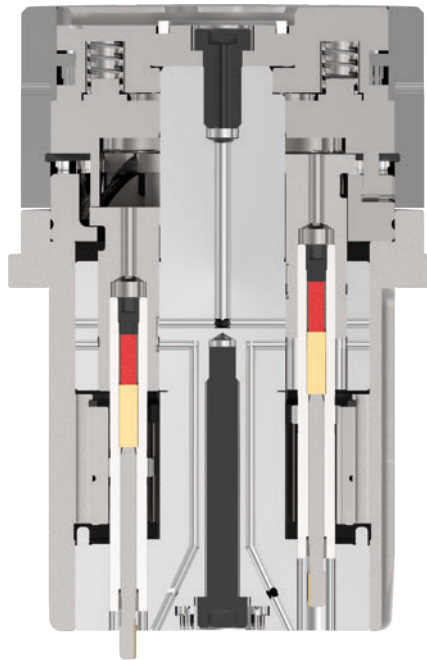
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## A. DESCRIPTION OF OPERATION

When activating the tool (pressing the ram onto the ram head), the upper clutch is arrested and the function of selection blocked. At the same time the below lying clutch is disengaged and the planetary gear is unblocked.



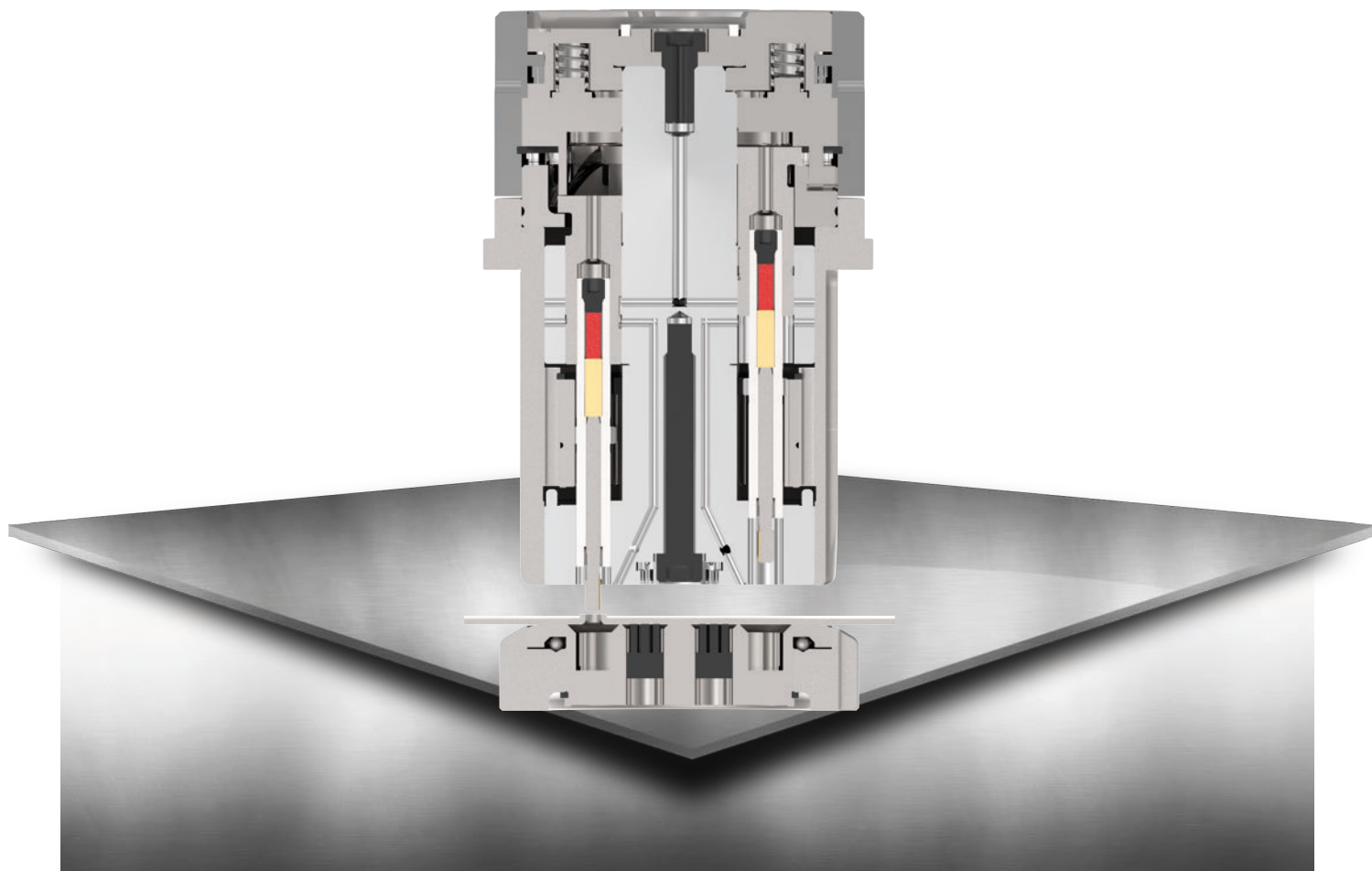
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

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## A. DESCRIPTION OF OPERATION

When typing sheet thickness or extrusion height into the controlling system the active tap insert will be moved 1 mm above the sheet or extrusion.



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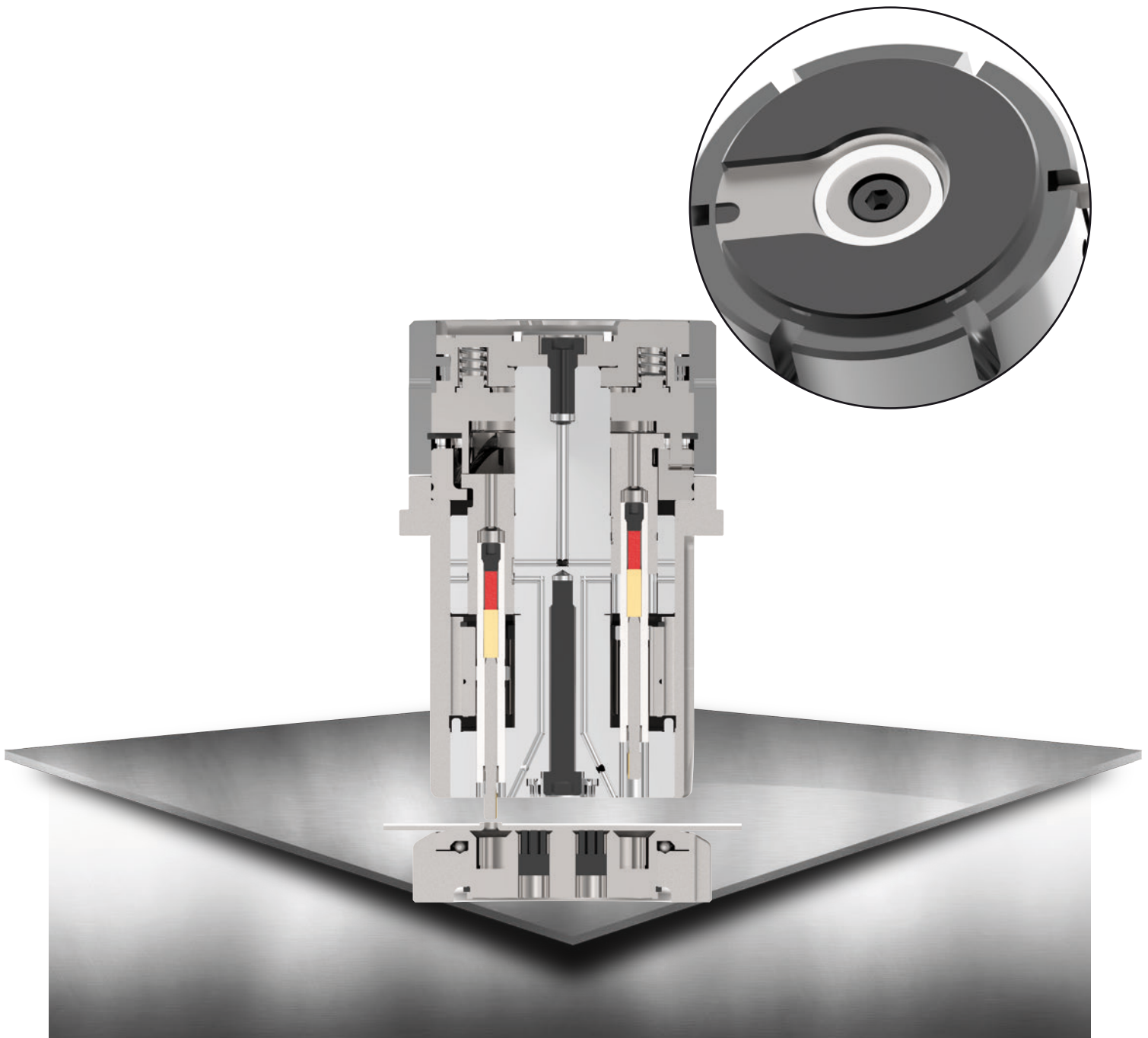
FOR MACHINE TYPE PRIMA POWER - STATION Di

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## A. DESCRIPTION OF OPERATION

Now, the tapping process begins.

By that working step, the keyhole-shaped machine ram remains in the opposite shape of the ram head ...



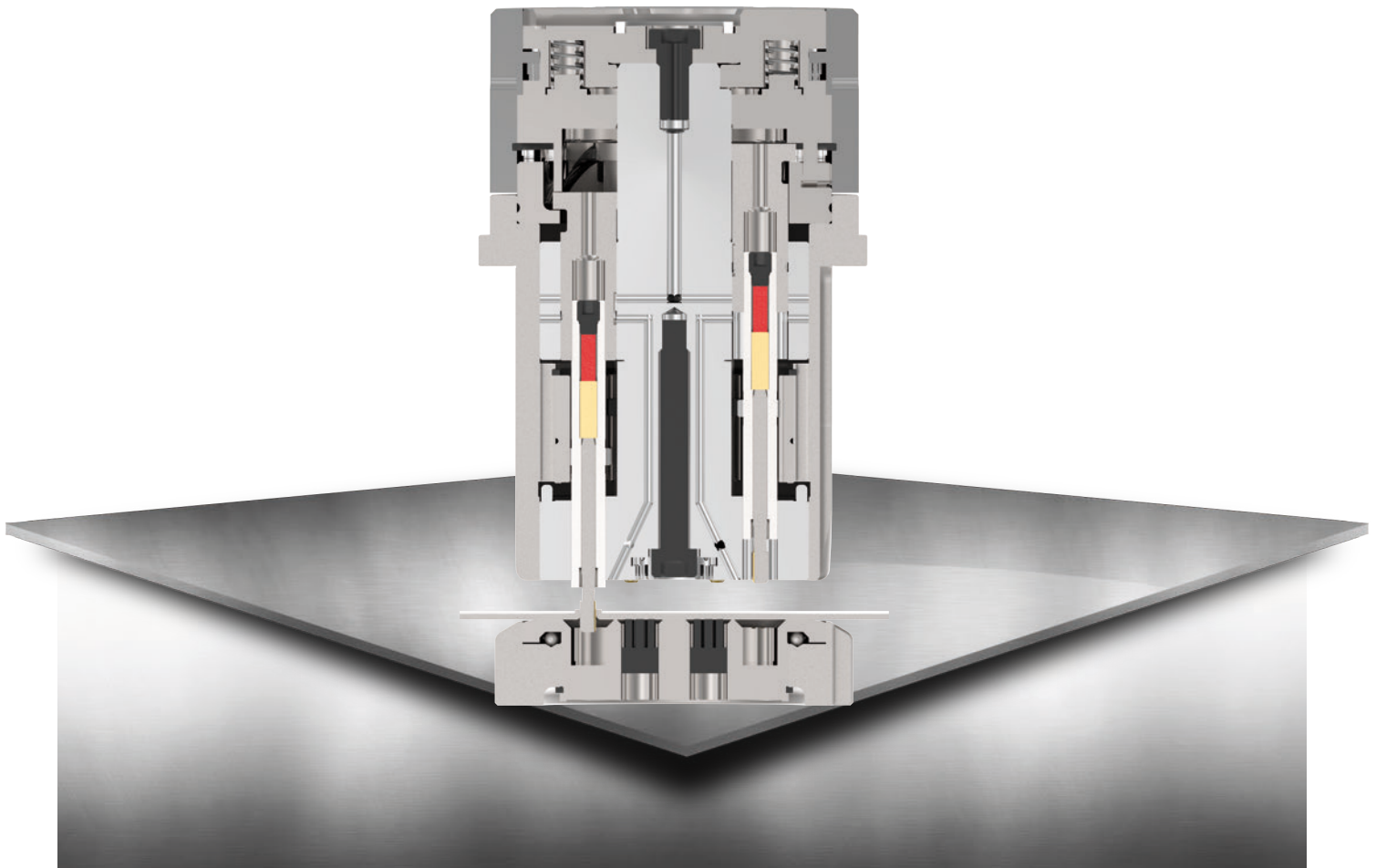
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## A. DESCRIPTION OF OPERATION

... and avoids its torsion. The index station begins to rotate in clockwise direction, whereas ALL tap inserts were turned outwards by the help of the leading spindle (according to the raising of the thread size) by a gear transmission ratio of about 1:5. The active tap insert forms itself analogically through the pre-punched sheet or extrusion.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

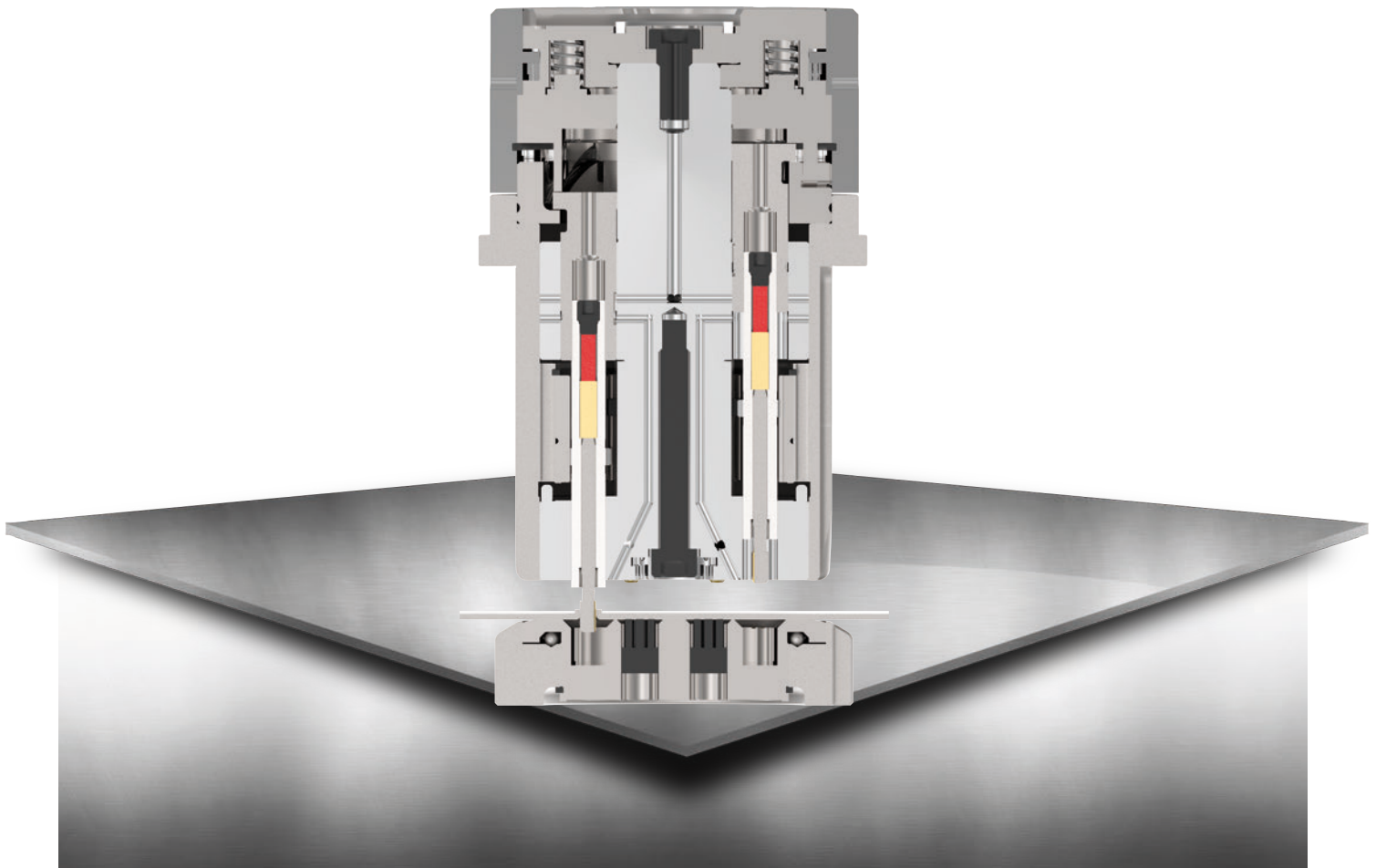
FOR MACHINE TYPE PRIMA POWER - STATION Di

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## A. DESCRIPTION OF OPERATION

The inactive tap inserts are still in the safety section over the sheet table, whereas they could move, depending on the combination of tools and working sheets, up to 1 mm close to the sheet table.

Attention should be paid on the interference shape – see chapter “Interference shape” – starts on page 53 as well as the controlling inputs in Tulus (see chapter “Tool choice in Tulus” – starts on page 25).



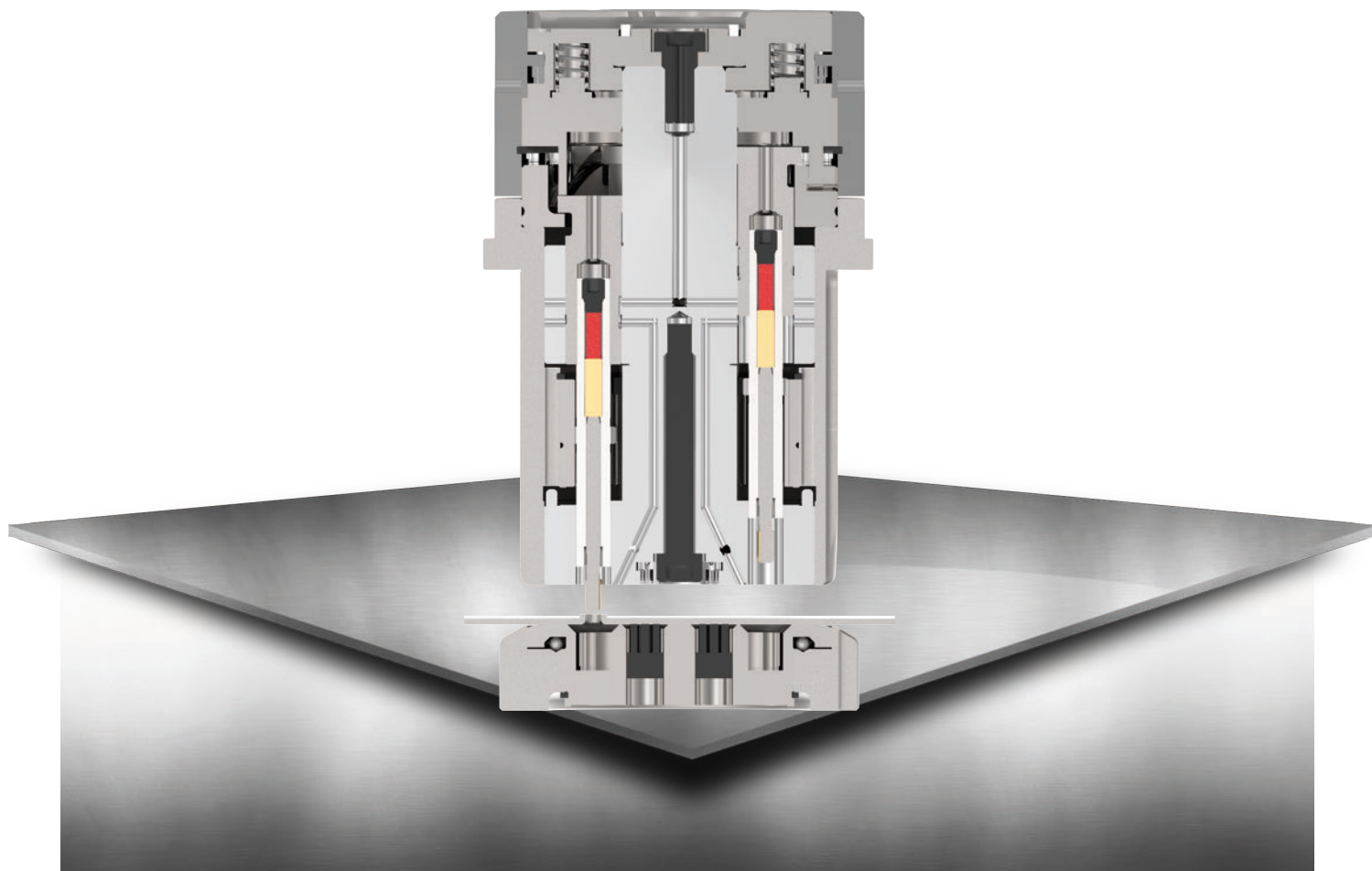
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## A. DESCRIPTION OF OPERATION

As soon as the active tap insert has passed through the sheet and formed the thread, the index motor changes the direction of the rotation and turns the tap from the sheet by using the same number of rotations.









