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TRAUB TNL 12.2

up to Machine No. 12520001

Tool holder Technical Information

Note on applicability

Illustrations in this publication may deviate from the product supplied. Errors and omissions due to technical progress expected.

A word on copyright

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Tool holder selection

For more information, please visit our iXshop
at ixshop.ixworld.com

We will be happy to send you an individual offer.
Just call us at +49 711 3191-9854 or
send us an email to werkzeughalter@index-werke.de.

Warranty

When using tool holders that are not adjusted, tested and marked as such by INDEX, the warranty for the tool drive is void.

Information on wear parts

Tool holders are wear parts requiring correct handling.
In order to ensure a long service life, compressed air or coolant must not enter the gap seals of the holders.

Inspection of live tool holders

Tool holders must be inspected at regular intervals (at least twice a year) for smooth running and play.

The drive pinion and drive clutch of the live tool holders must be subjected to a visual inspection for damage or wear.

If one of the above-mentioned defects is detected during the inspection of the tool holders, they must be returned immediately for preventive maintenance or repair to the following address:

INDEX-Werke GmbH & Co. KG
Plochinger Straße 92
D-73730 Esslingen
Fon +49 711 3191-554
werkzeughalter@index-werke.de

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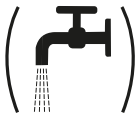
Tool holders with cooling lubricant supply

Tool holders marked with this symbol must be operated with cooling lubricant (no dry running permitted).

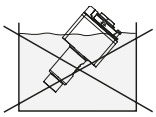


Tool holders marked with this symbol can be converted from external cooling lubricant supply to internal cooling lubricant supply.
Observe dry running capability of IC attachment!

Cooling lubricant filtering

When using live tool holders with internal cooling lubricant supply, it is necessary to use a cooling lubricant filter system with a retained particle size ≤ 50 µm.

Cleaning live tool holders



Live tool holders must never be immersed in cleaning fluid since mixing the cleaning fluid with the bearing grease will reduce the service life of the tool holders.

Speed ratio specifications on tool holders

The value to be programmed is specified in the documentation and on the live tool holders (= the input in the NC program).

$n_{prog} = n_{Tool} \times i$

n_{Tool} = speed at the cutting tool edge

n_{PROG} = speed to be programmed

i = speed ratio in the tool holder

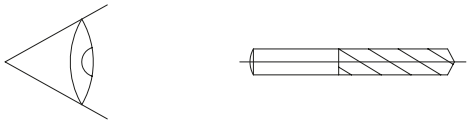
This means the speed increase or speed reduction is not specified as a fraction but as **a number**.

This gives speed **increase** ratios as numbers **less than 1**.
Example: i = 0.333 (corresponds to i = 1:3)
i = 0.676 (corresponds to i = 1:1.48)

Speed reduction ratios are numbers greater than 1.
Example: i = 2 (corresponds to i = 2:1)
i = 1.333 (corresponds to i = 4:3)

Direction of rotation specification

Definition of the viewing direction.
Viewing direction for determining the direction of rotation is always from behind (that is, from the drive direction) toward the shaft.



On the machine side, the direction of rotation has been set by parameters such that M03 always denotes clockwise rotation and M04 counter-clockwise rotation at the interface of the drive pinion of the tool holder.

The direction of rotation given on the holder therefore refers to a "change in direction within the holder". M03 and M04 are machine functions to be programmed.
The ↷ and ↶ arrows indicate the direction of rotation of the cutting edges.

This means:

↷ M03 ↶ M04

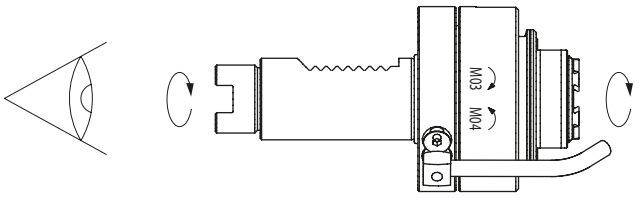
No reversal of direction of rotation
When the holder drive shaft has the **same** direction of rotation as the tool cutting edge, the clockwise direction of run must be specified by M03 (clockwise rotation). Accordingly, counter-clockwise rotation must be specified by M04.

↷ M04 ↶ M03

Reversal of direction of rotation
When the holder drive shaft has the **opposite** direction of rotation as the tool cutting edge, the clockwise direction of rotation must be specified by M04.
Accordingly, counter-clockwise rotation must be specified by M03.

Example

No reversal of direction of rotation



Tool turret

The TRAUB TNL 12.2 machine s equipped with one lower tool turret. An upper tool turret is available as an option.

The turret tools are driven by a motor and coupled by means of a central shaft co-axially through the turret disk.

The central lubrication supplies the tool holder pinion through the central shaft with lubricating oil.

Damaged sealing rings at the separation point between the tool holder and turret must be replaced immediately to prevent the ingress of dirt and chips.

Turret head

Each turret head has 6 tool stations for stationary and live tool holders.

Special features of the turrets:

- Orientation logic of turret indexing
- Use of the cutting circle as minimum retract position (minimum slide strokes)
- Optional tool drive
- Tool holders can be changed quickly and with high precision
- Use of double holders increases the number of tools mounted on a turret
- Tool cross section max. 12x12mm.
- The drive need not be switched off during turret indexing.
- The height of all live and non-live tool holders must only be adjusted on the tool holder.
- The tightening torque of the clamping screws for the tool holders is M_{max} = 6 Nm