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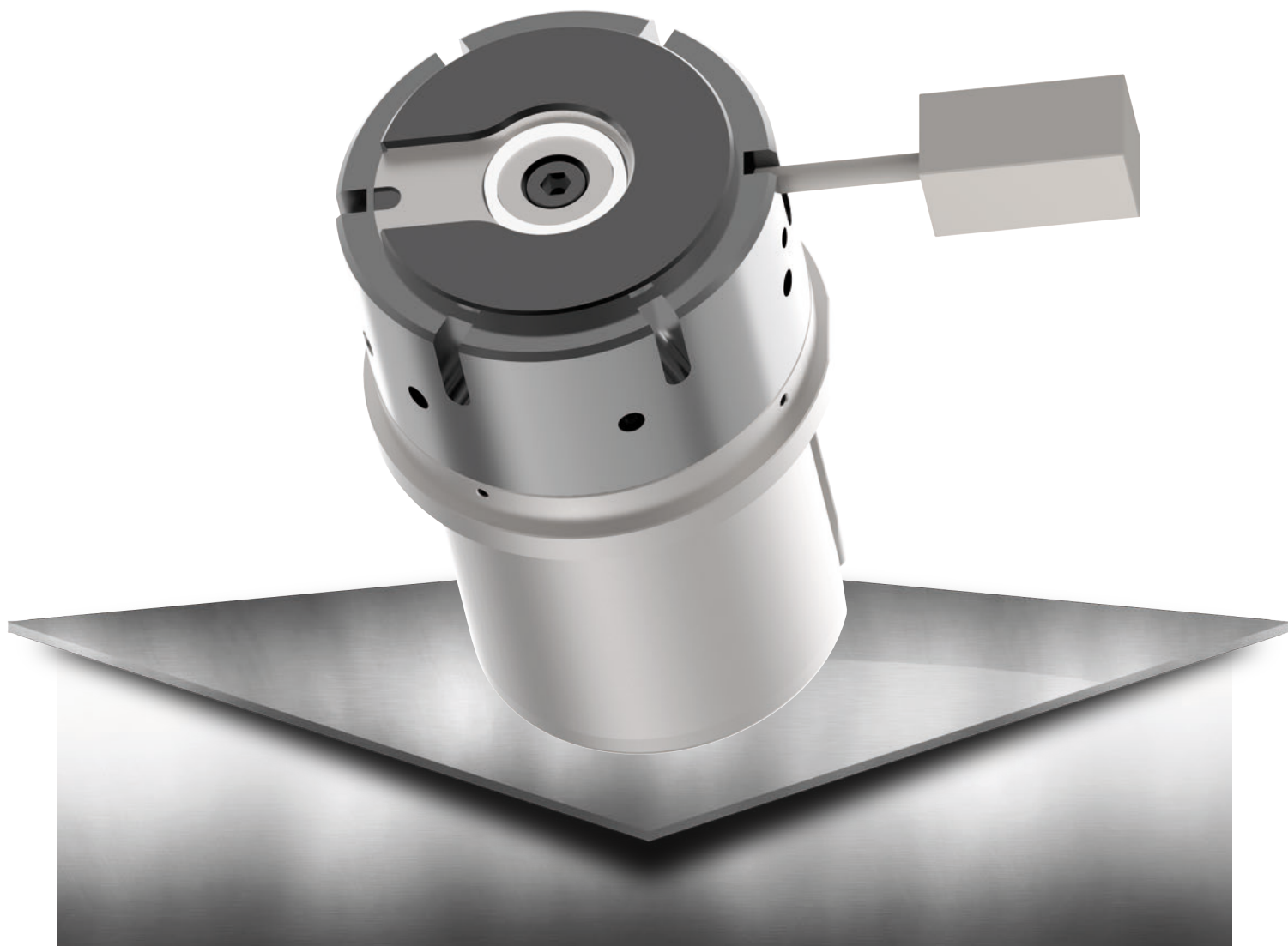
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## A. DESCRIPTION OF OPERATION

If it is necessary to form another thread hole into the same sheet, the machine ram moves completely upwards and the index cylinder chooses the tap insert in the corresponding size.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

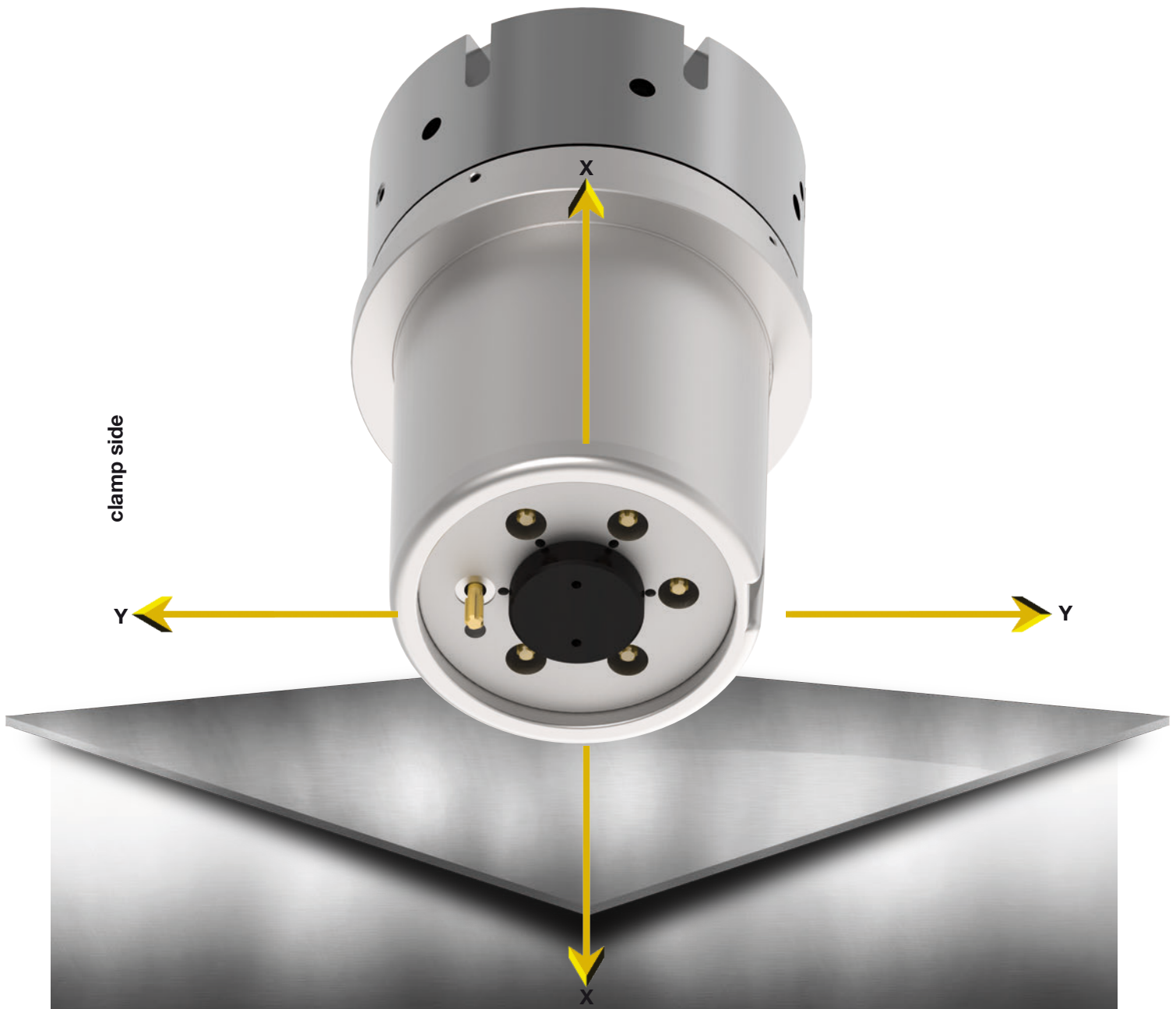
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

A

## A. DESCRIPTION OF OPERATION

Note: While programming, the stations will always rest at the same place. A place rotation of tap inserts does not happen.



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## B. INFORMATION BEFORE USING ps:®multi-thread®

The ps:®multi-thread® thread former – exclusively engineered and produced by PASS Stanztechnik AG for Prima Power machines – has its own manual and description how to use, install and programm it.

You will receive a special made aluminium suitcase with ps:®multi-thread® inside as well as some extra tools which are needed for assembly and disassembly.

Necessary tooling for assembly and function check of ps:®multi-thread® (MT6-TFi):



You will also find a memory stick inside with the following information:

- a movie of a working ps:®multi-thread® inside the machine
- the operation manual as pdf-file (88 pages)
- the Excel-file MT6\_TFi\_calc.xlsx to calculate the correct thread length for the taps
- a simulation movie on how the tool is actually working in the machine

Please have a close look at the 2 videos on the memory stick. It explains a lot how the tool is working and especially why the adjustments and calculation of the thread length are important.

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## B. INFORMATION BEFORE USING ps:®multi-thread®

These extra information show more detailed how to program the tool, how to calculate the thread length with the Excel-file and how to use it at the machine.

We also supply a spare part list of the tool and all its parts for an easy request.

Please use at all times the official manual supplied by Prima Power. This extra document will help you further with other issues like programming the Excel-file.

Before each use, please check the complete functionality of the ps:®multi-thread® (MT6-TFi) (see chapter “Manual function check” – starts on page 16). Especially when using the ps:®multi-thread® (MT6-TFi) firstly, you should test it carefully. Concerning deliveries to non-EU countries the tool could be disassembled for revisions from customs authorities and not reassembled again in the right way.

ps:®multi-thread® (MT6-TFi) is delivered with a special made suitcase. As ps:®multi-thread® (MT6-TFi) is a tool equipped with clutches and planetary gears, it is indispensable to provide a clean storage area.

In the standard version the tool is equipped with the following thread modules and tap inserts:

**Position 1: M2,5 / position 2: M3 / position 3: M4 / position 4: M5 / position 5: M6 / position 6: M8**

(Special equipment possible on customers' requests – please note).

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## C. MANUAL FUNCTION CHECK

Insert the upper part of ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) in the assembly fixture for THICK TURRET guide assemblies stat. D.

Check, if the central clamping screw is tightened with 70 Nm, especially when using the tool firstly.

Concerning deliveries outside the EU it could happen that customs authorities slack or loose this important screw completely.



Turn the head at least for 360° in steps by 60° as well in clockwise direction as also in counterclockwise direction. Each 60° step, the head should softly lock in place, but also unlatching should be easily.





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## C. MANUAL FUNCTION CHECK

Twist the marking "home position" to position 1 (see inscription at the guide range).



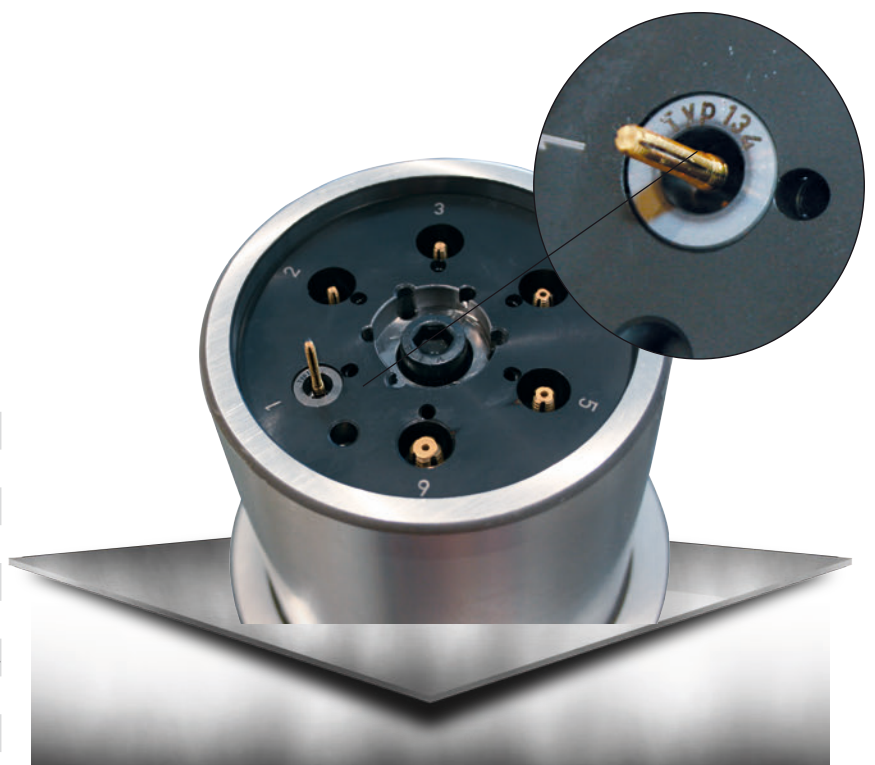
Remove tool from assembly fixture and set headlong onto the scheduled clean storage area.

Now, fit each thread module with the provided tap insert.

### IMPORTANT:

Pay attention on the right position from thread module to tap insert:

Type 38	M2
Type 43	M2,5 and UNC #2-56
Type 48	M3 and UNC #3-48
Type 61	UNC #4-40 and UNC #5-40
Type 67	M4
Type 76	M5 and UNC #6-32 and UNC #8-32
Type 95	M6 and UNC #10-24 and UNC #12-24
Type 119	M8 and UNC 1/4"-20
Type 134	UNC 5/16"-18
Type 143	M10 and UNC 3/8"-16



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**up to s = 8 mm**

## C. MANUAL FUNCTION CHECK

After all tap inserts are equipped, you have to check the total length of the complete upper part again ( $L = 209 \text{ mm} \pm 0,3 \text{ mm}$  measured from the head of inner shape to tap insert bottom).





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## C. MANUAL FUNCTION CHECK

Press down the guide (simulation of activating the tool within the machine) and stick the enclosed pin 6 mm into the provided drill hole of the head sleeve.



Fix the head sleeve (if necessary by holding on the pin) and turn around the guide in counterclockwise direction for exactly 2,5 rotations.

While rotating you should recognize that ALL tap inserts also twist and move upwards.

If this is not the case or if, however, the guide is clamping while rotating, the tool has to be cleaned. The units have to be newly calibrated (see chapter "Tool maintenance" – starts on page 49).



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**up to s = 8 mm**

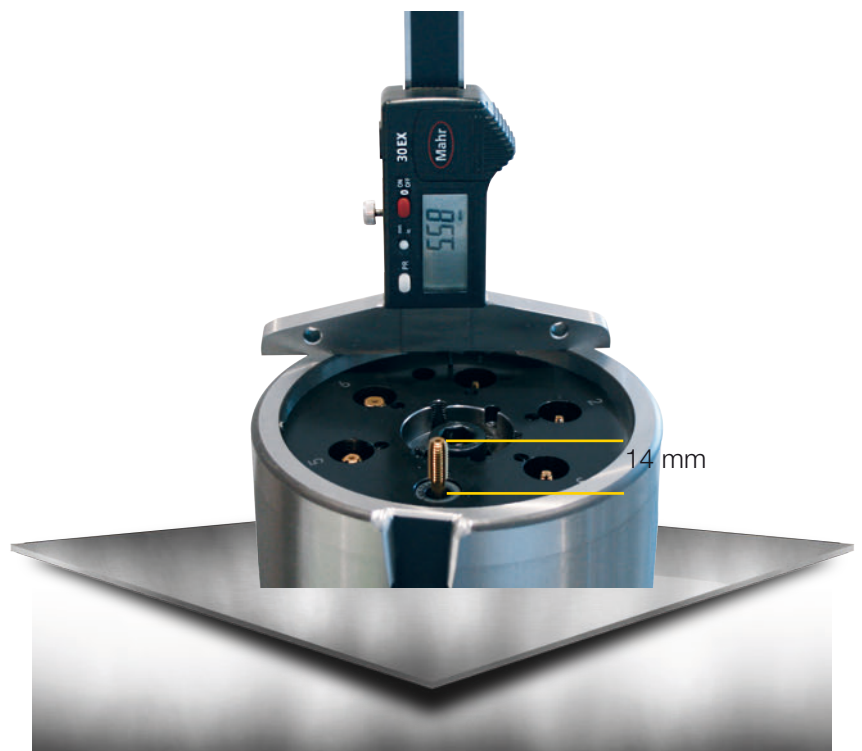
## C. MANUAL FUNCTION CHECK

Afterwards turn back the guide in clockwise direction exactly for 2,5 rotations and extract the pin.



Now, the coupling must lock in place again and the inner turret magazine has to feature a recess of 5,5 mm distance to the guide front.

The inactive tap inserts are approx 3 mm behind the turret magazine, the active tap insert sticks up about 14 mm from the turret magazine.



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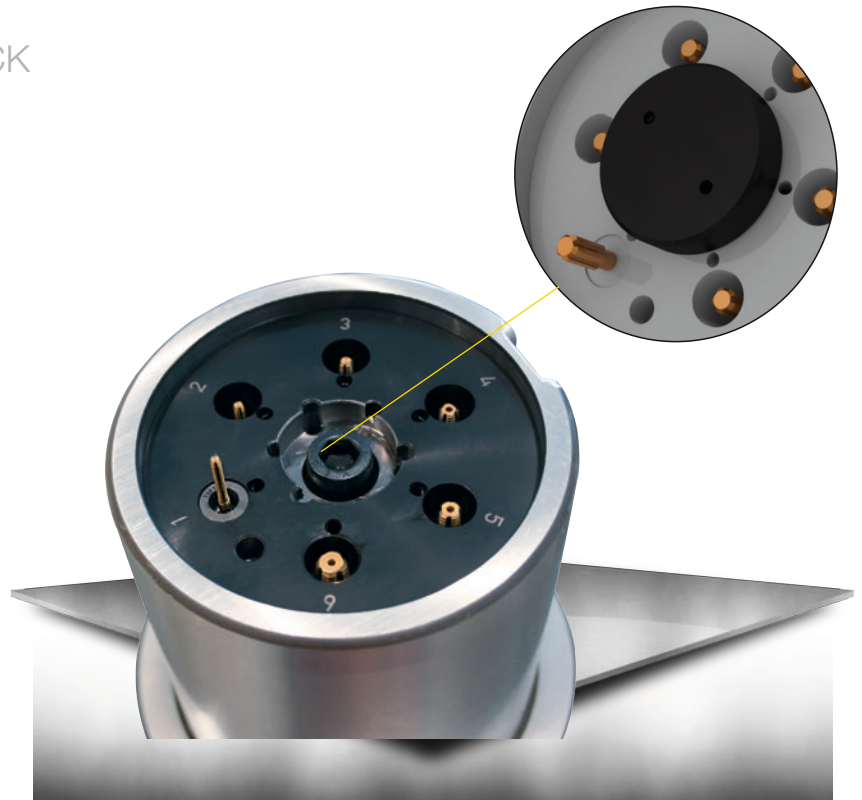
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## C. MANUAL FUNCTION CHECK

This PU stripper is eventually needed for the compensation of sheet deformations by pressing the sheet onto the die before the tap insert is forming through the sheet.

When programming, please note the interference shape (see chapter “Interference shape” – starts on page 53).



Finally, quickly check the functionality of the suitable die. Remove from suitcase and test rotation of the pivot-mounted die plate.