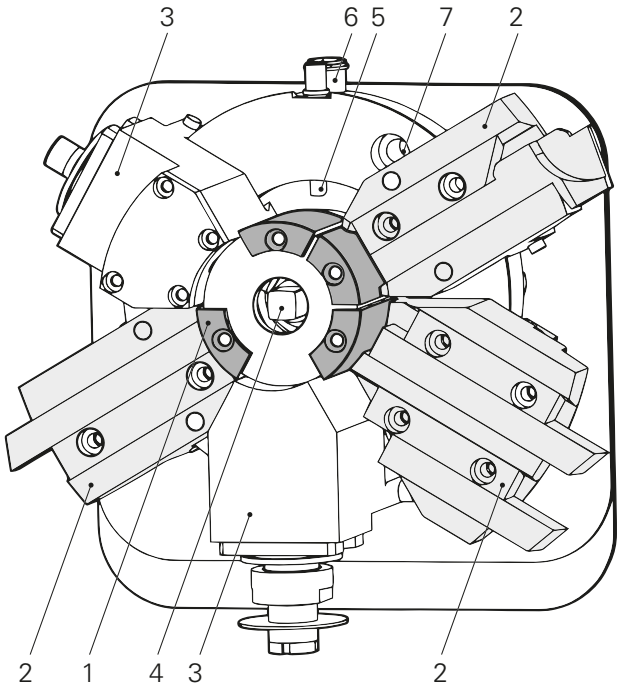
Attaching/detaching the tool holders to/from the tool turret

The work area of the machine must never be cleaned with compressed air, as there are guides, measuring systems, permanent magnets, labyrinths, and motors behind the cover panel, which can be destroyed by fine chips.

Chips and dirt must not enter into the inside of the turret head when tool holders are being replaced.

When using live tool holders, the locking segment 10297555 is removed.

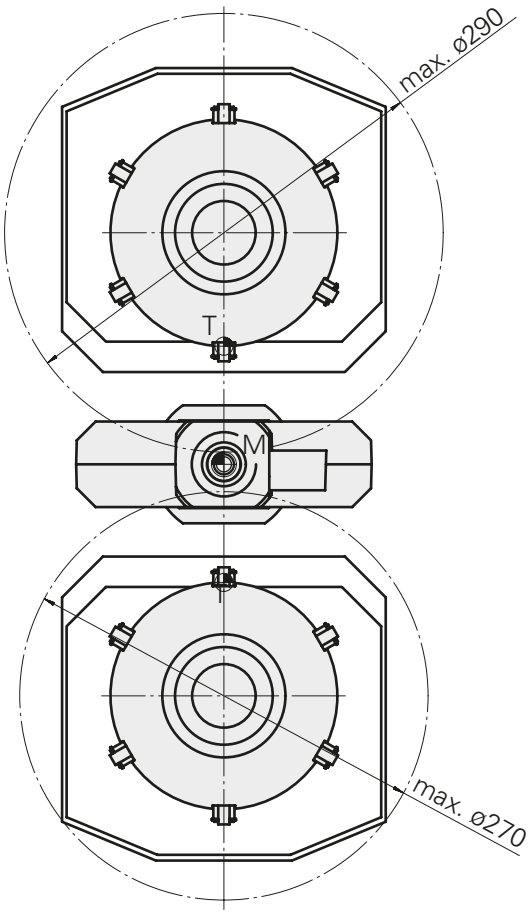
When using non-live tool holders, the locking segment 10297555 must be reattached to protect the central drive.



1 Locking segment 10297555 is included in the scope of delivery (6x)
2 Tool holder not live
3 Tool holder live
4 Central drive
5 Thrust pin (6x)
6 Clamping screw for tool holder (6x) M_{max} = 6 Nm
7 Clamping screw for turret disk (6x) M_{max} = 10 Nm

Cutting circle diameter

The maximum cutting circle diameters are different for the tool turrets (see schematic drawing). This must be taken into account when selecting and mounting the tools and tool holders.
The specifications in the TRAUB TNL 12.2 work area drawing are binding.
The dimensions of this drawing must be observed!

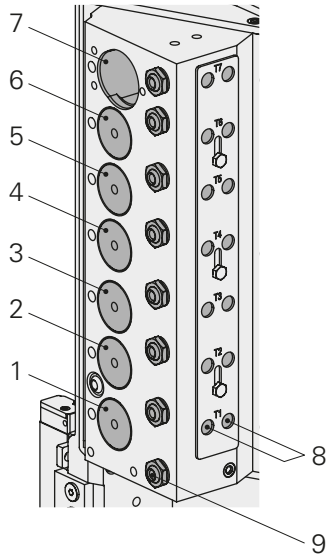


Collision hazard!
Note different dimensions of the cutting circle diameters.

Back working attachment

As standard, the machine is equipped with a back working attachment with an X axis for machining on the counter spindle.
Up to 7 D28 tools can be in use at the same time.
If station 7 is used for flushing out the workpiece, only 6 tools can be used.

Station	fixed	live	Speed	Internal cooling possible
7	Flushing tube for flushing out the workpiece	-	-	-
7	✔	-	-	-
6	✔	-	-	-
5	✔	-	-	120 bar (option)
4	✔	✔	12,000 rpm	120 / 200 bar (option)
3	✔	✔	9,000 rpm	-
2	✔	✔	9,000 rpm	-
1	✔	✔	12,000 rpm	120 bar (option)



1 - 7 Stations 1 - 7

8 Setscrew per station for tool holder clamping M_{max} = 7 Nm

9 External cooling per station

Tool mounting

There is external cooling at each tool mounting.
The tool holders are clamped with 2 setscrews.
The tightening torque of the set screws is M_{max} = 7 Nm.
The tools for the back and front working attachments are identical and interchangeable.

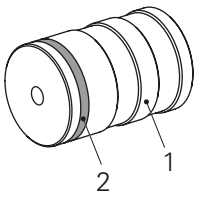
Installation/removal of the tool holders

When installing and removing the tool holders, clean the mounting shaft on the back working attachment and tool holder.

Blanking plugs

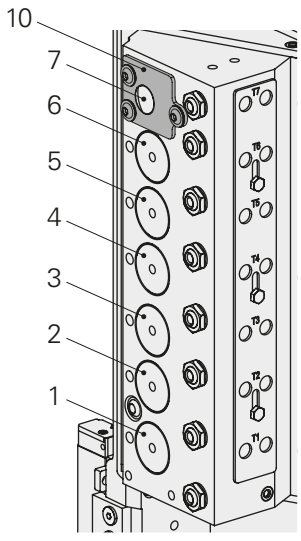
The machine may only be operated when all unused tool stations are closed with blanking plugs 10421704.
These are included in the accessories of the machine.

The sealing ring 10733048 on the blanking plug must be checked regularly for damage.
If necessary, replace damaged sealing ring (dia. 24x2)



1 Blanking plug 10421704
2 Sealing ring 10733048

Station 7 (workpiece flushing) must be closed with cover plate 12065669 when not in use.
The cover plate is included in the accessories of the machine.



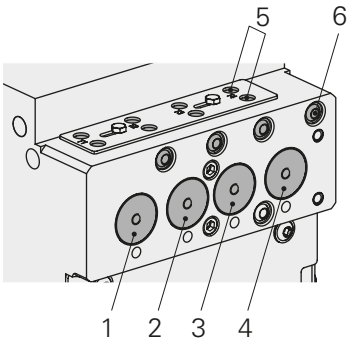
1 - 7 Stations 1 - 7

10 Cover plate

Front working attachment (option)

The machine is optionally equipped with a front working attachment with 4 stations for stationary or live tools with tool mounting D28.
Up to 4 D28 tools can be in use at the same time.

Station	fixed	live	Speed	Internal cooling possible
4	✔	✔	12,000 rpm	120 bar
4	✔	✔	12,000 rpm	at 200 bar (option) no internal cooling possible at station 3
3	✔		-	120 bar (option)
3		✔	9,000 rpm	-
2	✔		-	120 bar (option)
2		✔	9,000 rpm	-
1	✔	✔	12,000 rpm	120 bar (option)



1 - 4 Stations 1 - 4

5 Setscrew per station for tool holder clamping M_{max} = 7 Nm

6 External cooling per station

Tool mounting

There is external cooling at each tool mounting.
The tool holders are clamped with 2 setscrews.
The max. tightening torque of the setscrews is 7 Nm.
The tools for the back and front working attachments are identical and interchangeable.

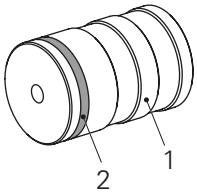
Installation/removal of the tool holders

When installing and removing the tool holders, clean the mounting shaft on the front working attachment and tool holder.

Blanking plugs

The machine may only be operated when all unused tool stations are closed with blanking plugs 10421704.
These are included in the accessories of the machine.

The sealing ring 10733048 on the blanking plug must be checked regularly for damage.
If necessary, replace damaged sealing ring (dia. 24x2)



1 Blanking plug 10421704
2 Sealing ring 10733048

Dry run with live tool holders

In setup and automatic mode, make sure that the seal on the tool holder is always wet with cooling lubricant at the cooling lubricant transfer.

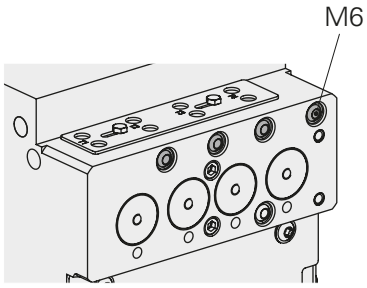
Tool holders may be operated in setup mode without cooling lubricant only for a short time. During this time, the leakage of the adding valves and the reserves in the supply line are used for lubrication.

For the front working attachment, all tool holders are live simultaneously by the overall drive. This will apply cooling lubricant briefly to the live tool holders that are not in use.

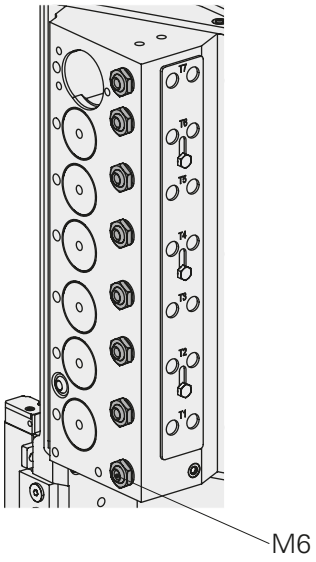
It is therefore recommended to remove the unused live tool holders and to close the tool holders with the blanking plugs.

External cooling lubricant supply for back and front working attachments

The external cooling lubricant for the back and front working attachments is used to support the cutting process and chip removal.
The tools of the back and front working attachments are supplied with cooling lubricant via the ball nozzles integrated in the housing. Threads (M6) are provided in the ball nozzles to close stations that are not required or to mount specially adapted feed tubes. Unnecessary cooling lubricant leakage must be avoided.



Front working attachment



Back working attachment

Internal cooling lubricant supply for back and front working units

Some stations can be operated either with internal cooling or external cooling. For this purpose, the cooling lubricant feeder or the cooling lubricant rotary feeder must be converted.

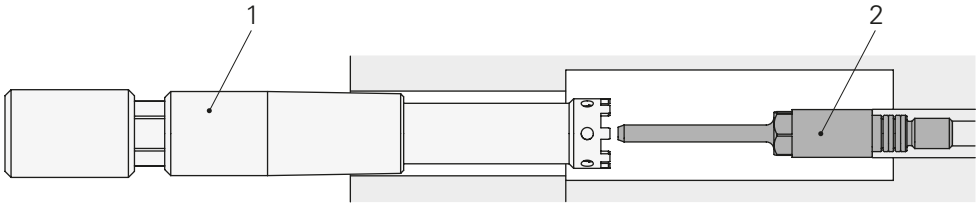
The internal cooling lubricant supply (IK) for rotary tools is provided by a cooling lubricant rotary feeder of up to 120 bar (exception: station 4 of the front working unit with 200 bar), for stationary tools by a cooling lubricant feeder.

Depending on the tool used, the appropriate feeder must be installed.