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**up to s = 8 mm**

## D. INTEGRATION IN THE TURRET

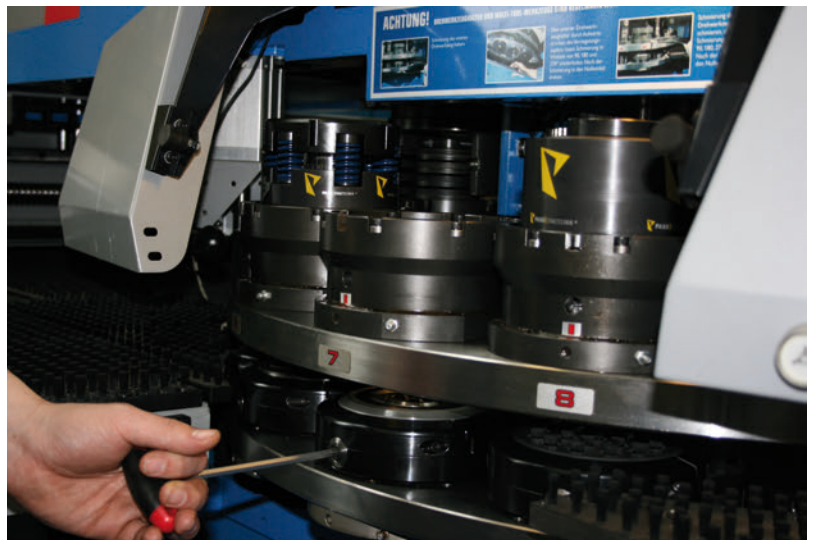
Review whether all tap inserts are mounted into the right thread module. Make sure again, that the tool length adjustment is made correctly. If the total length of 209 mm ( $\pm 0,3$  mm) is not correct, when activating the relevant tap insert, you will have to adjust the head exactly by turning counterclockwise for one or two complete rotations.

### IMPORTANT:

Length **MUST** be adjusted correctly, otherwise the tool is inevitably expected to break.



Firstly assemble the die into the scheduled index station (station Di).





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## D. INTEGRATION IN THE TURRET

Before assembling the upper part in the machine turret, please pump grease into the designated lubrication nipple at the tool.

1 pumping process is needed for the upper lubrication nipple (for crank ring) and 4-5 into the lower lubrication nipple (for the planetary gear).



Insert the upper part in the suitable turret position.

**IMPORTANT:** Adjust the head to position 1, so that the marking “home position 1” of the head points to “position 1” at the guide.

This step is essential, as only in this adjustment, the machine ram escapes to the shape of the tool ram head. This guarantees the functionality of the tool.



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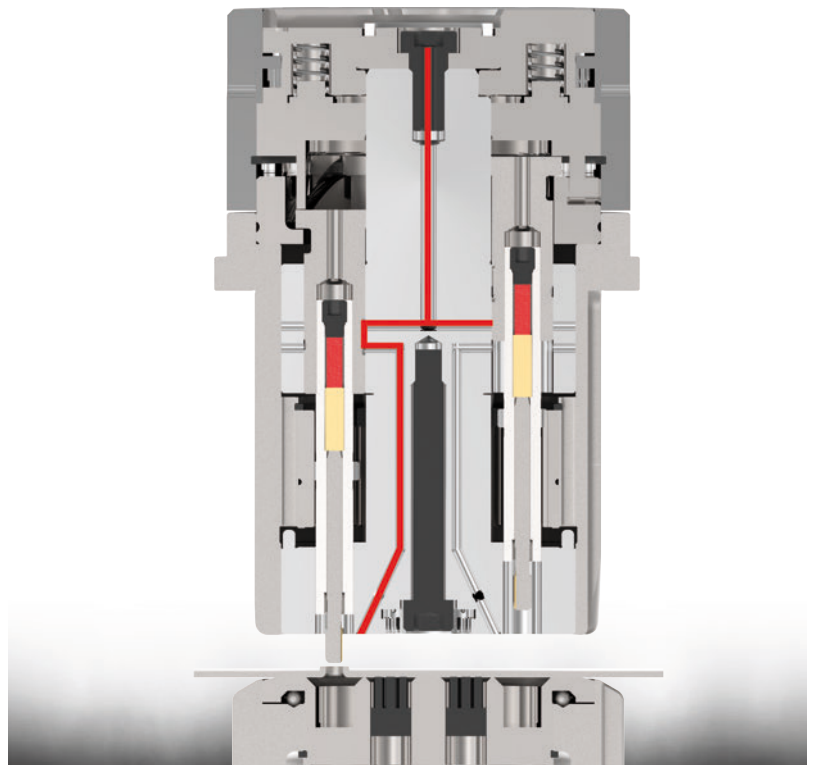
SHEET THICKNESS **up to s = 8 mm**

## D. INTEGRATION IN THE TURRET

Make sure that the head plate is moveable downwards for 6 mm. This test makes sure that the upper clutch will work well during process.



When using the tool for the first time, it is recommended to run each station **EMPTY** for 50 threads (i.e. without sheet) to ensure that all oil channels are filled by the machine lubrication and that the oil reaches the thread forming tip.

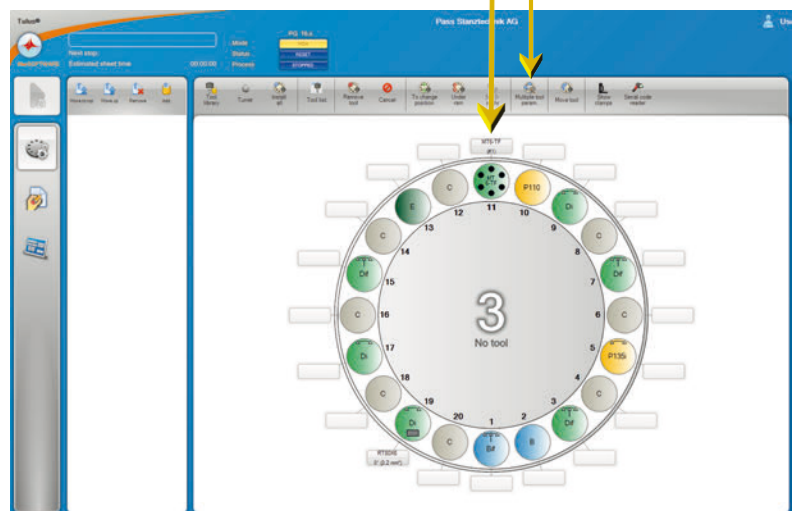
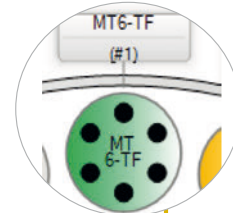


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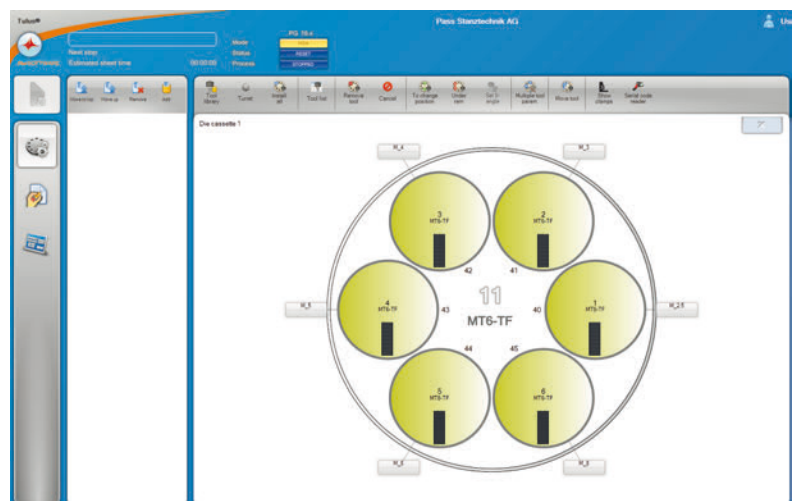
## E. TOOL CHOICE IN TULUS

Choose tool station at the machine and select ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi). Deposit at what positions which thread modules are installed.



### IMPORTANT:

ALWAYS register ALL effectively installed thread modules, even if those are not necessary for the current program.





# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

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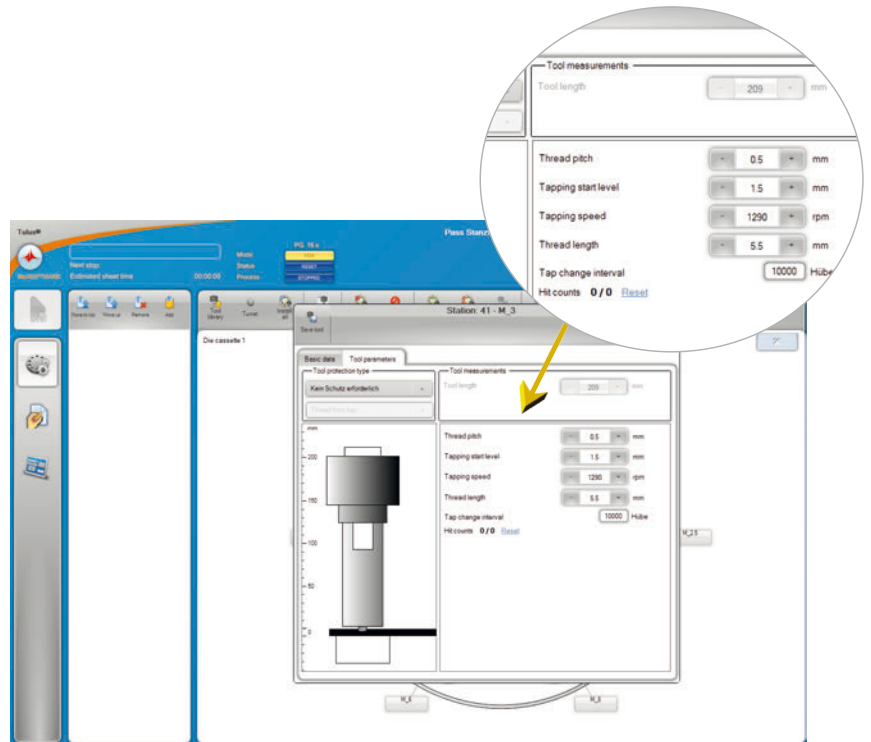
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## E. TOOL CHOICE IN TULUS

Deposit the values of all actually mounted thread modules for all positions of ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi).

Open ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) in Tulus by double click on the corresponding station.

By the next double click on the corresponding position you will get the window “Tool parameter”.



In the window “Tool parameter” you will have to fill in the following values in the appropriate boxes:

### Field “Coarse thread”:

Here are the values you will have to write in for the corresponding thread sizes:

Metric threads		UNC threads	
M2	0,4	#2-56 UNC	0,45
M2,5	0,45	#3-48 UNC	0,53
M3	0,5	#4-40 UNC	0,64
M4	0,7	#5-40 UNC	0,64
M5	0,8	#6 - 32 UNC	0,79
M6	1	#8-32 UNC	0,79
M8	1,25	#10-24 UNC	1,06
M10	1,5	#12-24 UNC	1,06
		1/4"-20 UNC	1,27
		5/16"-18 UNC	1,41
		3/8"-16 UNC	1,59

### Field “Thread-start position”:

The standard start position in Tulus is 1 mm. It should not be changed, because it is the distance between front of the tap insert to the sheet. When you change the thread start position, it has effects to the maximum sheet thickness. For thread extrusions you have to change the thread start position. Please change it to “1 mm + extrusion height (without sheet thickness)”. E.g.: 3 mm.

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## E. TOOL CHOICE IN TULUS / NC EXPRESS

How to program the tool inside NC Express:

To reach an optimal speed, but also to avoid an overload of the tap inserts, we advise to fill in the following cruises in the corresponding box of NC Express in rpm of each thread unit in dependence on the sheet that should be worked out as well as sheet thickness or embossing height.

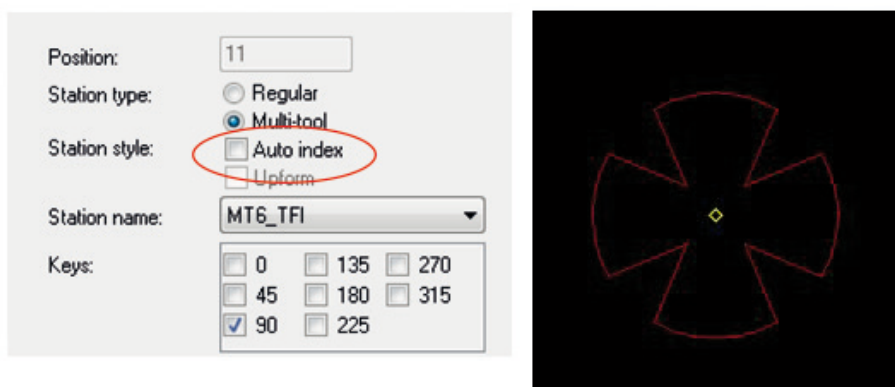
W	TU6	100.000	17.000	20.000
X	MT6-TF	216.000	73.000	120.000
Y	MTH_16	216.000	73.000	111.000

Size ID:	Description:	X-Dim:	Y-Dim:	Stripper diameter:
X	MT6-TF	216	73	120

### VERY IMPORTANT:

Turn off the “Auto index” flag of the tool! Otherwise the thread will not position on the prehole! Use the STA file or the TOOLSCOMMON.XML file with the latest version of NC Express:



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## E. TOOL CHOICE IN TULUS

Basic information
Machine
Special tool
Feature

Tool name:

Characteristics

Tool shape:  
✕ Special

X-dimension:

Y-dimension:

Corner radius:

Tool size: MT6-TFi

Description:

Key/slots of a die:

0

135

45

180

90

270

Close to clamp tool

Relieved stripper:

1-sided
  2-sided

Y-protection area:

Dies:

Quantity	Clearance
1	0.2
1	0.4
1	0.6

Miscellaneous

Nibbling priority:

Punch priority:

Punch count:

Tool can be 'Auto index'

Optimizing default settings

Optimizing group: MULTITHR

MULTITHR

Away from clamps

Part group processing

Motion principle:  
Minimum distance

Zone width:

Settings

Stripper distance:

Lower limit:

Ram speed down:

Ram speed up:

Delay before stroke:

Delay after stroke:

Acceleration:

---

Tool operating mode:  
Thread former

1:

2:

3:

4:

---

Operating mode at machine:

Only for 'PG1225'

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## E. TOOL CHOICE IN TULUS

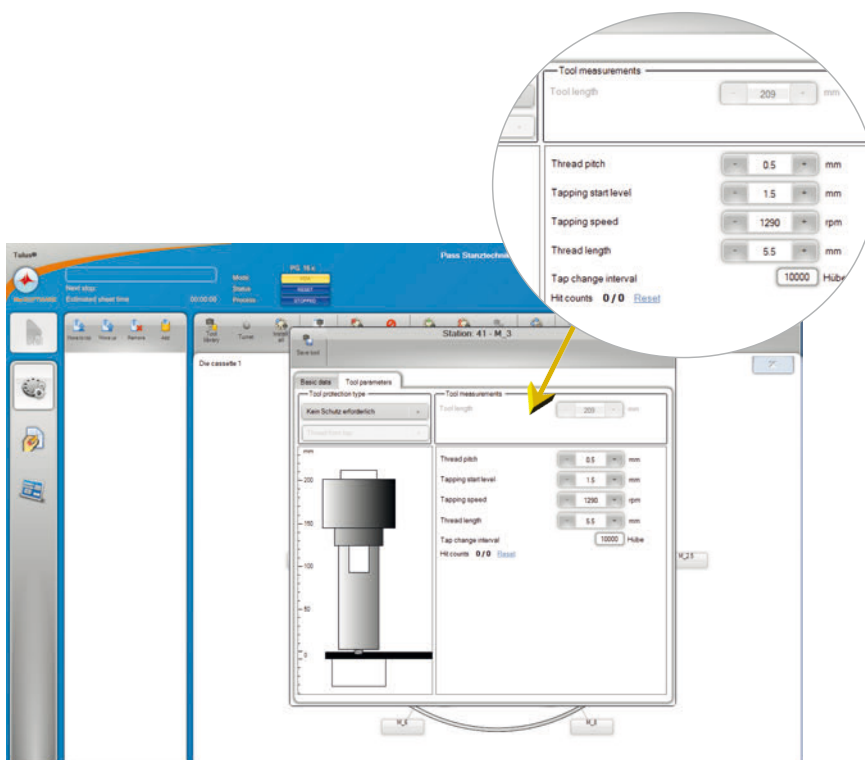
NC code should look like below:

```
<TOOL_START Number="49" X="587.917" Y="428.38" ToolName="M4_MT6TFI"/>
<THREADING_ON StartLevel="0" TapLength="0" TapSpeed="0" TapPitch="0"/>
<MOVE FlowID="1" X="587.917" Y="428.38"/>
<MOVE FlowID="1" X="853.917" Y="428.38"/>
<MOVE FlowID="1" X="853.917" Y="162.38"/>
<MOVE FlowID="1" X="587.917" Y="162.38"/>
<THREADING_OFF/>
```

### Activation in Tulus:

Handle the tool exactly in the same way as an indexable multitool in Tulus:

- First create the die holder. It is possible that you have to select the MT6-TF manually (no wizard).
- Create each separate tap individually. Use exactly the same name as in NC Express (possibly also here no wizard).
- Enter the correct values of pitch, tap length, start level and speed for every tap.



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## E. TOOL CHOICE IN TULUS

### Problem solving during using the tool in the machine:

In case, the tool is active with tapping and at the same time there is an interruption by safety beam or door, or reset button, Emergency stop etc., the machine MUST be reset and you should use the command THREAD\_OUT in MDA mode. This is the only correct way to proceed.

If the tap is broken and a replacement is needed, it is important to open the clamps first. Then move the clamps backwards so that the sheet is free. Afterwards slowly turn the turret (5 %) and the operator can remove the tap (this is also described in the manual).

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

Field "Thread cutting speed in rpm":

To reach an optimal speed, but also to avoid an overload of the tap inserts, we advise to fill in the following cruises in the corresponding box of Tulus in rpm of each thread unit in dependence on the sheet that should be worked out as well as sheet thickness or embossing height.

### Aluminium (Rm up to 250 N/mm<sup>2</sup>)

	UP TO T = 3 MM	OVER T = 3 MM
M2, M2,5 and UNC #2-56	1000 rpm	800 rpm
M3 and UNC #3-48 and UNC #4-40 and UNC #5-40	1000 rpm	800 rpm
M4 and UNC #6-32 and UNC #8-32	750 rpm	600 rpm
M5 and UNC #10-24	600 rpm	500 rpm
M6 and UNC #12-24 and UNC 1/4"-20	500 rpm	400 rpm
M8 and UNC 5/16"-18	350 rpm	300 rpm
M10 and UNC 3/8"-16	250 rpm	200 rpm

### Steel (Rm up to 450 N/mm<sup>2</sup>)

	UP TO T = 3 MM	OVER T = 3 MM
M2, M2,5 and UNC #2-56	800 rpm	720 rpm
M3 and UNC #3-48 and UNC #4-40 and UNC #5-40	800 rpm	600 rpm
M4 and UNC #6-32 and UNC #8-32	600 rpm	450 rpm
M5 and UNC #10-24	500 rpm	360 rpm
M6 and UNC #12-24 and UNC 1/4"-20	400 rpm	300 rpm
M8 and UNC 5/16"-18	300 rpm	200 rpm
M10 and UNC 3/8"-16	200 rpm	140 rpm

### Steel (Rm over 450 N/mm<sup>2</sup>, e.g. S355MC)

### Stainless steel (Rm up to 800 N/mm<sup>2</sup>)

	UP TO = 3 MM	OVER T = 3 MM
M2, M2,5 and UNC #2-56	500 rpm	400 rpm
M3 and UNC #3-48 and UNC #4-40 and UNC #5-40	400 rpm	320 rpm
M4 and UNC #6-32 and UNC #8-32	300 rpm	250 rpm
M5 and UNC #10-24	250 rpm	200 rpm
M6 and UNC #12-24 and UNC 1/4"-20	200 rpm	150 rpm
M8 and UNC 5/16"-18	120 rpm	100 rpm
M10 and UNC 3/8"-16	80 rpm	60 rpm

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

### Field "Optimum thread length":

Deposit the optimum thread length.

The calculation of optimal thread length is made by the help of Excel-file "MT6\_TFi\_calc", which you will find on the enclosed USB-stick.

Write the thread modules installed in real into ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) together with the thread pitch in mm into area "Step 1 – Select Tool Config" of the Excel-file "MT6\_TFi\_calc".

In sector "Step 2 – Program Active Tap" you will have to fill in the values "Pitch / Start Level / Sheet Thickness" for each thread module that will be needed in the following program.

For each thread size you will get an optimised thread length "Optimum Thread Length" that you will have to overtake in Tulus field "thread length".

Please see more detailed information how to use the Excel-file "MT6\_TFo\_calc.xls" on the following pages.