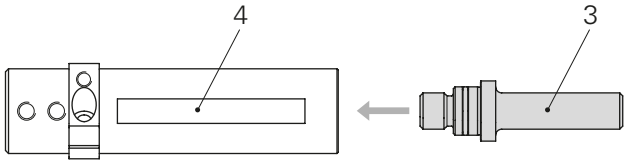
Internal cooling only when using a suitable tool holder on the corresponding station.

Cooling lubricant transfer internal cooling for stationary tools

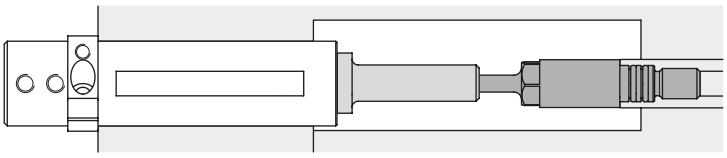
Install the cooling lubricant feeder in the back/front working units using the socket



Screw the tube into the stationary tool holder



Slide the assembled tool holder into the back/front working units

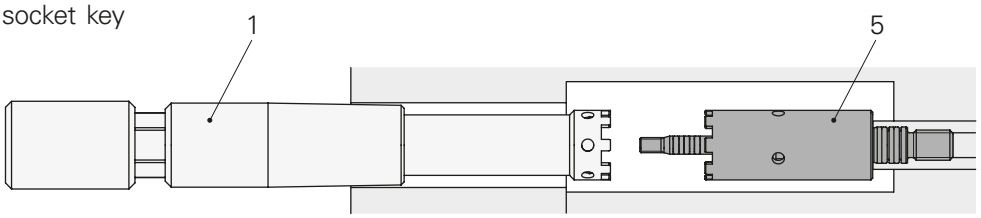


1 A socket key for rotary feeder is included in the machine accessories
2 A cooling lubricant feeder (IC) is included in the machine accessories
3 Tube *
4 Stationary tool holder

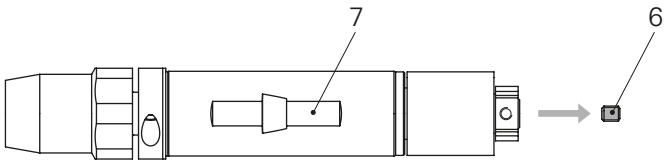
* You can find the part number of the respective tool holder in the accessories section of our iXshop at ixshop.ixworld.com

Cooling lubricant transfer, internal cooling for rotary tools

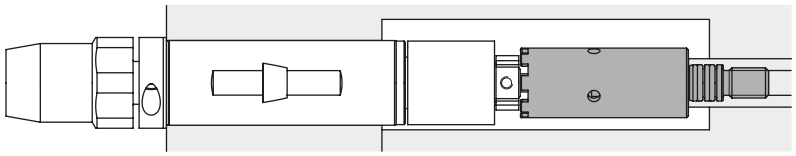
Install the cooling lubricant rotary feeder in the back/front working units using the socket key



Remove the setscrew from the tool holder



Slide the tool holder without the setscrew into the back/front working units



1 A socket key for rotary feeder is included in the machine accessories
5 Cooling lubricant rotary feeder (IC) *
6 Setscrew
7 Rotary tool holder

* You can find the part number of the respective tool holder in the accessories section of our iXshop at ixshop.ixworld.com

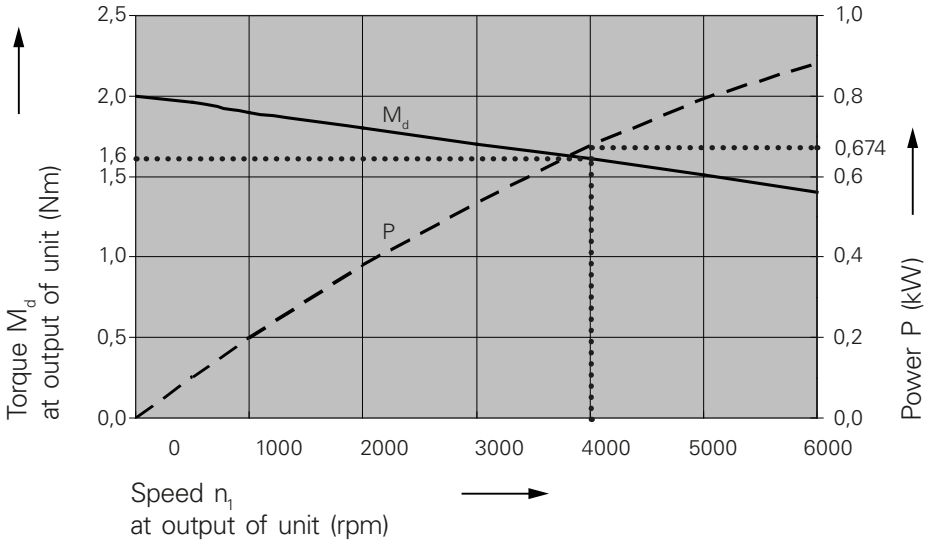
Notes on how to use the diagram when using tool holders

The diagram relates to the output speed **n** of the tool unit. The tool speed can be read directly from the diagram only if the internal speed ratio **i** in the tool holder is 1:1.

For tool holders with an internal speed ratio i ≠ 1, the output speed **n** of the tool unit to be programmed must be calculated from the required tool speed and the speed ratio i. Afterwards, the actual powers or torques can be read off or determined.

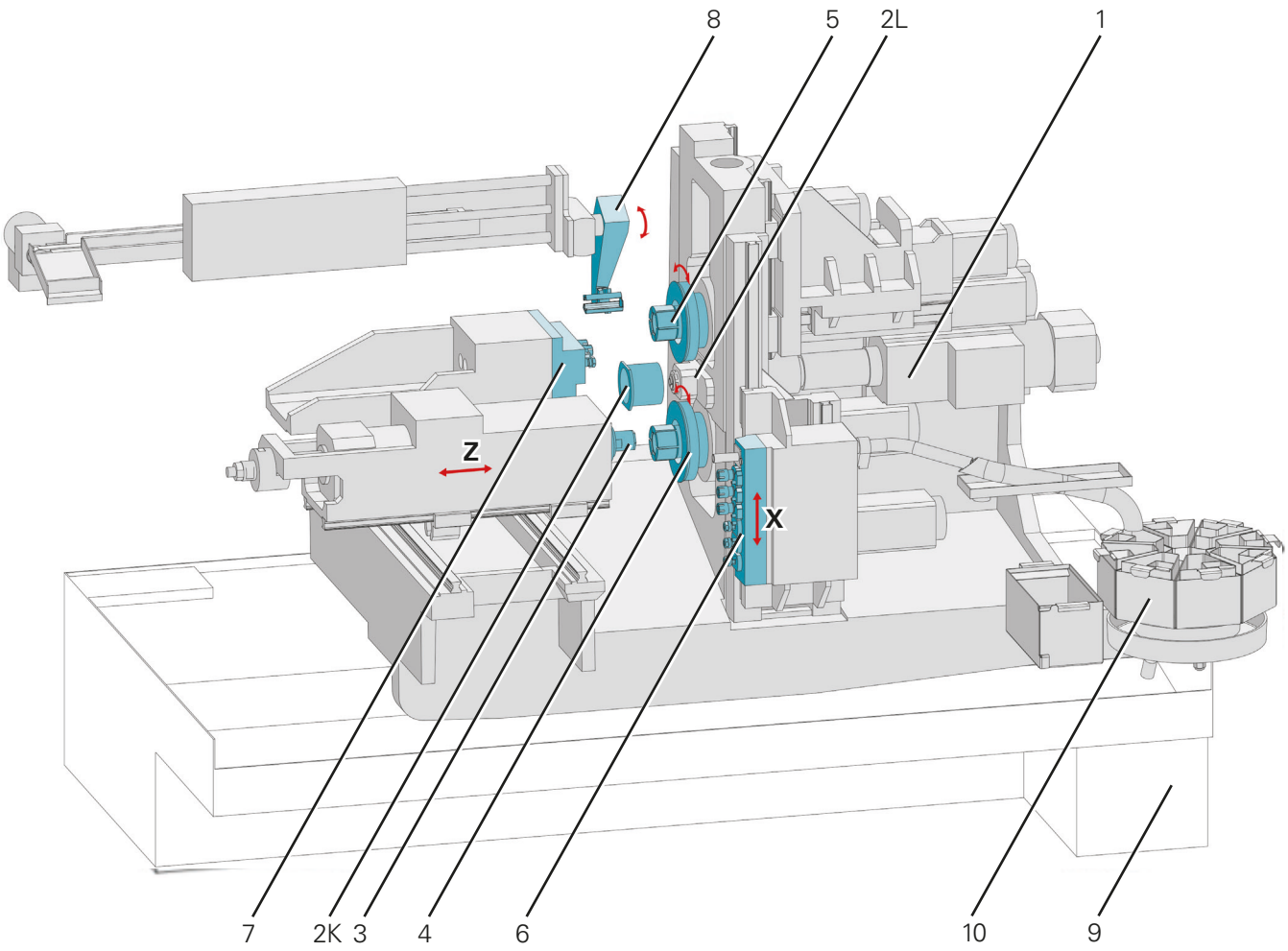
Example (at 100% duty cycle):

live tool unit, tool speed n_{Tool} = 1000 rpm	
Internal speed ratio i of the tool holder	i = 4
Programmed speed n_{prog} for the drive of the unit	$n_{prog} = n_{Tool} * i = 1000 \text{ rpm} * 4 = 4000 \text{ rpm}$
Torque M_{Tool} at the output of the tool holder	Read-out M_d at speed n_{prog} = 4000 rpm = 1.6 Nm $M_d = M_{Tool}$: i Formula changed: $M_{Tool} = M_d * i = 1.6 \text{ Nm} * 4 = 6.4 \text{ Nm}$
Power P at the output of the tool holder ≈ Power P at the output of the setup	Read-out at 4000 rpm –> P = 0.67 kW calculated: $P = 2 * \pi * n_{prog} * M_d$ $P = \frac{2 * \pi \times 4000 * 1.6 \text{ Nm}}{60 * 1000} = 0.67 \text{ kW}$



The transmission ratio and the technical data of each tool holder are available in our iXshop at ixshop.ixworld.com