### Thread pitch for thread formings (metric threads and UNC threads):

M	PITCH (MM)	PRE-PUNCH HOLE (Ø)	UNC	PITCH (MM)	PRE-PUNCH HOLE (Ø)
2	0,4	1,8	#2-56	0,45	2,0
2,5	0,45	2,3	#3-48	0,53	2,3
3	0,5	2,75	#4-40	0,64	2,55
4	0,7	3,7	#5-40	0,64	2,9
5	0,8	4,7	#6-32	0,79	3,15
6	1	5,6	#8-32	0,79	3,8
8	1,25	7,5	#10-24	1,06	4,35
10	1,5	9,45	#12-24	1,06	5,0
			1/4"-20	1,27	5,75
			5/16"-18	1,41	7,3
			3/8"-16	1,59	8,8



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

How to use the Excel-file delivered with ps:<sup>®</sup>multi-thread<sup>®</sup>:

The Excel-file is built to calculate and check the maximum length of the thread that can be entered into Tulus.

Step 1 - Select Tool Config		Step 3 - Find Vertical Motion Limitations		Step 5 - Find Limiting C Motion For Active Tap	
Position 1 - Thread Pitch	0,45	Position 1	3,6	Active Tap	919,7419355
Position 2 - Thread Pitch	0,5	Position 2	4		
Position 3 - Thread Pitch	0,7	Position 3	5,6		
Position 4 - Thread Pitch	0,8	Position 4	6,4		
Position 5 - Thread Pitch	1	Position 5	8		
Position 6 - Thread Pitch	1,25	Position 6	10		

Step 2 - Program Active Tap		Step 4 - Find Max C Motion For Max Vertical Motion		Step 6 - Find Max Thread Length For Active Tap	
Thread Pitch	1	Position 1	2554,83871	Active Tap	13,2
Start Level	1	Position 2	2299,354839		
Sheet Thickness	2	Position 3	1642,396313		
Thread Length	8	Position 4	1437,096774		
C-Axis Motion [deg]	557,4193548	Position 5	1149,677419		
C-Axis Motion [rounds]	1,548387097	Position 6	919,7419355		

Optim Calculations [ for testing ]		Value [mm]
Max Start Level		1
Optim Thread Length		8

### Step 1: Select Tool config

As standard, ps:<sup>®</sup>multi-thread<sup>®</sup> is delivered with 6 taps M2,5 - M8. As shown in the picture below, you only need to enter the pitch that is used. Note: M10 has pitch 1,5 and M2 has pitch 0,40.

Step 1 - Select Tool Config		Tap type
Position 1 - Thread Pitch	0,45	M2,5
Position 2 - Thread Pitch	0,5	M3
Position 3 - Thread Pitch	0,7	M4
Position 4 - Thread Pitch	0,8	M5
Position 5 - Thread Pitch	1	M6
Position 6 - Thread Pitch	1,25	M8

# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

### Step 2: Program Active Tap

Here, you have to fill in the tap that will be used for the active program.

The picture on the right is for a M6 thread. So fill in:

- **Thread Pitch:** 1.
- **Start Level:** Should be standard 1. This means that start tapping is 1 mm above sheet. If there are extrusions of course, you have to add that dimensions to it.
- **Sheet Shickness:** Enter the sheet thickness you are using.
- **Thread Length:** This value (in field "B13") will be automatically filled in with the value "H15" from the Excel-file "MT6\_Ti\_calc" (optimum thread length).

**Please do not enter anything in the green fields!**

Step 2 - Program Active Tap	
Thread Pitch	1
Start Level	1
Sheet Thickness	2
Thread Length	8
C-Axis Motion [deg]	557,4193548
C-Axis Motion [rounds]	1,548387097

There is nothing to enter in the other steps. Those are just calculations and values you should use to check if you can use the tap in the material thickness – especially when you have also other taps installed in the tool (even if you do not use them).

### STEP 3 + 4 ARE ONLY CALCULATIONS!

#### Step 3:

This is the distance in mm calculated for each tap inside the tool. Check the value for position 5 as this is the value we entered in step 2 (in this case: position 5, M6 value 8 mm).

Step 3 - Find Vertical Motion Limitations	Vertical Motion
Position 1	3,6
Position 2	4
Position 3	5,6
Position 4	6,4
Position 5	8
Position 6	10

Step 5 - Find Limiting C Motion For Active Tap	Max C Motion
Active Tap	919,7419355

#### Step 4:

This is the calculation about how many index degrees a rotation is needed. This value is just for internal use and is not needed for Tulus or NC Express or anywhere else.

Step 4 - Find Max C Motion For Max Vertical Motion	Max C Motion
Position 1	2554,83871
Position 2	2299,354839
Position 3	1642,396313
Position 4	1437,096774
Position 5	1149,677419
Position 6	919,7419355

Step 6 - Find Max Thread Length For Active Tap	Max Thread Length
Active Tap	13,2

Optim Calculations [ for testing ]	Value [mm]
Max Start Level	1
Optim Thread Length	8

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION DI

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

**STEP 5 + 6 ARE ONLY CALCULATIONS of the tap that has been entered in step 2!**

### Step 5:

This calculation is checking if one tap is used so that the other taps will not touch the sheet also during the use of the active tap. In this example the thread length for M3 is calculated 7,5. This means that if you would use the M3 tap in 4 mm sheet thickness, the tap in position 6 ( M8 ) would touch the sheet.

The only solution for this is to take the tap insert M8 physically out of the tool.

For a correct calculation without any problems it is very important to add in the Excel-file which taps are physically inside the individual positions. This applies especially when you leave the taps inside the tool – even when you do not use them. It should be common sense and rule not to put the taps inside, if you do not need them for this actual program or work queue.

Step 1 - Select Tool Config		Step 3 - Find Vertical Motion Limitations	
Position 1 - Thread Pitch	0,45	Position 1	6,75
Position 2 - Thread Pitch	0,5	Position 2	7,5
Position 3 - Thread Pitch	0,7	Position 3	10,5
Position 4 - Thread Pitch	0,8	Position 4	12
Position 5 - Thread Pitch	1	Position 5	15
Position 6 - Thread Pitch	1,25	Position 6	18,75

Step 2 - Program Active Tap		Step 4 - Find Max C Motion For Max Vertical Motion	
Thread Pitch	0,5	Position 1	2554,83871
Start Level	1	Position 2	2299,354839
Sheet Thickness	4	Position 3	1642,396313
Thread Length	7,5	Position 4	1437,096774
C-Axis Motion [deg]	1045,16129	Position 5	1149,677419
C-Axis Motion [rounds]	2,903225806	Position 6	919,7419355

### Example 1 - M6, M8 and M10 inside 6 mm sheet thickness

Step 1 - Select Tool Config		Step 3 - Find Vertical Motion Limitations		Step 5 - Find Limiting C Motion For Active Tap	
Position 1 - Thread Pitch	0,01	Position 1	0,12	Active Tap	766,4516129
Position 2 - Thread Pitch	0,01	Position 2	0,12		
Position 3 - Thread Pitch	0,01	Position 3	0,12		
Position 4 - Thread Pitch	1	Position 4	12		
Position 5 - Thread Pitch	1,25	Position 5	15		
Position 6 - Thread Pitch	1,5	Position 6	18		

Step 2 - Program Active Tap		Step 4 - Find Max C Motion For Max Vertical Motion		Step 6 - Find Max Thread Length For Active Tap	
Thread Pitch	1	Position 1	114967,7419	Active Tap	11
Start Level	1	Position 2	114967,7419		
Sheet Thickness	6	Position 3	114967,7419		
Thread Length	12	Position 4	1149,677419		
C-Axis Motion [deg]	836,1290323	Position 5	919,7419355		
C-Axis Motion [rounds]	2,322580645	Position 6	766,4516129		

Optim Calculations [ for testing ]		Value [mm]
Max Start Level		1
Optim Thread Length		12

Inside position 1, 2 and 3 all taps are removed, so value 0,01 is used. Position 4 is M6, position 5 is M8 and position 6 is M10 (available separately). Sheet thickness is 6 mm. With thread pitch value for M6 (1 mm) the thread length is 12 mm. In this case, the tap in position 6 (M10) would touch the sheet during the use of the tap M6 in position 4 ( M6 ). The only solution for this is to take the tap insert M10 physically out of the tool.

# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## E. TOOL CHOICE IN TULUS

Example 2 - Use of M3, M6, M8 and M10 inside 4 mm sheet thickness

Step 1 - Select Tool Config		Step 3 - Find Vertical Motion Limitations		Step 5 - Find Limiting C Motion For Active Tap	
Position 1 - Thread Pitch	0,01	Position 1	0,15	Active Tap	766,4516129
Position 2 - Thread Pitch	0,5	Position 2	7,5		
Position 3 - Thread Pitch	0,01	Position 3	0,15		
Position 4 - Thread Pitch	1	Position 4	15		
Position 5 - Thread Pitch	1,25	Position 5	18,75		
Position 6 - Thread Pitch	1,5	Position 6	22,5		

Step 2 - Program Active Tap		Step 4 - Find Max C Motion For Max Vertical Motion		Step 6 - Find Max Thread Length For Active Tap	
Thread Pitch	0,5	Position 1	114967,7419	Active Tap	5,5
Start Level	1	Position 2	2299,354839		
Sheet Thickness	4	Position 3	114967,7419		
Thread Length	7,5	Position 4	1149,677419		
C-Axis Motion [deg]	1045,16129	Position 5	919,7419355		
C-Axis Motion [rounds]	2,903225806	Position 6	766,4516129		

Optim Calculations [ for testing ]		Value [mm]
Max Start Level		1
Optim Thread Length		7,5

Exactly the same configuration as the previous example, however inside position 2 there is the M3 added tap with pitch 0,5 and its used. The field “active tap” shows right away that the thread length is too long (max length should be 5,5 mm) and the positions with M8 and M10 would touch the sheet before M3 is ready. To solve this is simple: Remove M8 and M10 taps on pos. 5 and 6 and change the pitch values to 0,01. The max length (step 6) will increase to 8,25 which is enough to be able to use both M3 and M6 in 4 mm sheet thickness.

Be aware, these calculations are also inside Tulus! So if you would start a program and these calculations are red then Tulus will not start the program and comes with an alarm that the thread length value is not correct.

In general you can say the following points need to be respected:

- Install inside the tool only the taps you are going to use for the active program, remove the ones you do not use.
- Enter the correct tap positions inside the Excel-file and calculate the correct thread length for the tap you use.
- In general when using a small dimension tap, the bigger dimensions, if installed, can block the smaller dimension.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) is able to be equipped with thread modules from M2,5 til M10 or UNC #2-56 til UNC 3/8"-16. It is irrelevant which thread module is located in the individual stations. It is even possible to insert some thread modules of the same thread size.

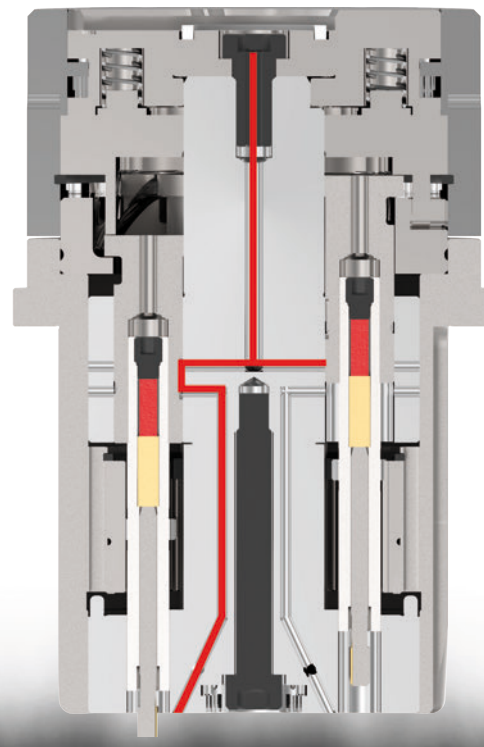
Furthermore, not all positions in ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) have to be filled in. So it is imaginable that only one thread module (i.e. M6) is assembled in position 4 – all remaining positions rest empty. It is also possible that i.e. 4 thread modules M3 and, additionally 2 thread modules UNC #6-32 are on duty, to change in long-term uses regularly the tap inserts and avoid excessive heat. Of course, the assembling of the thread modules must be in accordance with the programming (data input for control system).

Please note, that all thread modules are connected with the oil channel.

We recommend putting a blind leading nut (part-no. 451611000) into the open hole. Only then, there is the full oil power on the active tap.

If avoidable, you should also refrain from taking very small tap inserts (M2,5 til M5) together with M10. Generally, this would work but obviously will result in a highly strong restriction of sheet thickness (see chapter "Tool choice in Tulus" – page 25).

There are 10 different kinds of thread modules available, see page 80.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

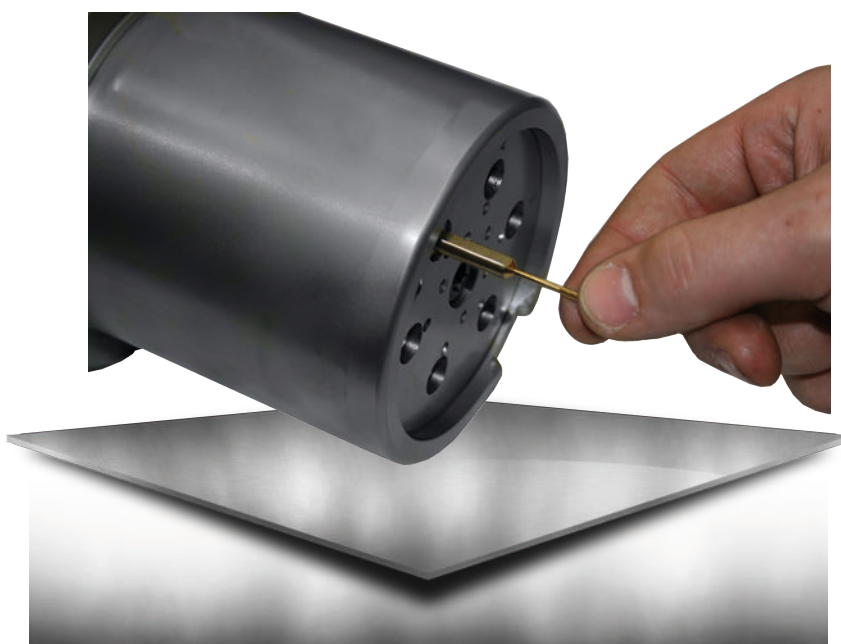
SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

For changing the thread modules, the head marking “home position 1” has to point to “position 1” in order to take out the tool of the turret.



To avoid damages, extract the active tap insert from the unit.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

Put the upper part in the assembly fixture and loose the central fixing screw.

However, leave the screw in the thread.

We advise releasing the screw only by half a turn. So the bottom-side clutch will rest in the gear ring. This ensures that no undefined rotation will occur.



Remove the complete upper part from the assembly fixture and place on the enclosed auxiliary mounting ring.

Now, release the screw completely ...



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

... and lift-off the head.

During the whole process of disassembling and assembling, please leave the guide assembly in the auxiliary mounting ring to ensure that no undefined rotation will happen.



Now, you may remove the thread modules upwards.





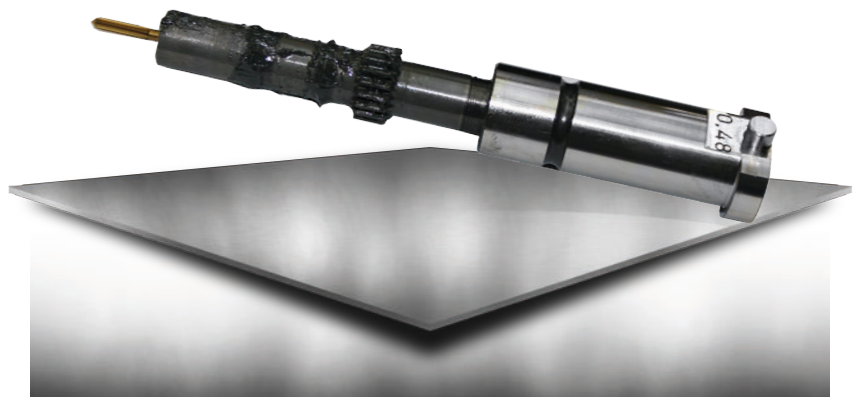
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

To insert new thread modules, it is always necessary to use the thread modules together WITH assembled tap insert.



Please grease the gear wheel of the thread module component strongly by using the enclosed Molykote grease.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

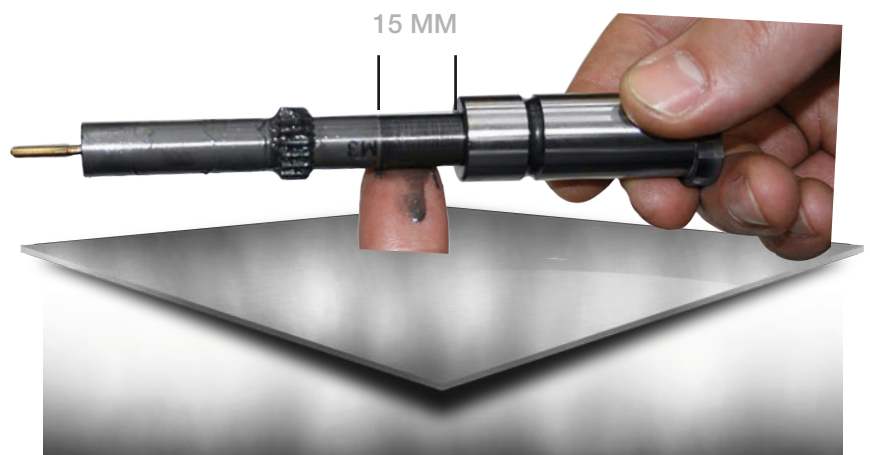
SHEET THICKNESS

**up to s = 8 mm**

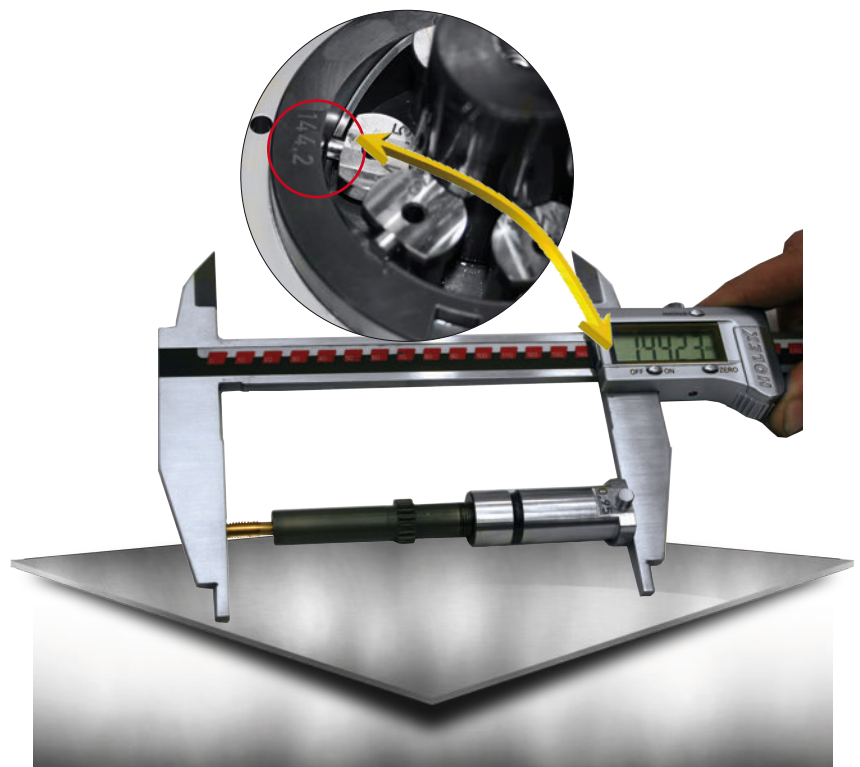
## F. REPLACEMENT OF THREAD MODULES

After long usage we advise also slightly greasing the leading spindle with the supplied Molykote grease.

Due to that, please turn the leading spindle and the leading screw-nut for about 15 mm apart, afterwards slightly grease the leading thread and return the 15 mm.



Adjust the length of the thread module incl. assembled tap insert to a total length with a tolerance of  $\pm 0,3$  mm like marked at the crank ring.