Modular system of the TRAUB TNL 12.2



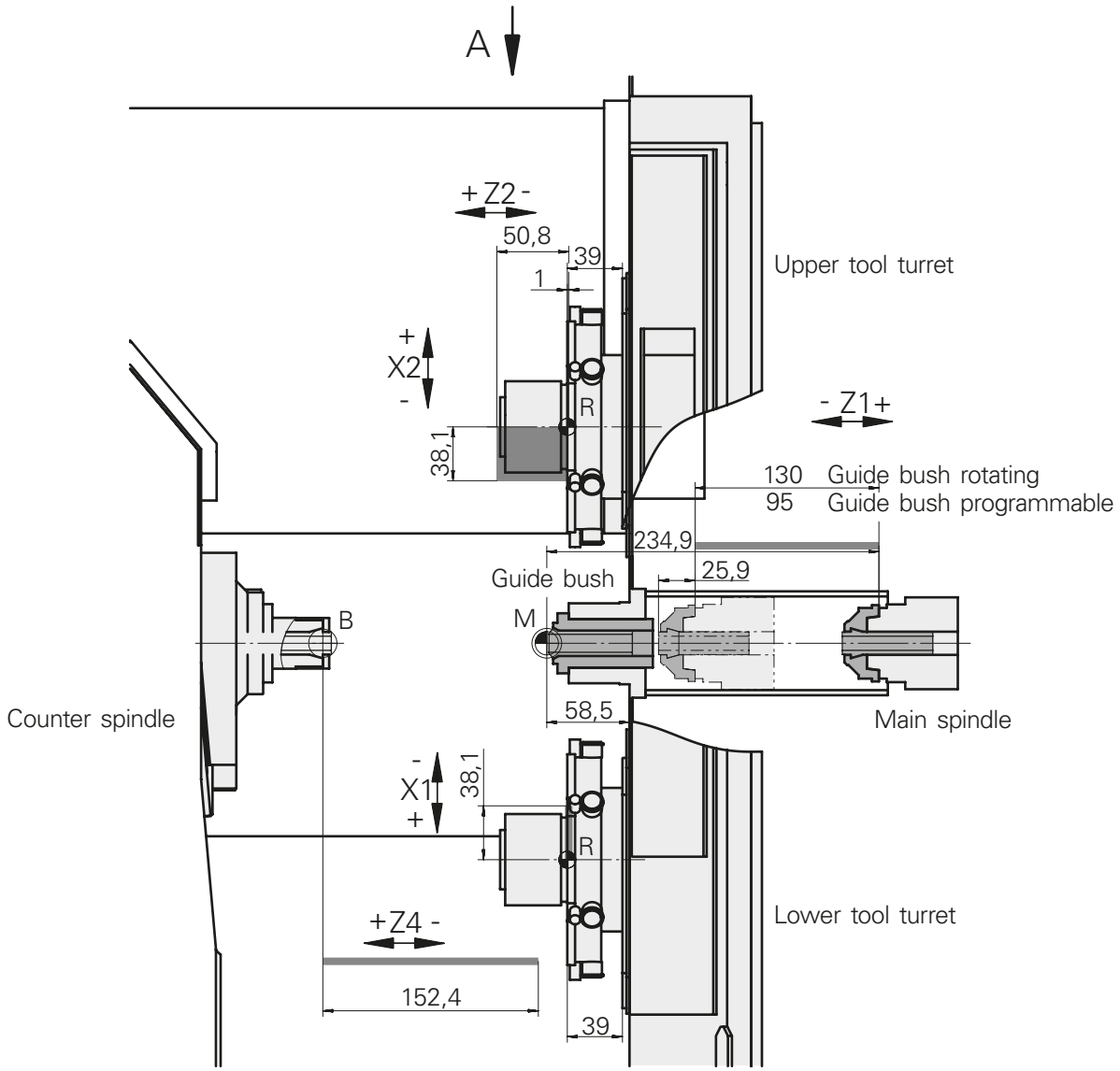
1 Main spindle
2L Guide bush for sliding headstock operation
2K Guide bush for fixed headstock operation
3 Counter spindle
4 Lower tool turret
5 Upper tool turret (optional)
6 Back working attachment with workpiece flushing unit to the right
7 Front working attachment (optional)
8 Workpiece removal unit to the left with collecting tray (alternatively: gripper)
9 Container for flushed-out workpieces (alternatively)
10 Selector for flushed-out workpieces

Working area TRAUB TNL12.2

Sliding headstock turning

shown without a back working attachment

- T = Workpiece carrier zero point
- B = Reference point
- R = Reference point
- M = Machine zero point

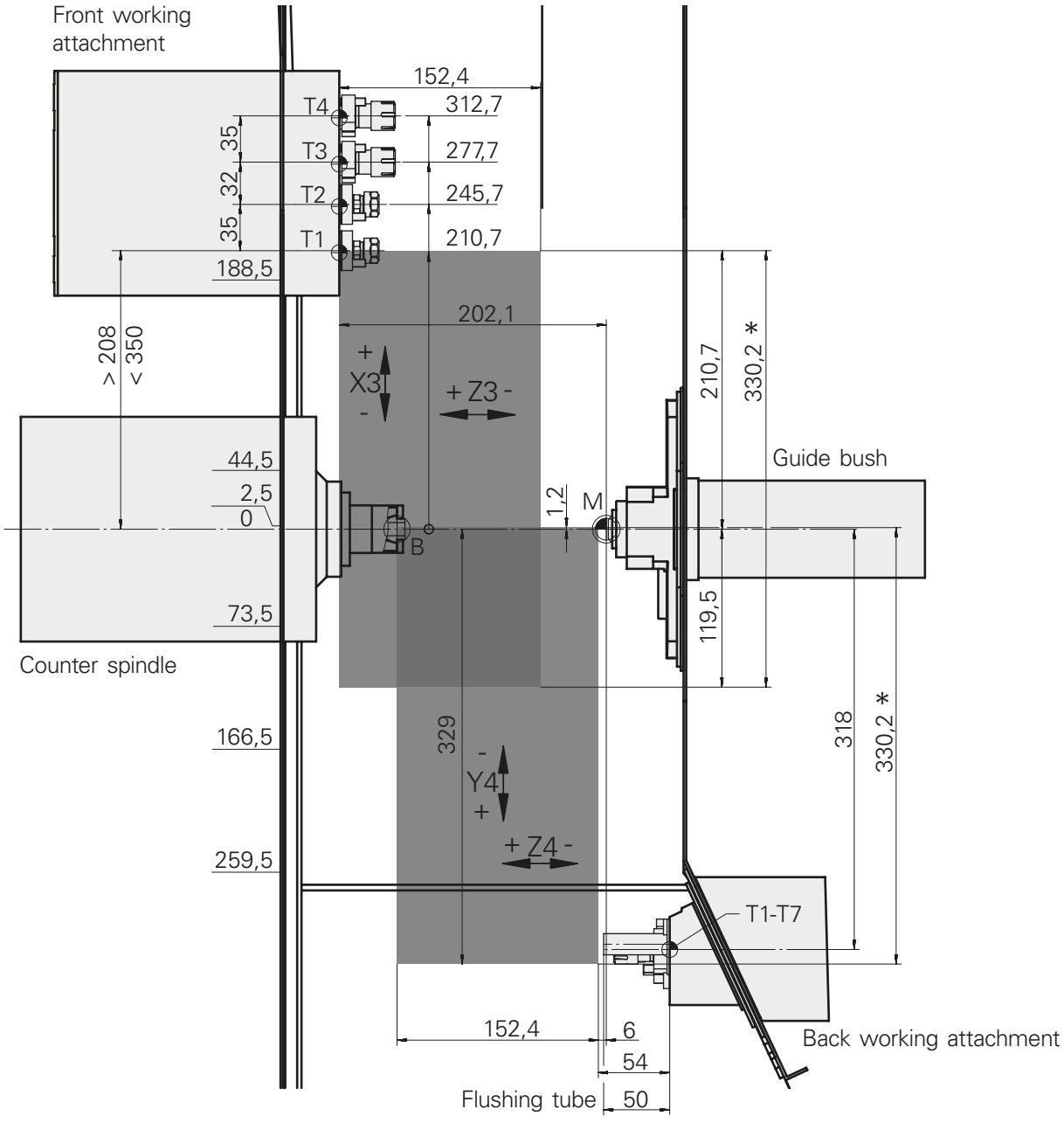


Working area TRAUB TNL12.2

Sliding headstock turning

shown without a tool turret, view A

- T = Workpiece carrier zero point
- B = Reference point
- R = Reference point
- M = Machine zero point

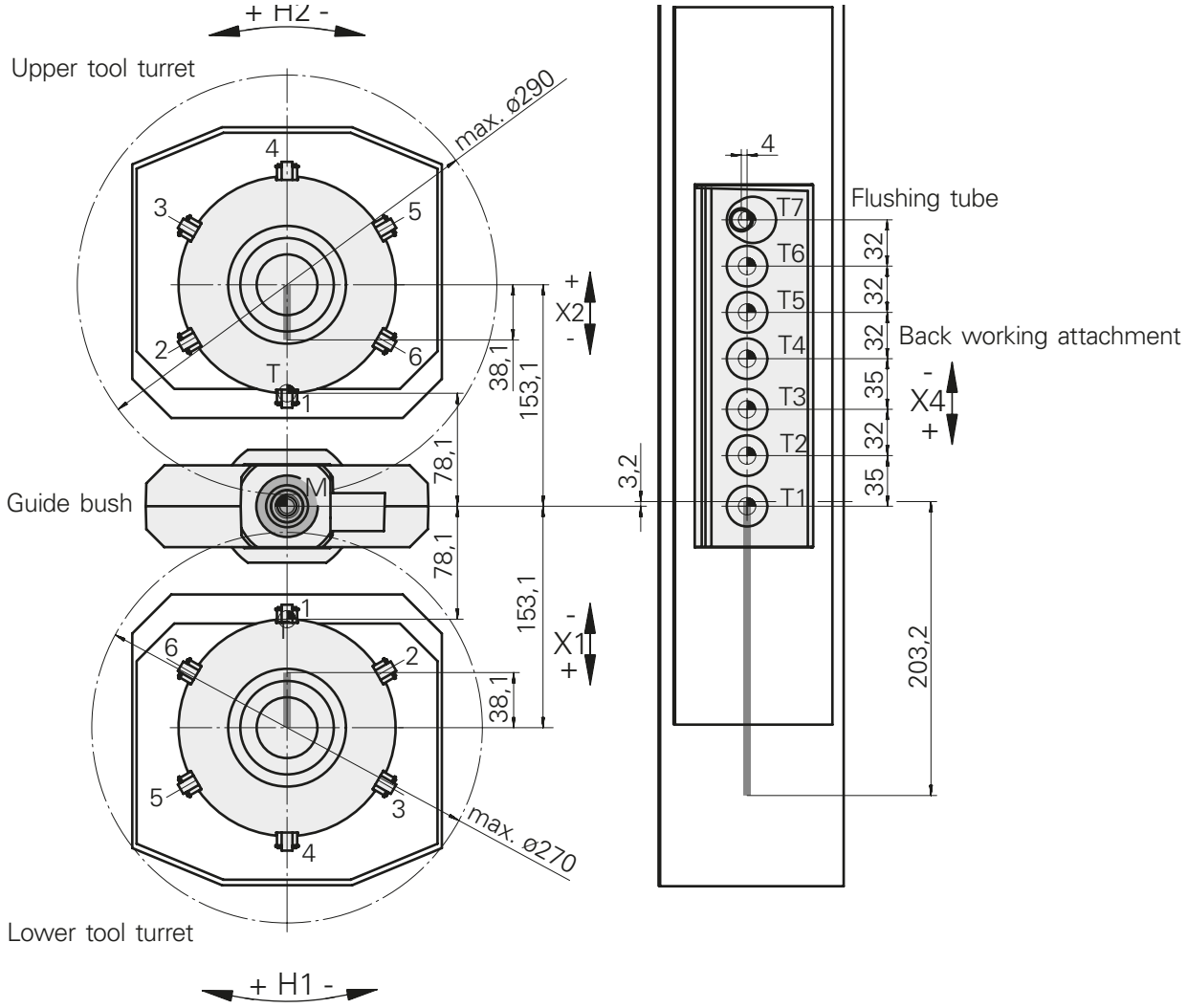


* The total travel distances shown are partially restricted by collision monitoring of the subsystems among each other.

Working area TRAUB TNL12.2

Sliding headstock turning

- T = Workpiece carrier zero point
- B = Reference point
- R = Reference point
- M = Machine zero point