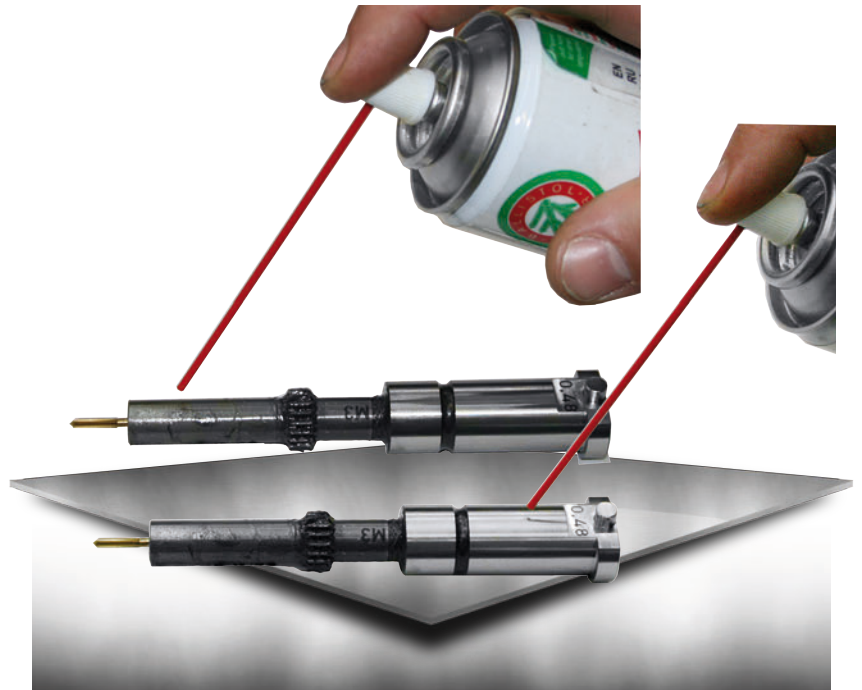
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

Now oil (we recommend Ballistol oil) the guide diameter of the leading spindle and leading screw of the thread module ...



... and put the thread module into the desired position of the guide.



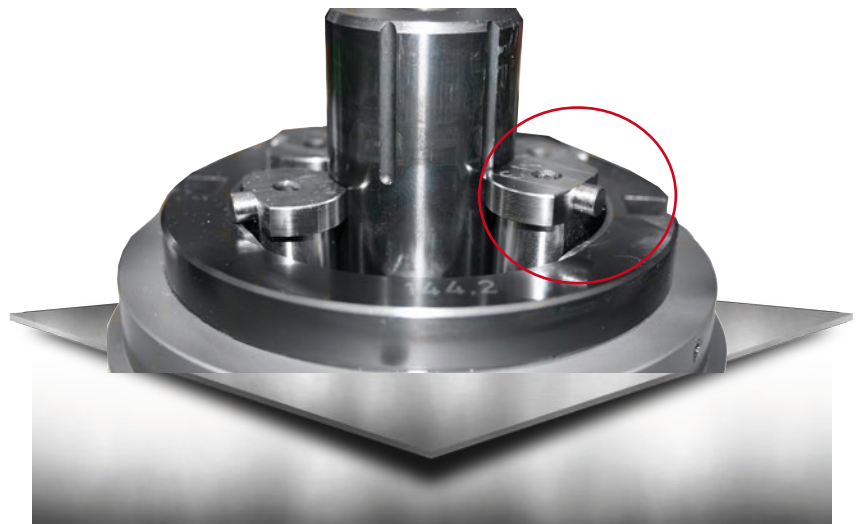
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

If the side pin of the thread module is not correctly arranged on the crank guide, the teeth of the gear are positioned on each other and so are not consolidated exactly.



For consolidation please take the enclosed socket wrench SW 4 mm. Stick the socket wrench through the head-side drill hole of the thread module and turn lightly (max. 5°) in clockwise or counterclockwise direction.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

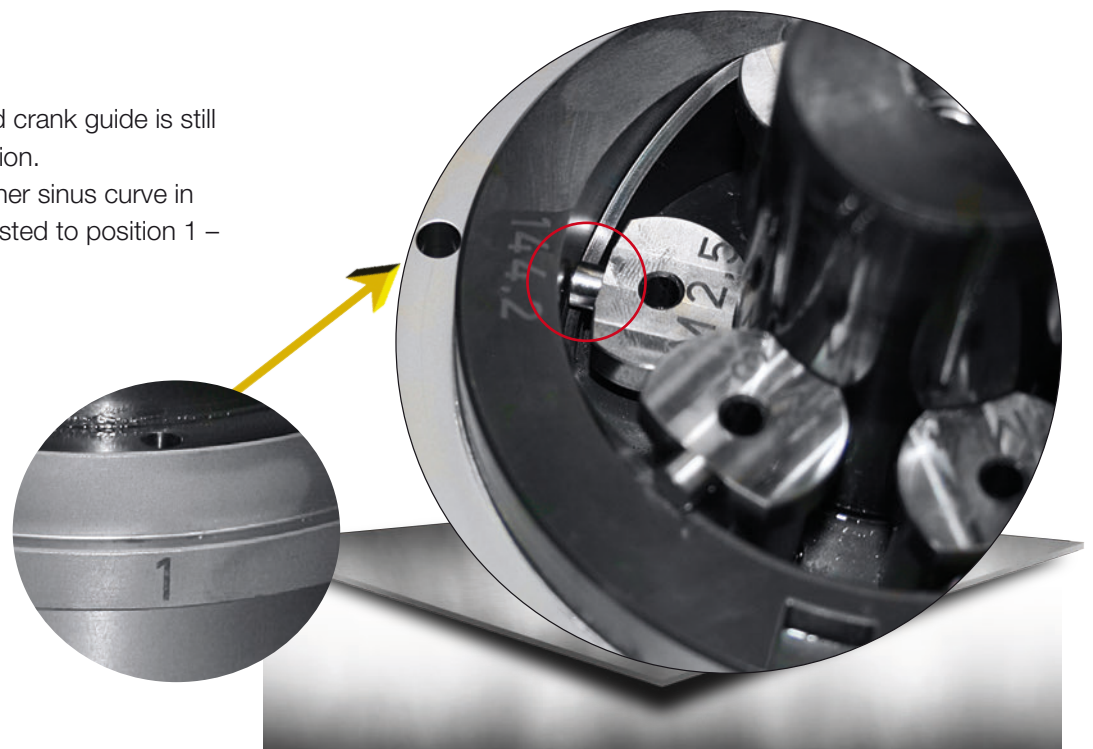
The thread module slips downwards and the gear-wheel meets the inner gear-wheel of the planetary gear.

You have to act with the remaining thread modules in the same way until all of them are mounted.



Check, if the pivot-mounted crank guide is still remaining on the right position.

The deepest point of the inner sinus curve in the crank ring has to be twisted to position 1 – see picture.





# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

Provide the central fixing screw with a special safety adhesive (i.e. Loctite 243) ...



... and re-assemble the head onto the guide.





# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

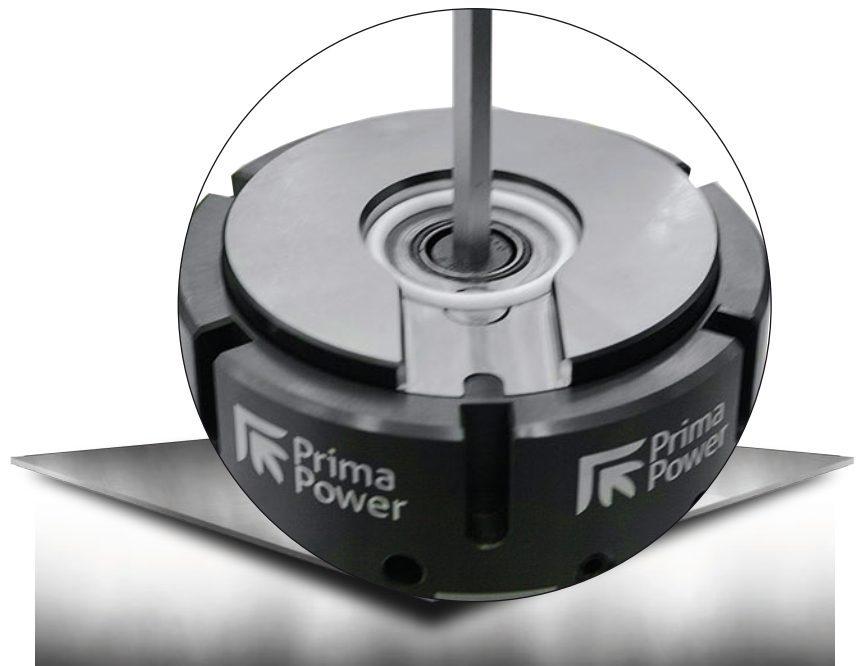
Make sure that the tooth connection is correctly clicked into place, otherwise mounting is not possible.

To be able to recognize if tooth connection is correctly assembled, you will have to check briefly the air space between head and guide. This gap should show a measure of about 0,3 mm.



Put the screw into the central fixing hole.

Now tighten the central fixing screw stoutly and take off the whole tool from the auxiliary mounting ring.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## F. REPLACEMENT OF THREAD MODULES

Plug the whole tool in the assembly fixture and tighten the central fixing screw with a torque of 70 Nm.

Check again the function of the tool (see chapter “Manual function check” – starts on page 16).



# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

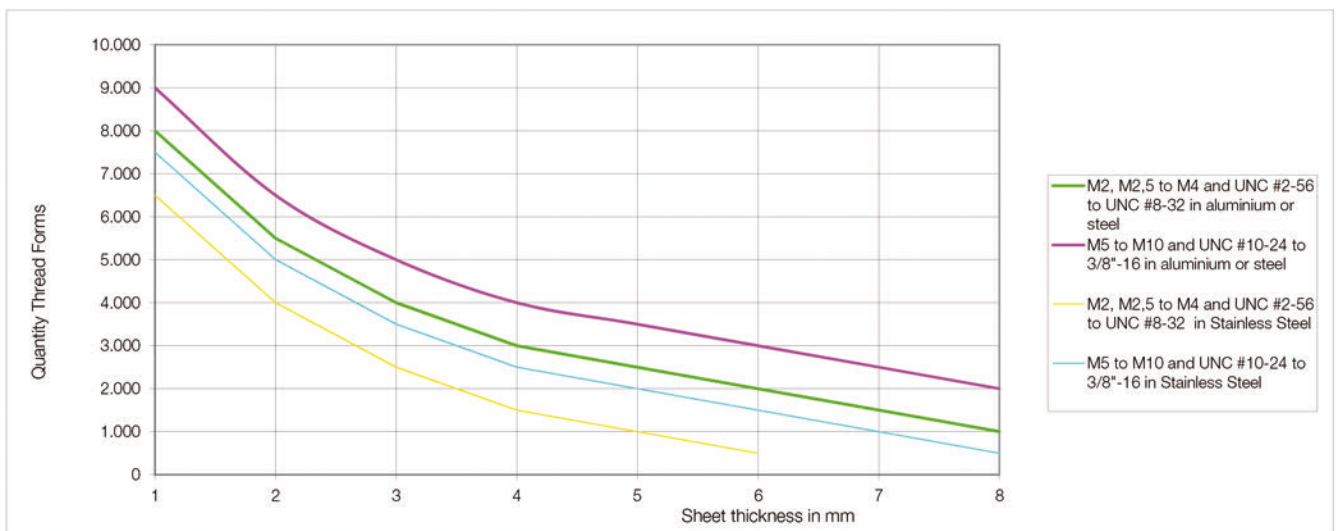
## G. TOOL MAINTENANCE

We advise to regularly making the below described tool services in the indicated periods or depending on the tool use frequency.

### Exchange of tap inserts:

#### Quantity Thread Forms

	sheet thickness in mm							
	1	2	3	4	5	6	7	8
M2, M2,5 to M4 and UNC #2-56 to UNC #8-32 in aluminium or steel	8.000	5.500	4.000	3.000	2.500	2.000	1.500	1.000
M5 to M10 and UNC #10-24 to 3/8"-16 in aluminium or steel	9.000	6.500	5.000	4.000	3.500	3.000	2.500	2.000
M2, M2,5 to M4 and UNC #2-56 to UNC #8-32 in Stainless Steel	6.500	4.000	2.500	1.500	1.000	500		
M5 to M10 and UNC #10-24 to 3/8"-16 in Stainless Steel	7.500	5.000	3.500	2.500	2.000	1.500	1.000	500



- greasing of the index station after 5.000 thread forming processes
- greasing of the tool with Molykote grease after 5.000 thread forming processes
- oil tank checking after 5.000 thread forming processes
- degrease and new greasing after 40.000 thread forming processes

# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## H. THREAD MODULE

Thread module consists of 5 individual parts.



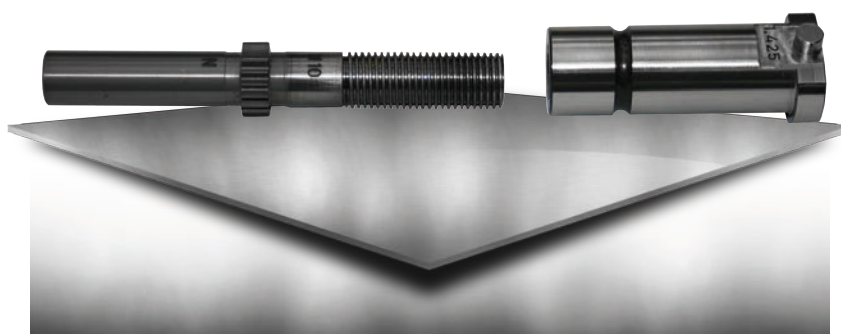
1. Leading screw    2. Screw    3. PU spring    4. Magnet    5. Leading spindle



Screw, PU spring and the magnet are components that are equal in each thread module. Leading screw nut, leading spindle and tap insert have ALWAYS to be mounted as a unit depending on the thread size. You will find the thread size marked on each component.

H

If a tap insert breaks and cannot be removed ahead by hand, you will have to turn down the leading screw nut from the leading spindle.



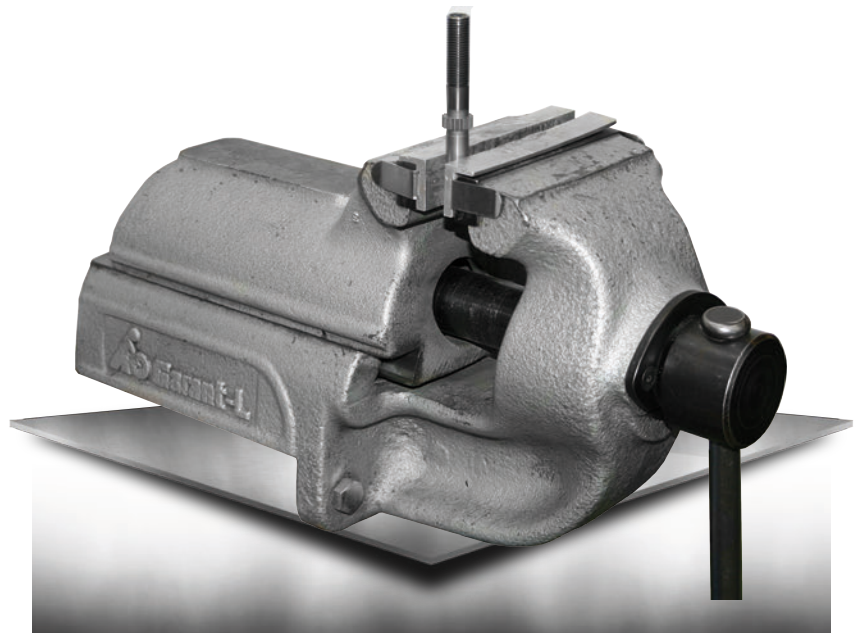
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## H. THREAD MODULE

Clamp the leading spindle at the below guide diameter into a bench vise with aluminum flanges.



Loose the screw by the help of a socket wrench SW = 4 mm.





# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## H. THREAD MODULE

Take off the leading spindle from the bench vise and softly knock the magnet upwards on a mild bottom chord (i.e. aluminium or wood).



Now, you may let fall out the broken shaft downwards.

When mounting please act in conversed sequences. Please take a special security adhesive for fixing the screw.

Assemble the whole tooling (see chapter "Replacement of thread modules" – starts on page 37).





# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

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SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## I. INTERFERENCE SHAPE

When programming pay attention on the interference shape of the tool.

PDF- and DXF-files for residual shape(s) are memorized on the USB-stick that is enclosed to the delivery.

As delivered, the tool is not equipped with the star-shaped stripper plate at the front side.

This PU stripper is needed for compensation of possible sheet deformations by pressing the sheet onto the die before the tap insert is forming through the sheet. In this case, take DXF-file "MT6\_TFi\_ishape" for programming.

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

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SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## J. LUBRICATION AT THREAD FORMING

Both, the guide surface in the tool and the tap insert are provided by the machine ram lubrication.

The lubrication with grease for the gear has to be done by hand. Please use the installed lubrication nipple on the tool – see chapter “Tool maintenance” – starts on page 49.

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

### 1. Machine - broken tap insert

The tap inserts are produced in high quality H-PM<sup>®</sup> steel, to be able to guarantee a very long tool life.

As these tools are however wear parts which are faced to strong torques and alternating loads, they should be exchanged regularly.

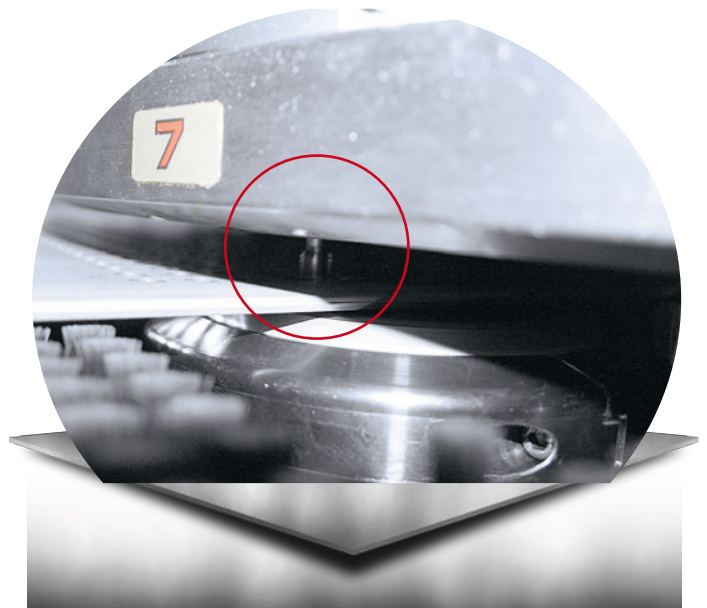
In chapter G (see page 49) we indicate the max. intervention time of the tap inserts depending on the size of the thread formed sheet material.

It could certainly happen, that a tap insert could break untimely. Also, special troubles (wrong pre-punch diameter / no pre-punch hole / sheet deformation etc.) could lead to a burst of the tap insert while working.

Typically, the front part of the tap insert sticks in the sheet and the shaft of the tap insert is settled in the thread module.



But it could be also, that the broken tap insert sticks in the sheet.



K

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

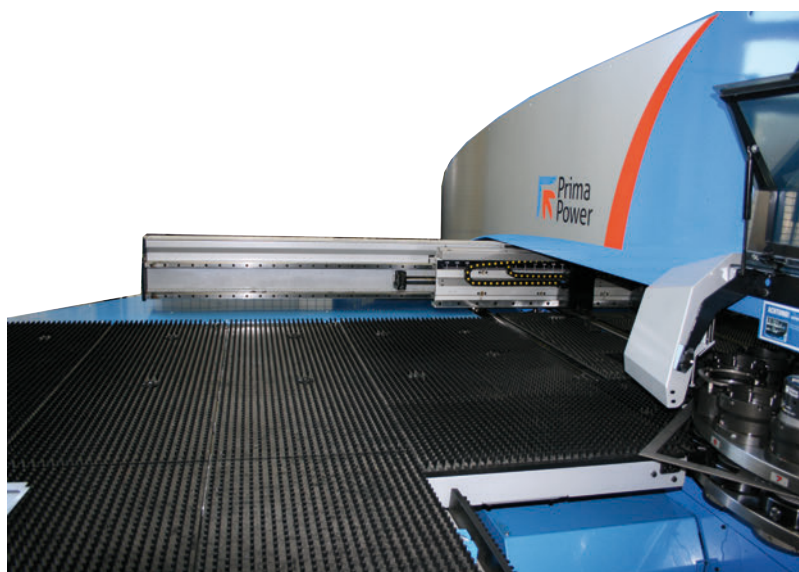
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Then it is important to open the clamps before you turn the turret together with the sheet to the changing position.



We recommend using the following method:

Stop the machine by reducing the speed rate to 0.



# ps:®multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

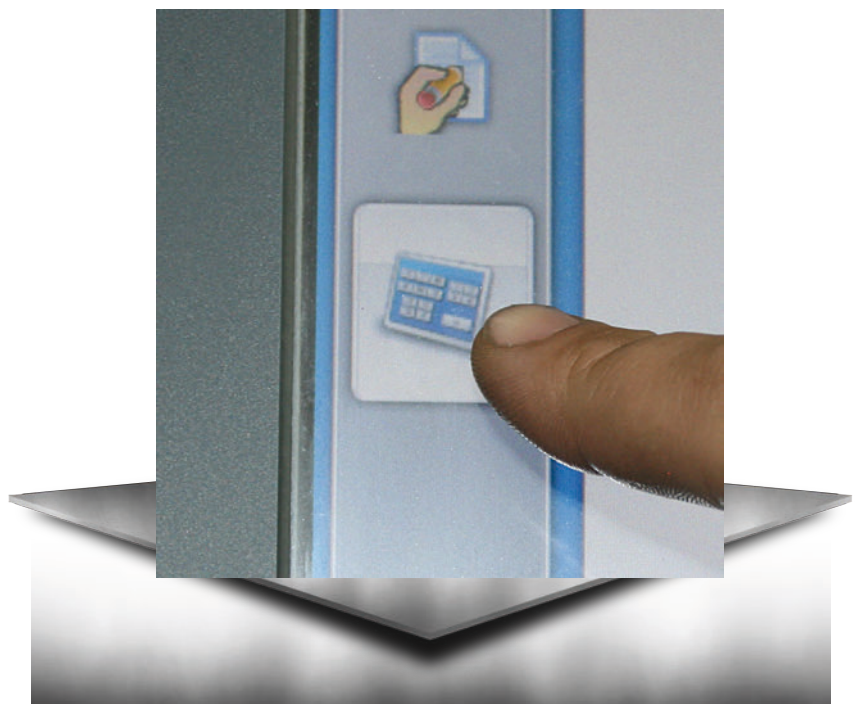
SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Switch to manual operation.



Press the button "control table".



K

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS

**up to s = 8 mm**

## K. ASSISTANCE

Activate the Disable X pin function.



Open the clamps.





# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Choose the axis which you want to move back (typically axis Y).



Press the Y+ button to move the clamps backwards. Increase the speed rate slowly during this process.



K

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

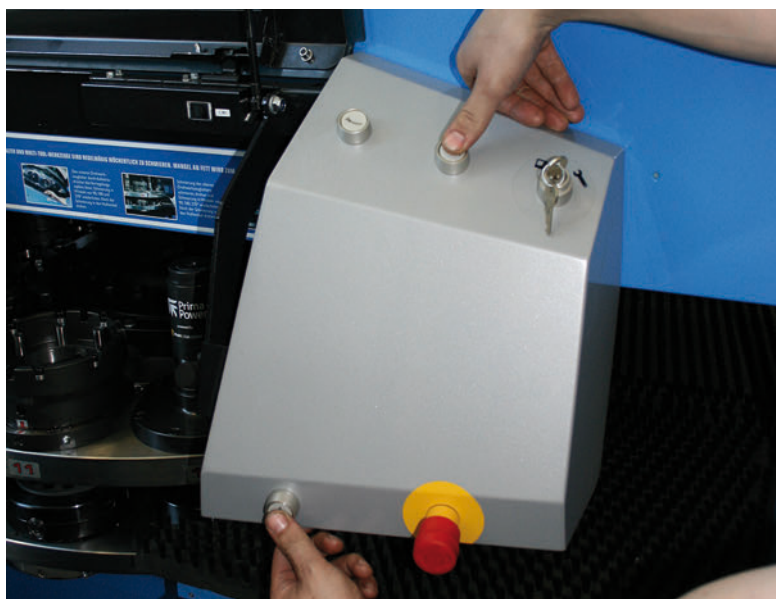
SHEET QUALITY **all sheet materials**

SHEET THICKNESS

**up to s = 8 mm**

## K. ASSISTANCE

Turn the turret to the changing position.



Take out the tool from the turret.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

You can see the broken part of the tap insert in the sheet.



We recommend using the following method:

Take out the broken tap insert from the sheet.  
If necessary, use tongs.



K

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

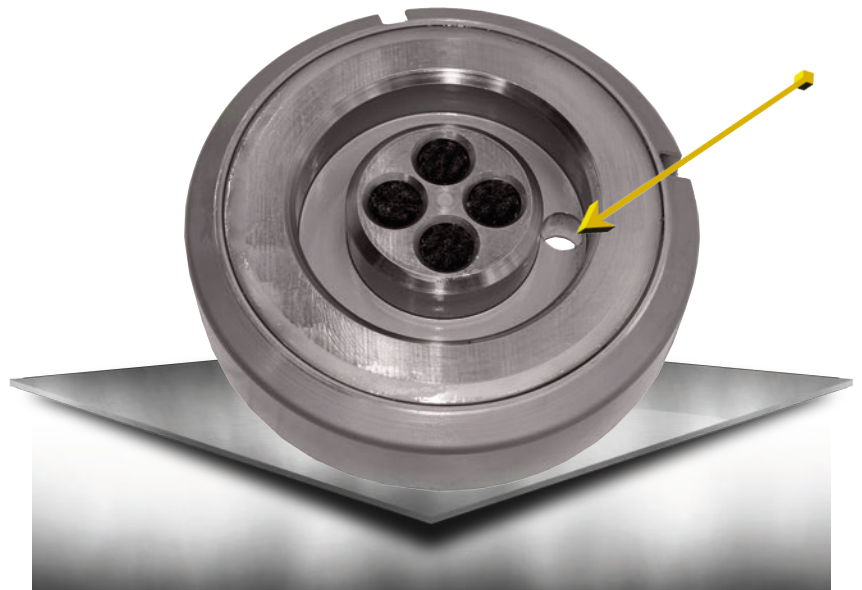
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

The die has a through-hole that allows to depollute the broken tap insert (if necessary) downwards into the waste disposal chute and so to remove the sheet plate.



If a rest of the broken tap insert shank is remaining in the module and it is not possible to take it out by hand, please disassemble the module as described in chapter F (see chapter “Replacement of thread modules” – starts on page 37). How to remove the broken tap insert shank from the module, you can read in chapter H (see chapter “Thread module” – starts on page 50).



# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

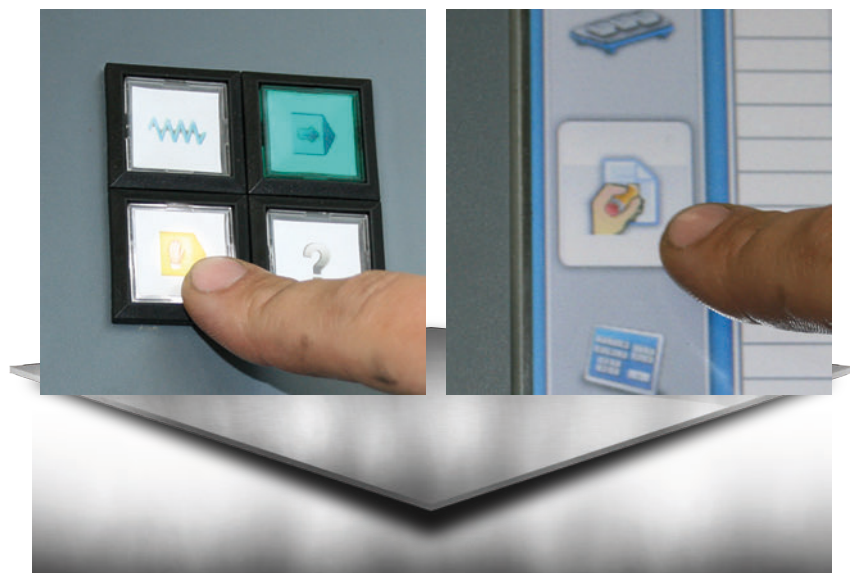
## K. ASSISTANCE

### 2. Machine - light beam, emergency stop button and other interruptions

If there is an interruption during the threatening process, it is important to turn back the tool with program "THREAD\_OUT". This makes sure that the tool turns back to the right length and also to the right basis angle.

Please use the following method:

Press the MDA button on the keyboard and afterwards at the screen.





# ps:®multi-thread® (MT6-TFi)

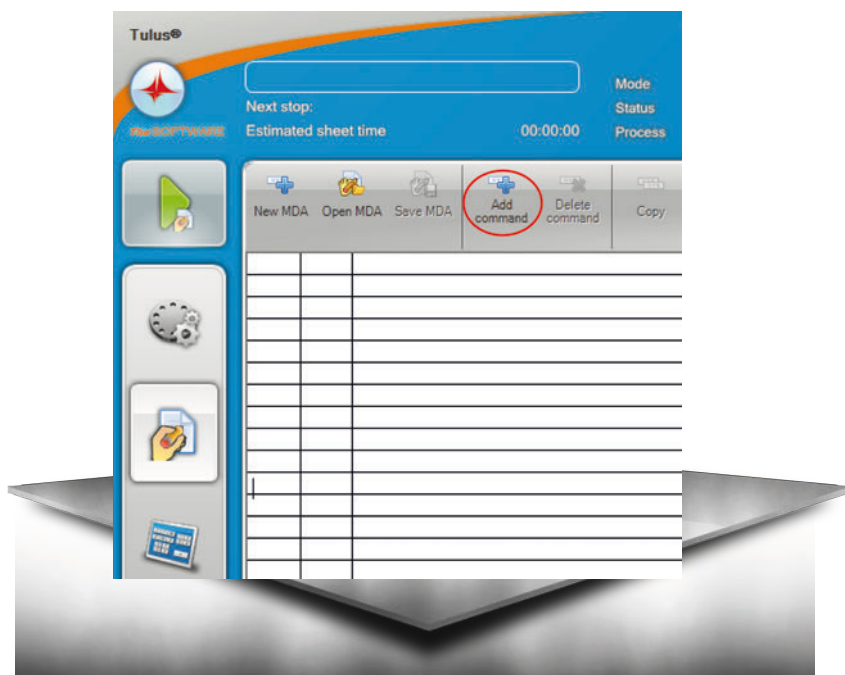
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

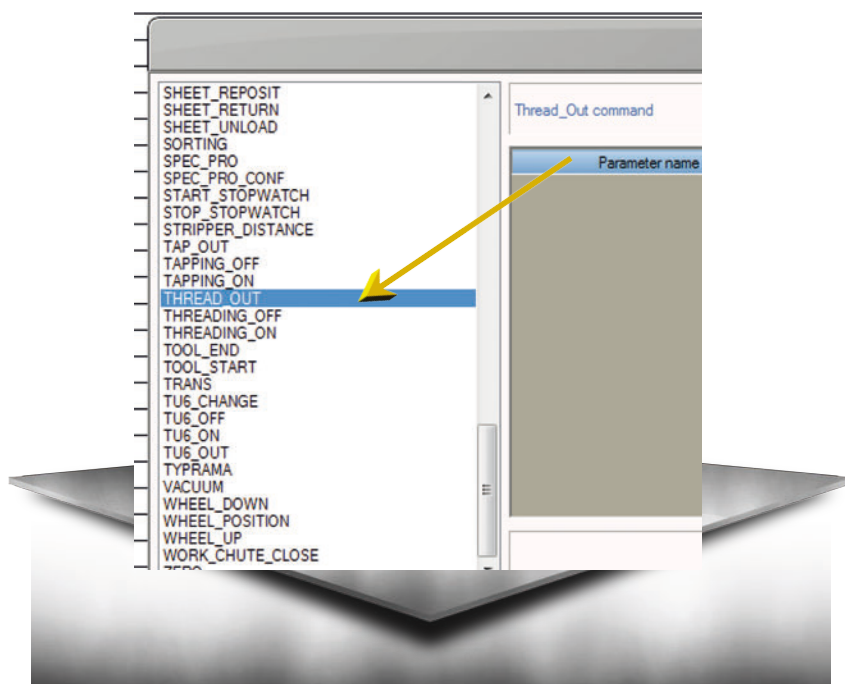
SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Press the “add command” button.



Choose “THREAD\_OUT” from the list.



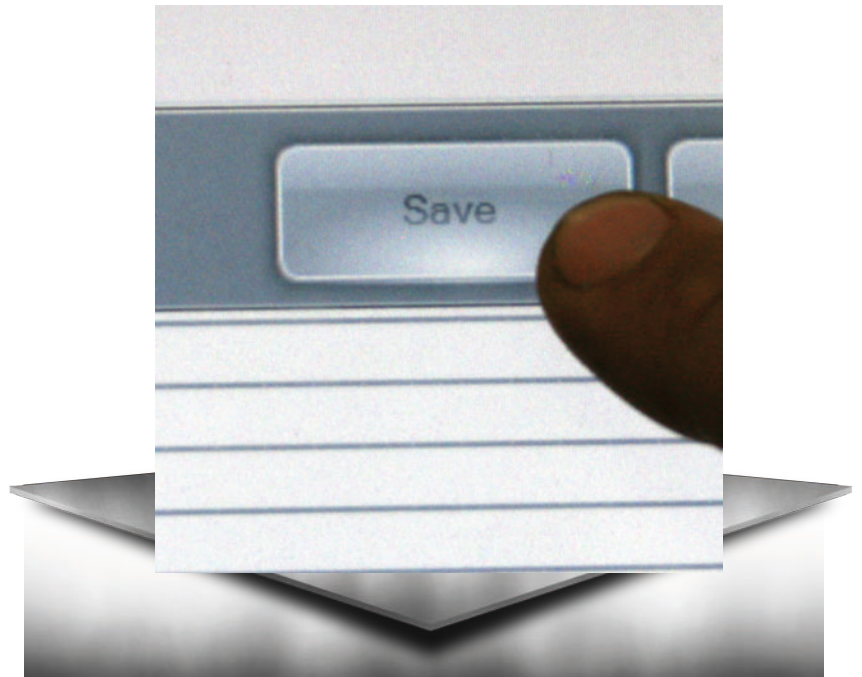
# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Finally, press "Save".



Reduce the speed to approx. 5 %.  
Then press the START button.



ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

3. Machine - damaged gear wheel

The gear drive (inner gear wheel and modules with gear) are wear parts. After a long use (i.e. 200.000 threads), it could be necessary to change these parts. Of course there could be also a damage in the gear drive after a wrong use (no or wrong pre punch hole, or wrong parameters in the program). We recommend to have always the following spare parts on stock to make sure there is no long pause in your production.

THREAD MODULES - COMPLETE (WITHOUT TAP INSERTS)		PART-NO.
Type 38	for tap inserts M2	451610020
Type 43	for tap inserts M2,5 and UNC #2-56	451610025
Type 48	for tap inserts M3 and UNC #3-48	451610030
Type 61	for tap inserts UNC #4-40 and UNC #5-40	451610037
Type 67	for tap inserts M4	451610040
Type 76	for tap inserts M5 and UNC #6-32 and UNC #8-32	451610050
Type 95	for tap inserts M6 and UNC #10-24 and UNC #12-24	451610060
Type 119	for tap inserts M8 and UNC 1/4"-20	451610080
Type 134	for tap inserts UNC 5/16"-18	451610087
Type 143	for tap inserts M10 and UNC 3/8"-16	451610100
TAP INSERTS		PART-NO.
M2		924GF1492
M2,5		924GF1401
M3		924GF1402
M4		924GF1404
M5		924GF1405
M6		924GF2401
M8		924GF2402
M10		924GF2403
UNC #2-56		924GFUC05
UNC #3-48		924GFUC10
UNC #4-40		924GFUC15
UNC #5-40		924GFUC20
UNC #6-32		924GFUC25
UNC #8-32		924GFUC30
UNC #10-24		924GFUC35
UNC #12-24		924GFUC40
UNC 1/4"-20		924GFUC45
UNC 5/16"-18		924GFUC50
UNC 3/8"-16		924GFUC55
SPARE PARTS		PART-NO.
Gear wheel incl. key wedge + locking ring		451601120

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

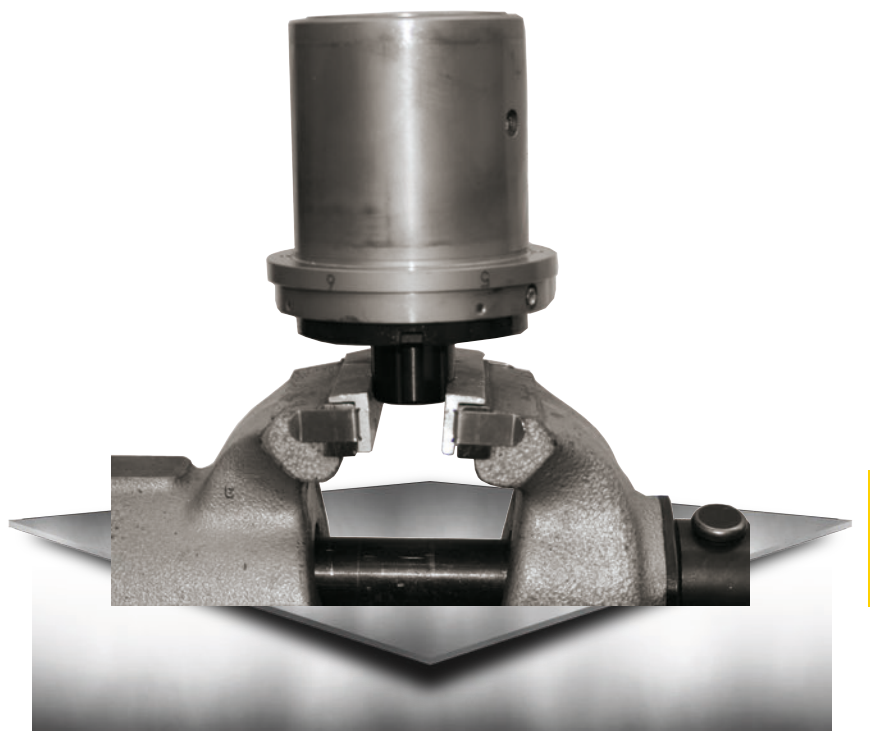
## K. ASSISTANCE

Please use the following method for changing the inner gear wheel.

Take out all thread modules as described in chapter F (see chapter “Replacement of thread modules” – starts on page 37) and take out the guide from the auxiliary mounting ring.



Clamp the magazine at the middle part into a bench vise with aluminum flanges as you see on the picture.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Loosen and take out the central screw.



Pull the guide upwards.

The pivot-mounted crank guide and the upper magazine remain in the bench vise. Guide and the lower magazine are in your hand.





# ps:® multi-thread® (MT6-TFi)

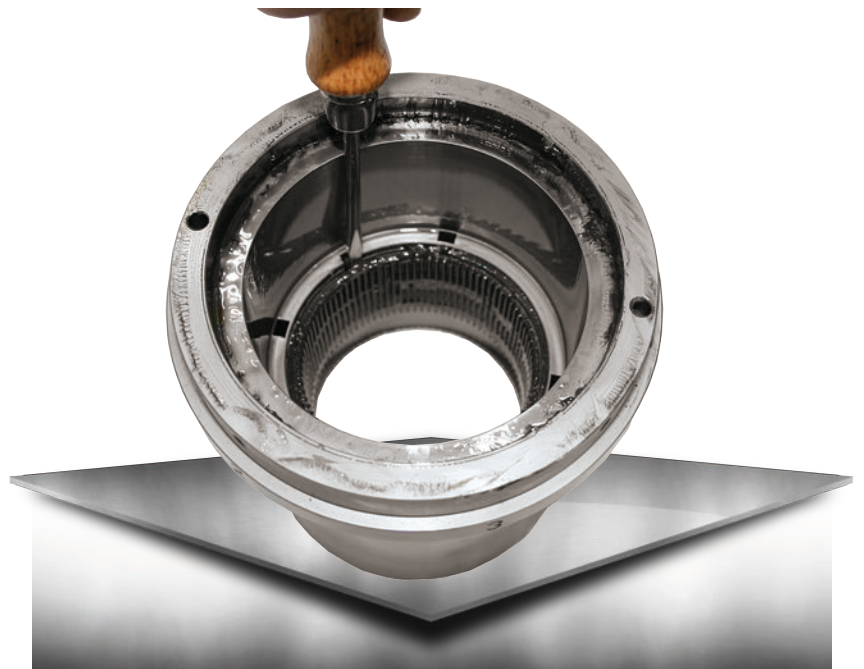
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

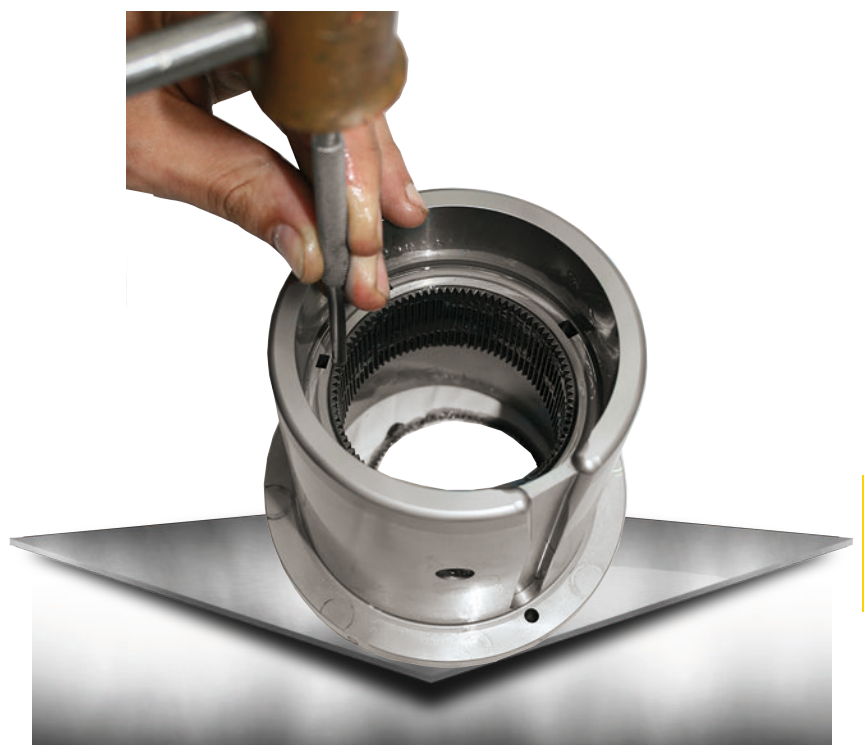
## K. ASSISTANCE

Take out the locking ring.

It is easier to take out the retaining ring, when you turn the open part from the ring to the axial square hole in the guide. Then, use a screw driver.



Put the guide headlong on a table and knock the ring out of the guide. Please do this carefully with soft knockings around the gear wheel.



K

# ps:®multi-thread® (MT6-TFi)

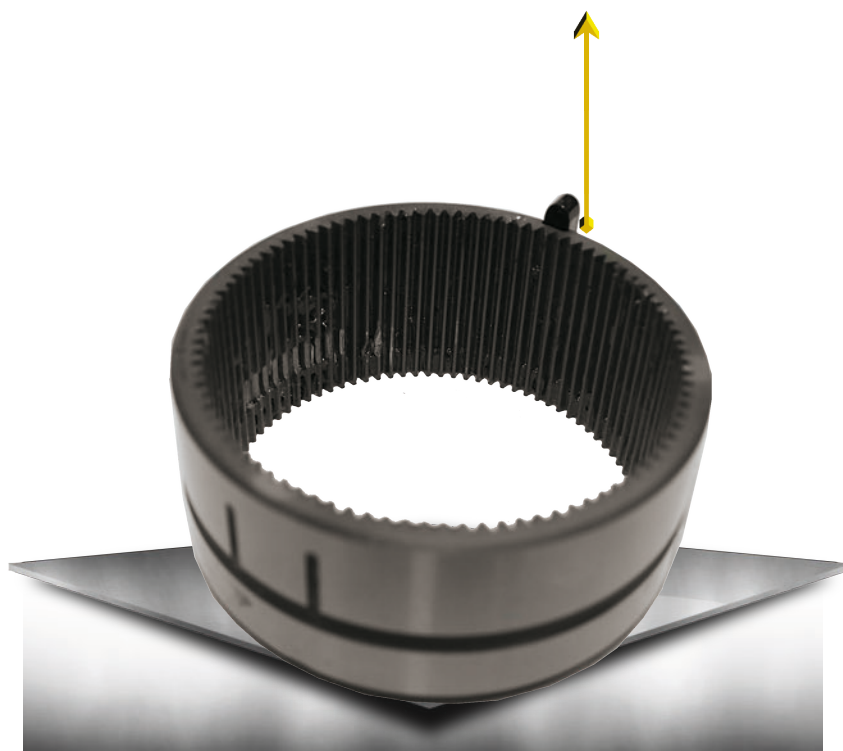
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Take out the wedge.



Clean the whole guide very accurately from broken parts and grease. Use cleaning cloth and pressure air for this work.



ps:® multi-thread® (MT6-TFi)  
 FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

K. ASSISTANCE

Oil the new gear wheel and assemble it together with a new wedge in the guide.



Assemble a new retaining ring and check that it fits properly.



K

# ps:® multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

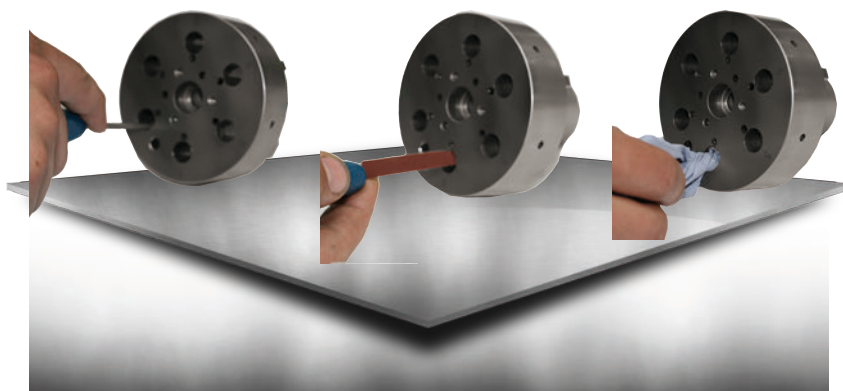
## K. ASSISTANCE

Grease the inner gear wheel with a lot of Molykote grease.



Clean both magazines accurately. Make a double check if there are damages on these parts (especially make a double check in the holes). Sometimes it could be that a broken tap insert made a damage in a hole.

If necessary, grind and polish the hole to make sure the module will not stuck in the hole.



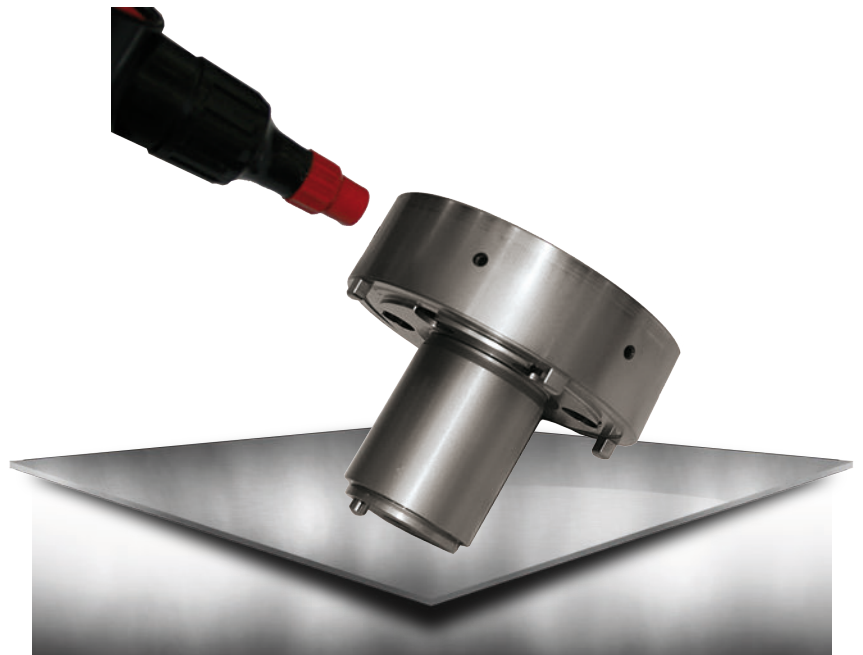
# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

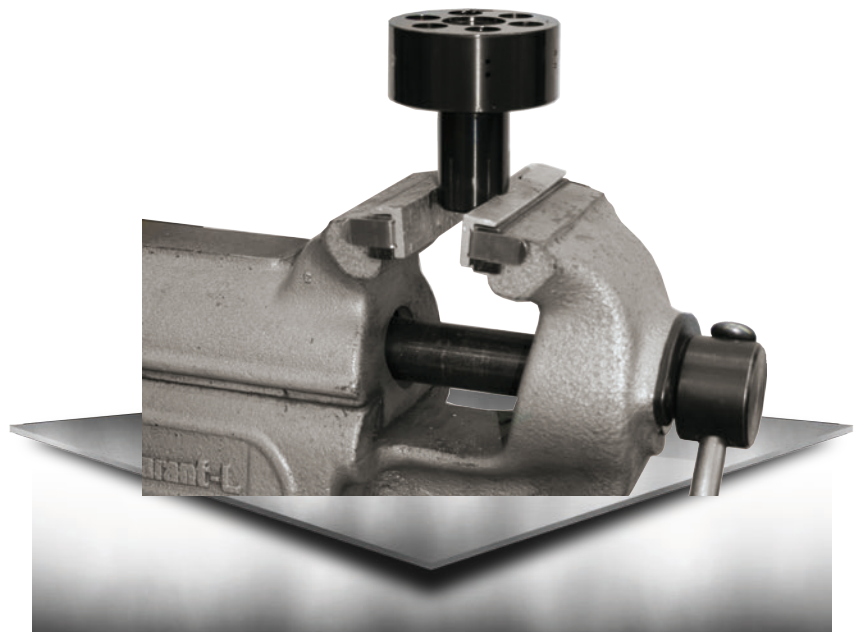
## K. ASSISTANCE

Oil the outside diameters of the magazines.



Assemble the lower magazine into the guide.

Make sure the pin-key-connection is correct.



K



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Put the guide in this magazine.



Assemble the lower magazine into the guide.  
Make sure the pin-key-connection is correct  
(see picture).



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

Assemble the center screw with a torque of 90 Nm (use special security adhesive for fixing the screw).



Take out the complete guide from the vice and put it in the auxiliary mounting ring to define the correct shape position.

Put the pivot-mounted crank guide back in the guide.



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials**

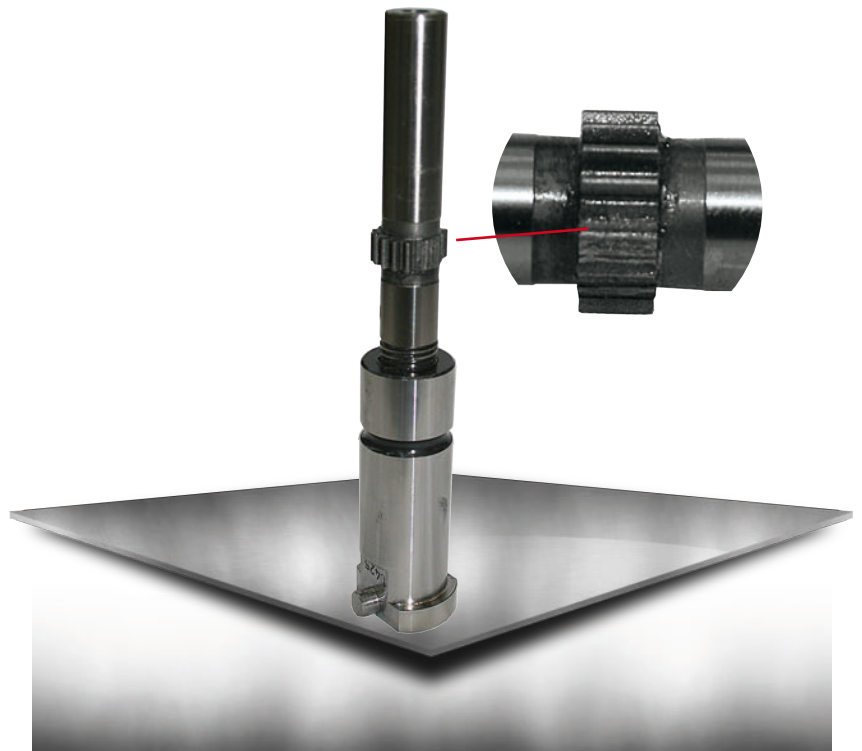
SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

After a gear wheel damage, the leading screws at the thread modules are typically also damaged. Check all used thread modules thoroughly.

In case the gears at the thread modules are still okay, it is very important to clean the whole module very accurate, because often there are very small broken parts from the broken gear wheel in the grease of the thread module.

Go further as described in chapter F (see chapter "Replacement of thread modules" – starts on page 37).



# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

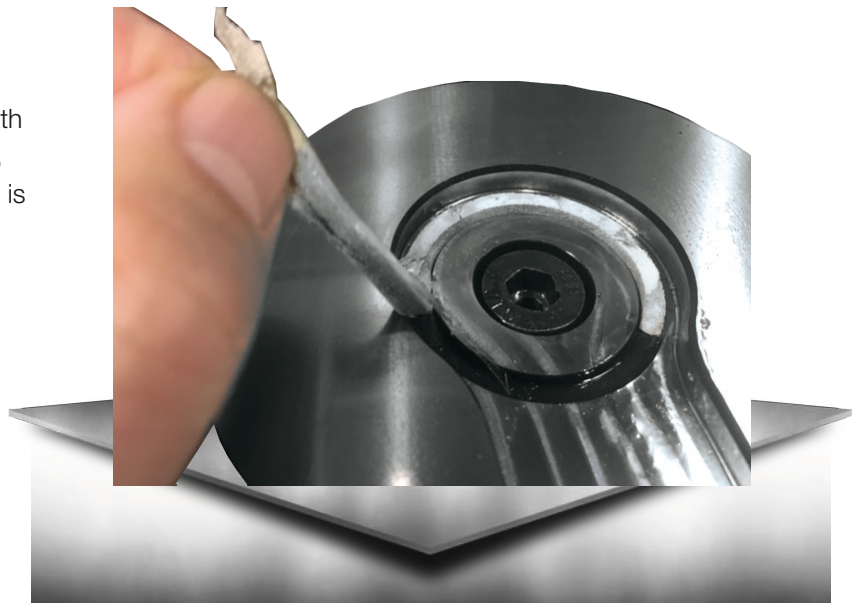
FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## K. ASSISTANCE

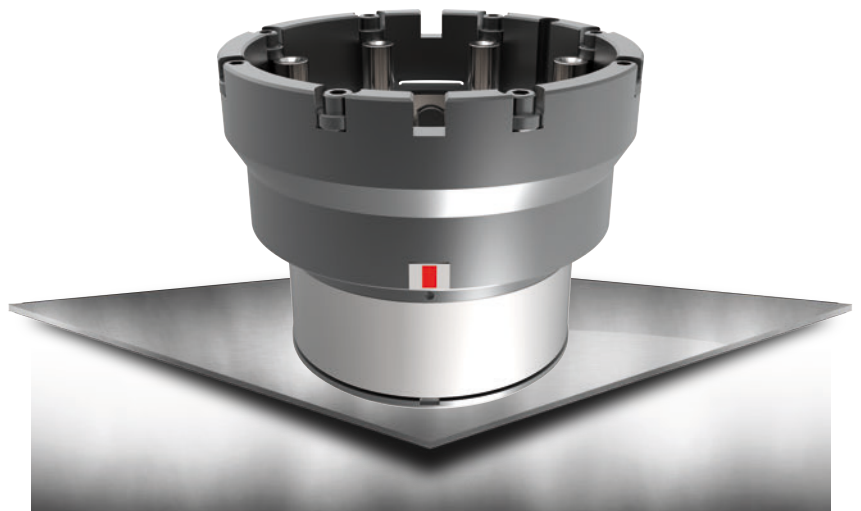
### 4. Machine - damage to the head sealing ring

If the head sealing ring is damaged, it must be replaced as quickly as possible to maintain the lubricating effect of the tapping tool. Together with the new head sealing ring (part-no. 919030024), the special glue (90 ml) required for this purpose is also available under part-no. ZHB005009.



### 5. Machine - punch adapter problem

If, after a certain time, the punch adapter no longer engages correctly in the zero position, we recommend that you use the hardened version of the punch adapter.



ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**L. SPARE PART LIST FOR ps:<sup>®</sup>multi-thread<sup>®</sup>ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) FOR PRIMA POWER MACHINE (6-STATION DROP-IN FOR Di-STATION)

DESCRIPTION	PIECES	PART-NO.	POSITION
Complete upper part (without tapping moduls)			
Upper head	1	451601010	8
Head sealing ring	1	919030024	20
Head screw	1	451601021	13
Head springs	6	916000036	17
Lower head incl. screws and pin	1	451601040	7
Sliding disk (A-MAX coated)	1	451601051	9
Head canister incl. screw and locking	1	451601060-PP	3
Wing plate - positive incl. ball-screws	1	451601070	10
Wing plate - negative	1	451601081	6
Upper module holder	1	451601091	4
Lower module holder	1	451601100	5
Guide without gear wheel	1	451601110	1
Gear wheel incl. key wedge + locking ring	1	451601120	2
Active PU-stripper	1	451601141	25
Complete upper part (without tapping moduls)	1	451601000-PP	

UPPER PART

ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi) FOR PRIMA POWER MACHINE (6-STATION DROP-IN FOR Di-STATION)

DESCRIPTION	PIECES	PART-NO.	POSITION
Bearing cup incl. brushes	1	451621010	2+5
Balls (for bearing)	54	922000050	1
Die incl. locking ring	1	451621020	4
Complete die	1	451621000	

LOWER PART

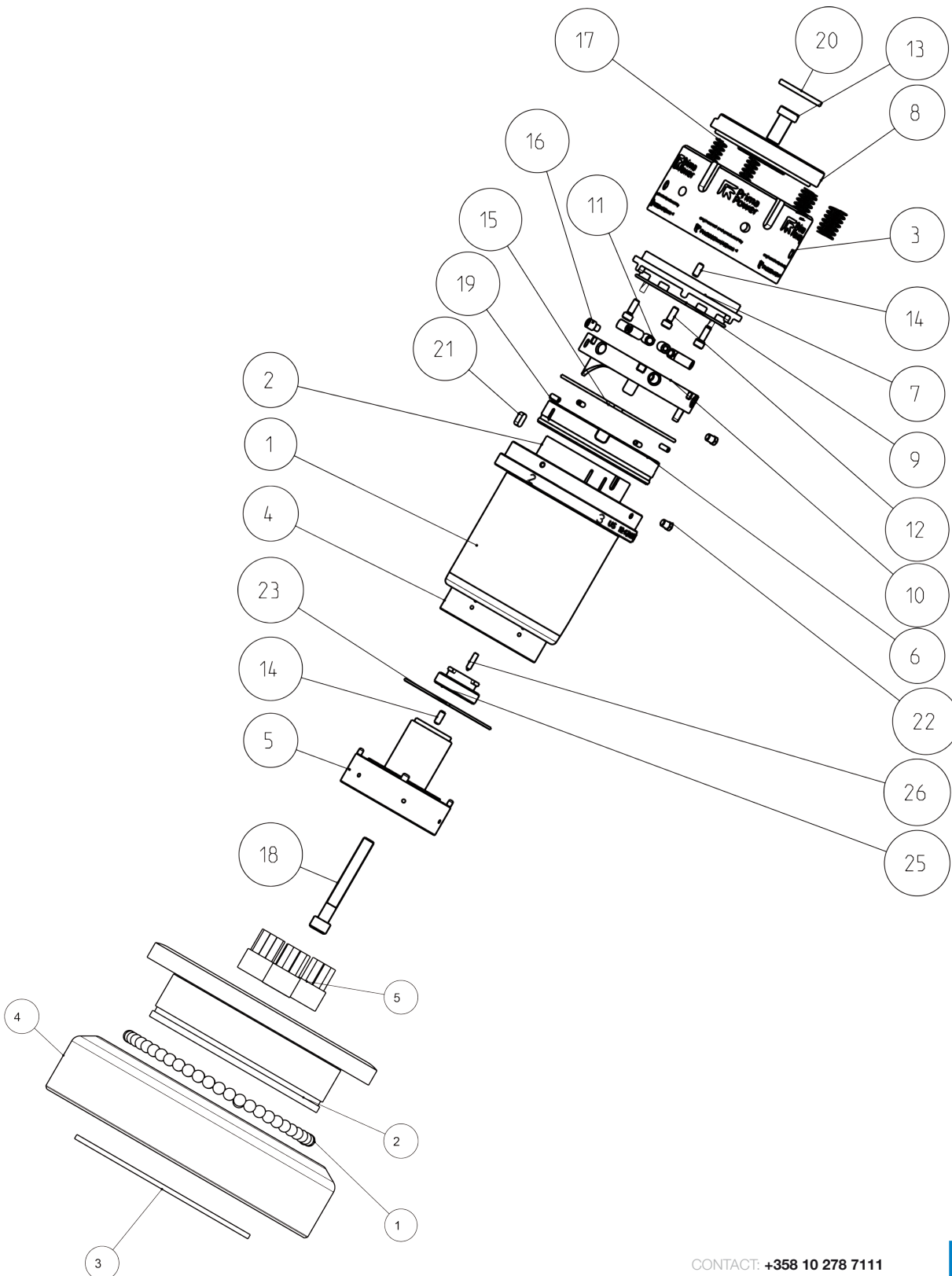


# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## L. SPARE PART LIST FOR ps:<sup>®</sup>multi-thread<sup>®</sup>



# ps:®multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

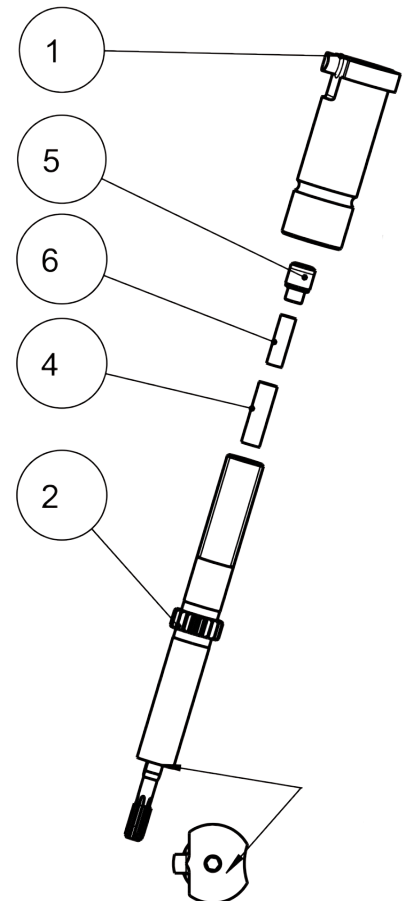
## L. SPARE PART LIST FOR ps:®multi-thread®

### TAPPING MODULES

TYPE	DESCRIPTION	PART-NO.
Type 38	for tap inserts M2	451610020
Type 43	for tap inserts M2,5 and UNC #2-56	451610025
Type 48	for tap inserts M3 and UNC #3-48	451610030
Type 61	for tap inserts UNC #4-40 and UNC #5-40	451610037
Type 67	for tap inserts M4	451610040
Type 76	for tap inserts M5 and UNC #6-32 and UNC #8-32	451610050
Type 95	for tap inserts M6 and UNC #10-24 and UNC #12-24	451610060
Type 119	for tap inserts M8 and UNC 1/4"-20	451610080
Type 134	for tap inserts UNC 5/16"-18	451610087
Type 143	for tap inserts M10 and UNC 3/8"-16	451610100

### TAP INSERTS

TYPE	PART-NO.
M2	924GF1492
M2,5	924GF1401
M3	924GF1402
M4	924GF1404
M5	924GF1405
M6	924GF2401
M8	924GF2402
M10	924GF2403
UNC #2-56	924GFUC05
UNC #3-48	924GFUC10
UNC #4-40	924GFUC15
UNC #5-40	924GFUC20
UNC #6-32	924GFUC25
UNC #8-32	924GFUC30
UNC #10-24	924GFUC35
UNC #12-24	924GFUC40
UNC 1/4"-20	924GFUC45
UNC 5/16"-18	924GFUC50
UNC 3/8"-16	924GFUC55



# ps:®multi-thread® (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## L. SPARE PART LIST FOR ps:®multi-thread®

### ASSEMBLY AND MAINTENANCE KIT

DESCRIPTION	PIECES	PART-NO.
PASS assembly kit torque wrench with inserts and grease	1	499MONKIT
Grease gun	1	923000005
Molykote grease	1	923000002
Auxiliary assembling ring	1	451609991
Rig pin 6 mm	1	919030017
Socket wrench 4 mm	1	919030018
Torque wrench / grease gun / rig pin 6 mm	1	451603000
Auxiliary assembling ring / socket wrench 4 mm		
Molykote grease		



### ASSEMBLY AND MAINTENANCE KIT

DESCRIPTION	PIECES	UPPER PART AND DIE INCL. PART-NO.
Upper part and die + 6 thread modules (metric) + 6 tap inserts (5 pce / each size) + complete assembly and maintenance kit		451600000-PP

# ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

FOR MACHINE TYPE PRIMA POWER - STATION Di

SHEET QUALITY **all sheet materials** SHEET THICKNESS **up to s = 8 mm**

## L. SPARE PART LIST FOR ps:<sup>®</sup>multi-thread<sup>®</sup>

### UPPER GUIDE UNIT FOR Di-STATION - FULL HARDENED VERSION

DESCRIPTION	PIECES	PART-NO.	POS.
Di upper guide	1	454D01111	1
Di guide wedge	1	452410051	2
Di screw M5x12	2	904010	3
Di ejector	8	454D01121	4
Di spring (purchase from PP BeNeLux 053068)	8	916000039	5
Di shim	8	454D01116	6
Di screw M6x12	8	907012	7
Di locking ring SW120	1	908004120	8
Di sticker	1	452401012	9

Di upper guide unit (complete assembled)

454D01101

<b>PASS   STANZTECHNIK AG</b>		Dateiname: 454D01101	Revision: 0
		Maßstab: 1:2	Gewicht: 643 kg
		Werkstoff: 1.100 mm	
		Maschinentyp: SG6 / SP8	
		Di, upper	
		PASS Stanztechnik	
		LFN: 1419	
		Projekt:	wkz ID: 0
		Lager	Blatt: 1/3

Index	Änderung	Datum	Name
01	Beschreibung hinzugefügt	20.08.16	Li
02	Material / Fertigungsbezeichnung	21.08.16	Li

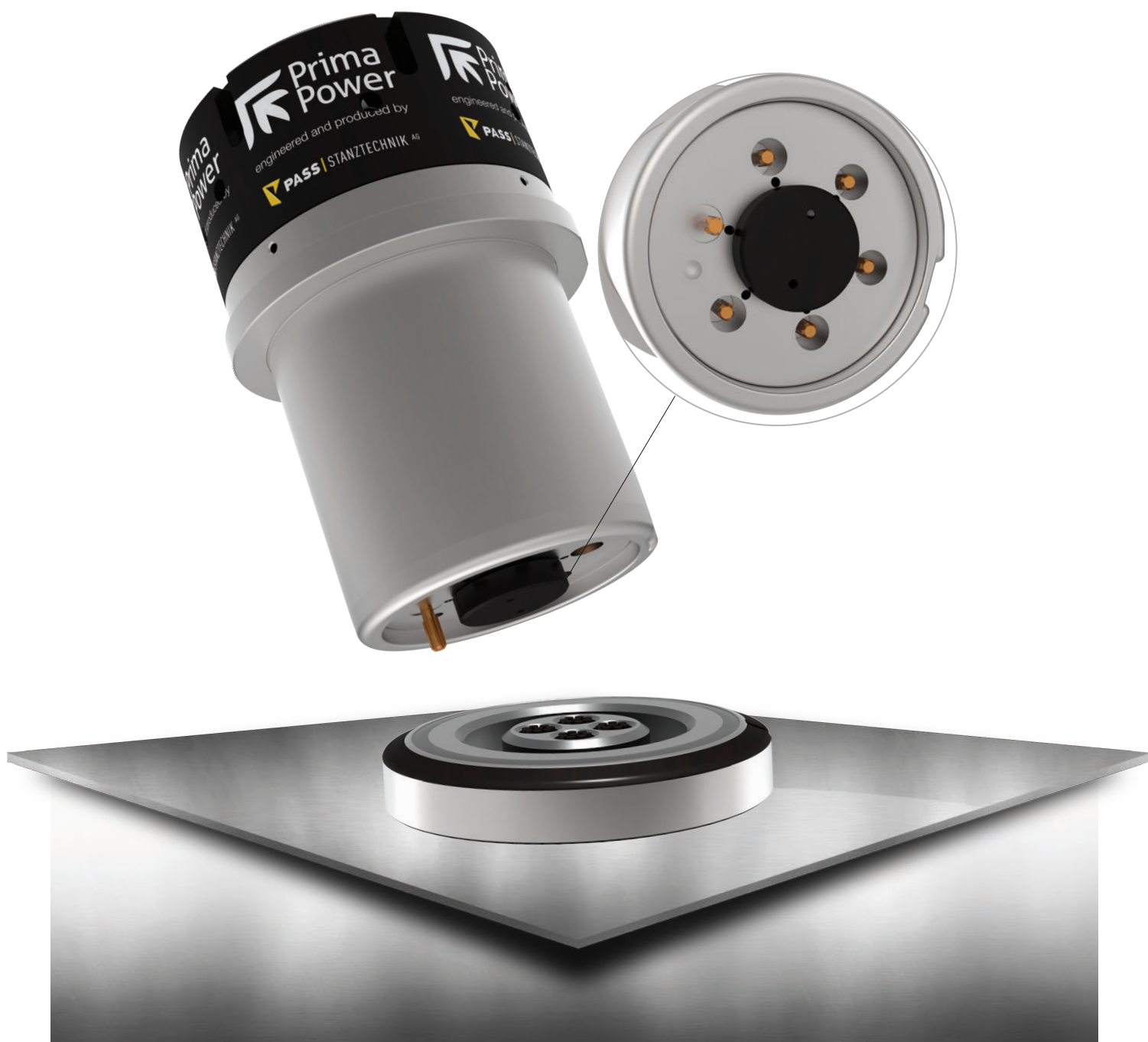
Allgemeintol.	Werkstoff
DIN ISO 2768-mS	-kanten DIN 6794
Datum	Name
Bear: 16.11.17	Deuerlein
Gepr.:	
Norm:	





# APPENDIX

SHORT MANUAL FOR ps:®multi-thread®



# SHORT MANUAL FOR ps:<sup>®</sup>multi-thread<sup>®</sup> (MT6-TFi)

## MANUAL FUNCTION CHECK BEFORE USING THE TOOL:



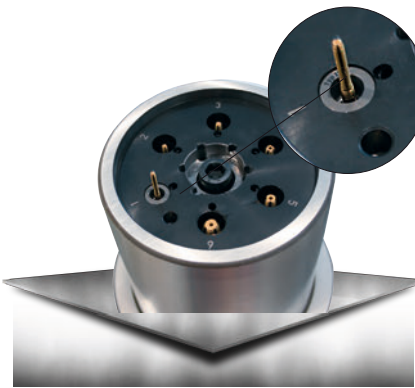
1. Check, if the central clamping screw is tightened with 70 Nm, especially when using the tool firstly.



2. Turn the head at least for 360° in steps by 60° as well in clockwise direction as also in counterclockwise direction. Each 60° step, the head should softly lock in place, but also unlatching should be easily.



3. Twist the marking "home position 1" to position 1 (see inscription at the guide range).



4. Fit each thread module with the provided tap insert (check the correct assignment of thread module to tap insert).



5. Check again the total length of the complete upper part ( $L = 209 \text{ mm} \pm 0,3 \text{ mm}$  measured from the head of inner shape to tap insert bottom).



6. Press down the guide (simulation of activating the tool within the machine) and stick the enclosed pin 6 mm (part-no. 919030017) into the provided drill hole of the head sleeve.



7. Fix the head sleeve and turn around the guide in counterclockwise direction for exactly 2,5 rotations. ALL tap inserts should rotate and move upwards. If this is not the case or if the guide is clamping, the tool has to be cleaned. The units have to be newly calibrated.



8. Afterwards turn back the guide in clockwise direction exactly for 2,5 rotations and extract the 6 mm pin.



9. Now, the coupling must lock in place again and the inner turret magazine has to feature a recess of 5,5 mm distance to the guide front. The inactive tap inserts are approx 3 mm behind the turret magazine, the active tap insert sticks up about 14 mm from the turret magazine.

10. Check the functionality of the die; it should work freely and cleanly.

## INTEGRATION IN THE TURRET:

1. Make sure that all tap inserts are mounted into the correct thread module and position.
2. Check again the correct length adjustment of the tool ( $209 \pm 0,3 \text{ mm}$ ).
3. Install the die in the provided index station.
4. Pump some grease into the grease nipples (top and bottom) on the tool:
  - 1 pump into the upper one and 4-5 pumps into the lower one.
5. Insert the tool into the turret position and make sure that position 1 points to the marking "home position 1".
6. Press the head plate downwards by hand for about 6 mm.
7. Open the turret screen inside Tulus and set the zero angle for the tool.

# SHORT MANUAL FOR ps:®multi-thread® (MT6-TFi)

## TOOL SETTINGS IN TULUS:

1. Select the tool station in Tulus in which the tool is installed.
2. ALWAYS register ALL effectively installed thread modules, even if those are not necessary for the current program.  
Defaults are: M2, M2,5, M3, M4, M5, M6, M8 and M10.
3. Please proceed as follows for each thread:
  - a. Enter the correct starting position of the tap insert.
  - b. Enter the correct pitch (see picture 1).
  - c. Enter the correct thread length (data on supplied USB-stick for optimized values!)
  - d. Enter the correct thread cutting speed (see picture 2).

①			②									
M	PITCH (MM)	PRE-PUNCH HOLE (MM)	UNC	PITCH (MM)	PRE-PUNCH HOLE (MM)	THREAD CUTTING SPEED IN RPM						
						ALUMINIUM UP TO T = 3 MM	ALUMINIUM OVER T = 3 MM	STEEL UP TO T = 3 MM	STEEL OVER T = 3 MM	STAINLESS STEEL UP TO T = 3 MM	STAINLESS STEEL OVER T = 3 MM	
2	0,4	1,8	#2-56	0,45	2,0	M2, M2,5 and UNC #2-56	1000	800	800	720	500	400
2,5	0,45	2,3	#3-48	0,53	2,3	M3 and UNC #3-48 and UNC #4-40 and UNC #5-40	1000	800	800	600	400	320
3	0,5	2,75	#4-40	0,64	2,55	M4 and UNC #6-32 and UNC #8-32	750	600	600	450	300	250
4	0,7	3,7	#5-40	0,64	2,9	M5 and UNC #10-24	600	500	500	360	250	200
5	0,8	4,7	#6-32	0,79	3,15	M6 and UNC #12-24 and UNC 1/4"-20	500	400	400	300	200	150
6	1	5,6	#8-32	0,79	3,8	M8 and UNC 5/16"-18	350	300	300	200	120	100
8	1,25	7,5	#10-24	1,06	4,35	M10 and UNC 3/8"-16	250	200	200	140	80	60
10	1,5	9,45	#12-24	1,06	5,0							
			1/4"-20	1,27	5,75							
			5/16"-18	1,41	7,3							
			3/8"-16	1,59	8,8							

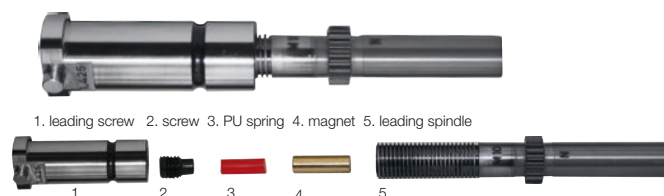
## IMPORTANT:

Pay attention on the right position of thread module to tap insert (M2,5 into type 43 / M3 into type 48 and so on).

Type 38	M2
Type 43	M2,5 and UNC #2-56
Type 48	M3 and UNC #3-48
Type 61	UNC #4-40 and UNC #5-40
Type 67	M4
Type 76	M5 and UNC #6-32 and UNC #8-32
Type 95	M6 and UNC #10-24 and UNC #12-24
Type 119	M8 and UNC 1/4"-20
Type 134	UNC 5/16"-18
Type 143	M10 and UNC 3/8"-16

## FURTHER ADVICE:

For further information on "Replacement of thread modules" please refer to Operation Manual (pages 37 - 48).



## WHAT TO DO WHEN THE TAP INSERT BREAKS:

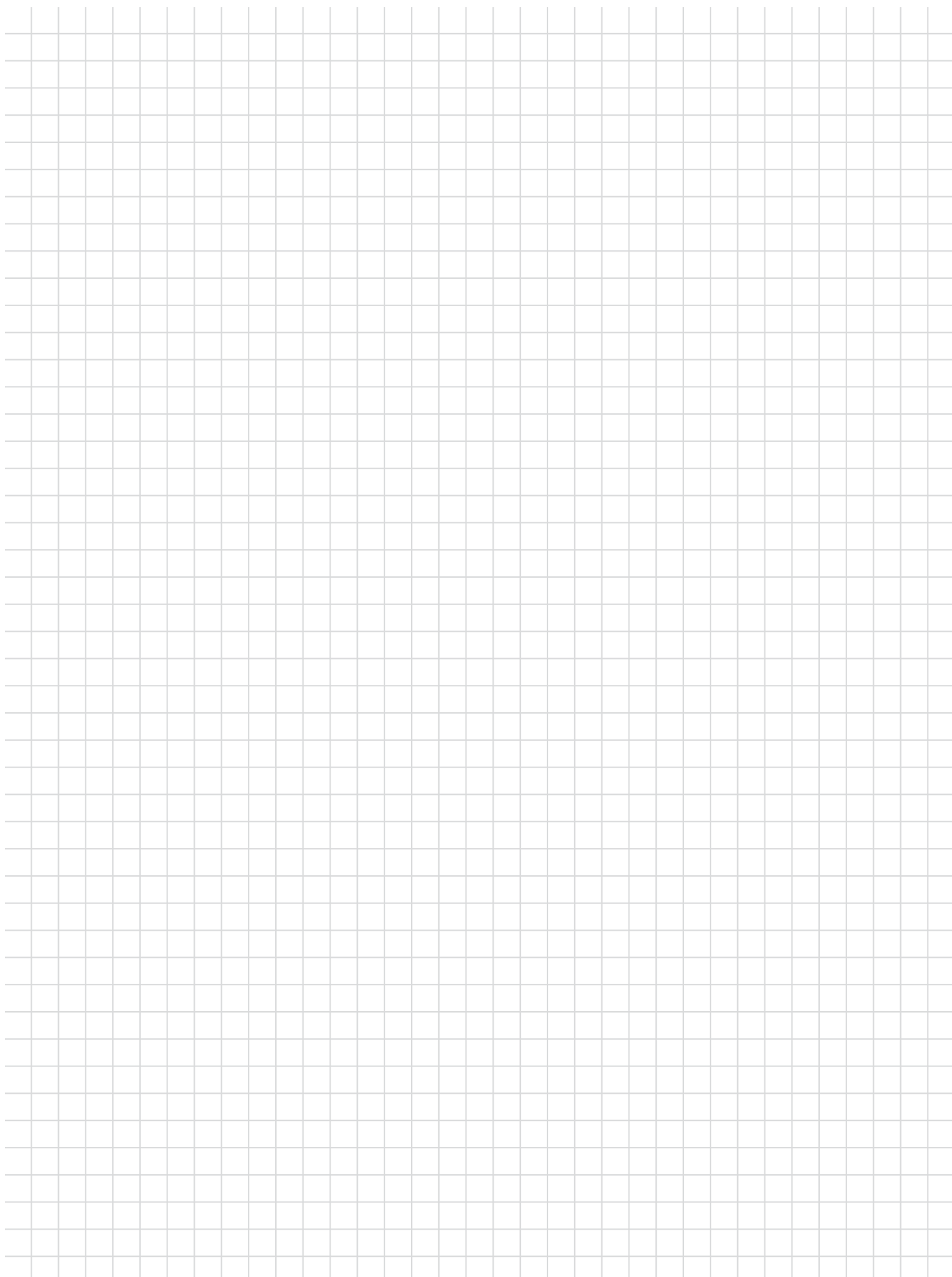
1. Press reset to stop the machine.
2. Switch to Jog mode.
3. Activate the Disable X pin function.
4. Open the clamps, this will only open the clamps and the X pin will not come up.
5. Move the carriage with open clamps slowly backwards in Y+ direction so the sheet is out of the clamps.
6. Now it is possible to turn ps:®multi-thread® to the tool change position.
7. Take out ps:®multi-thread®, check the broken tap insert and remove it.
8. Check the tap insert on condition and length as described above.
9. Try to find the cause why the tap has broken.



## WHAT TO DO WHEN THE SAFETY BEAMS ARE INTERRUPTED DURING TAPPING:

1. Press reset to stop the machine.
2. Re-activate the safety beams.
3. Switch to MDA mode.
4. Activate the program THREAD\_OUT and save it.
5. Reduce the speed to approx. 5 %.
6. Press the start button to run the THREAD\_OUT program. The index axis now moves to the zero position.
7. Use the restart function in Tulus to start again with the last thread before the interruption.

# NOTES



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