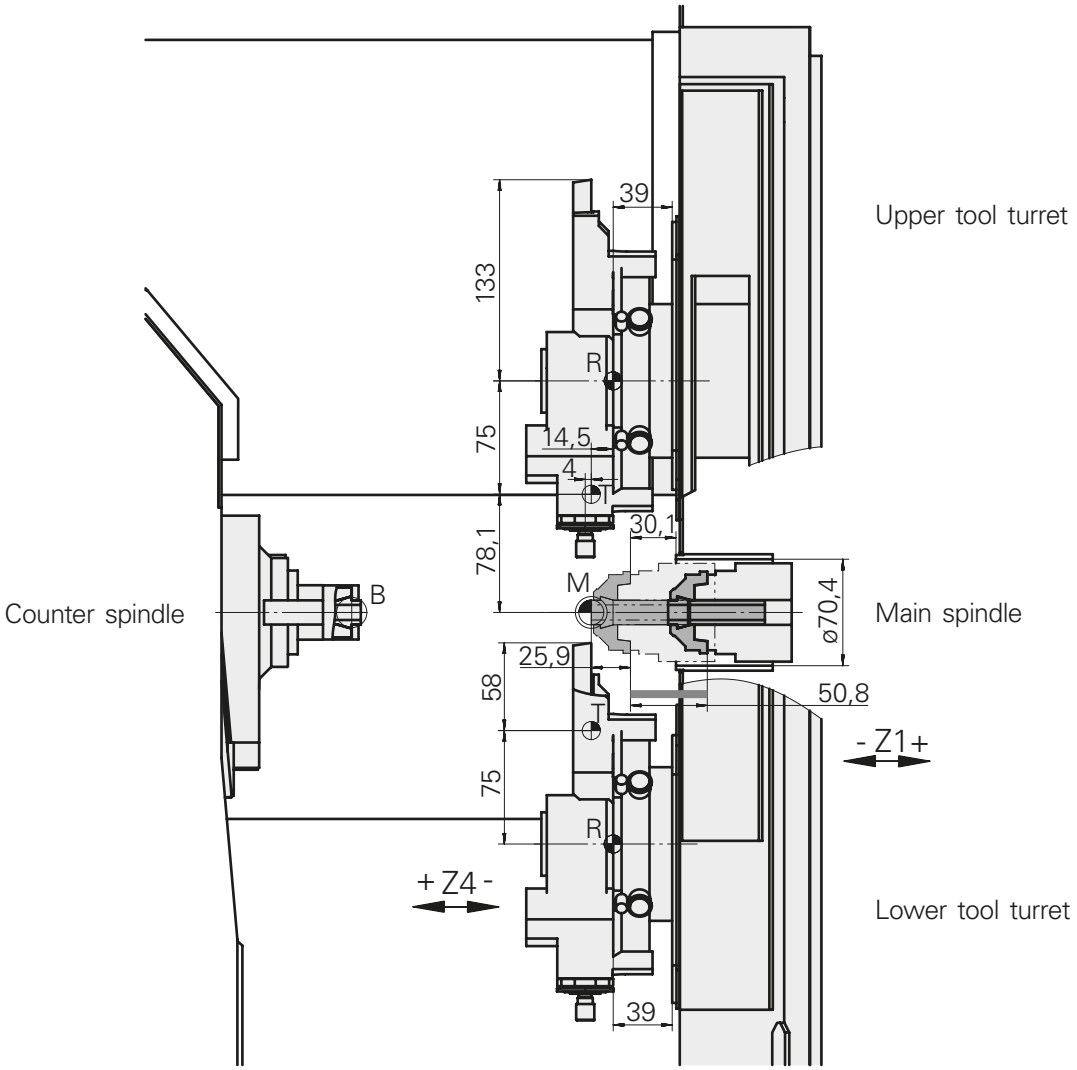


Working area TRAUB TNL12.2

Fixed headstock turning

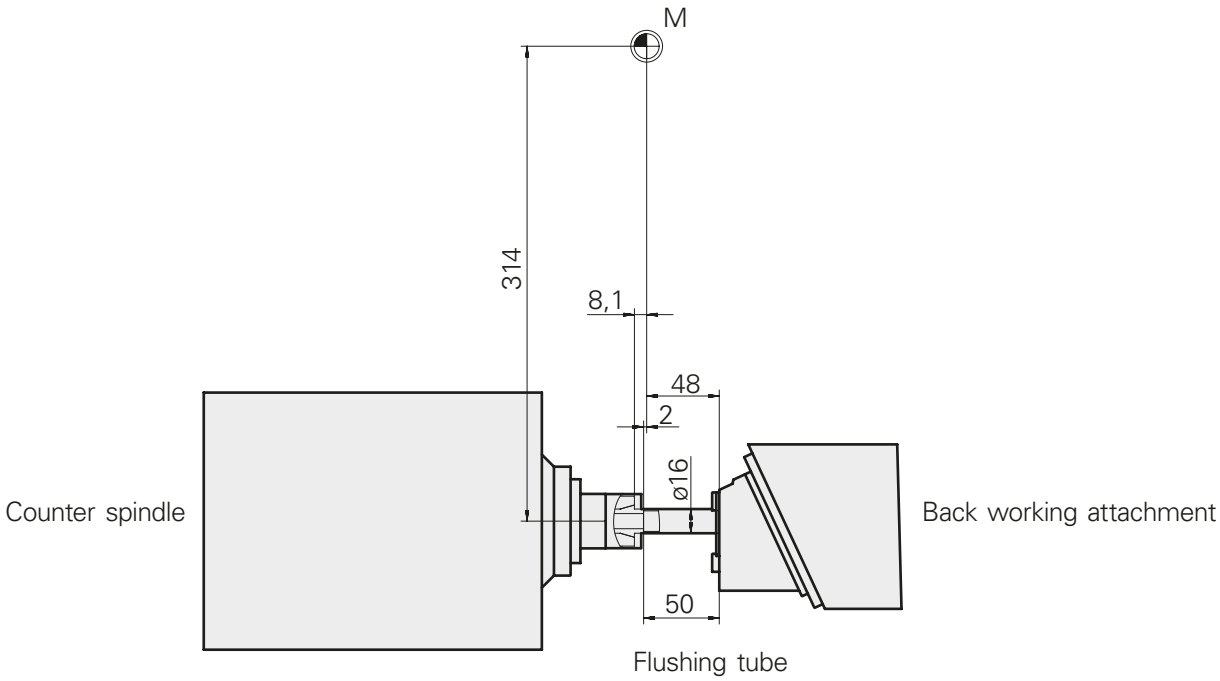
shown without a back working attachment

- T = Workpiece carrier zero point
- B = Reference point
- R = Reference point
- M = Machine zero point



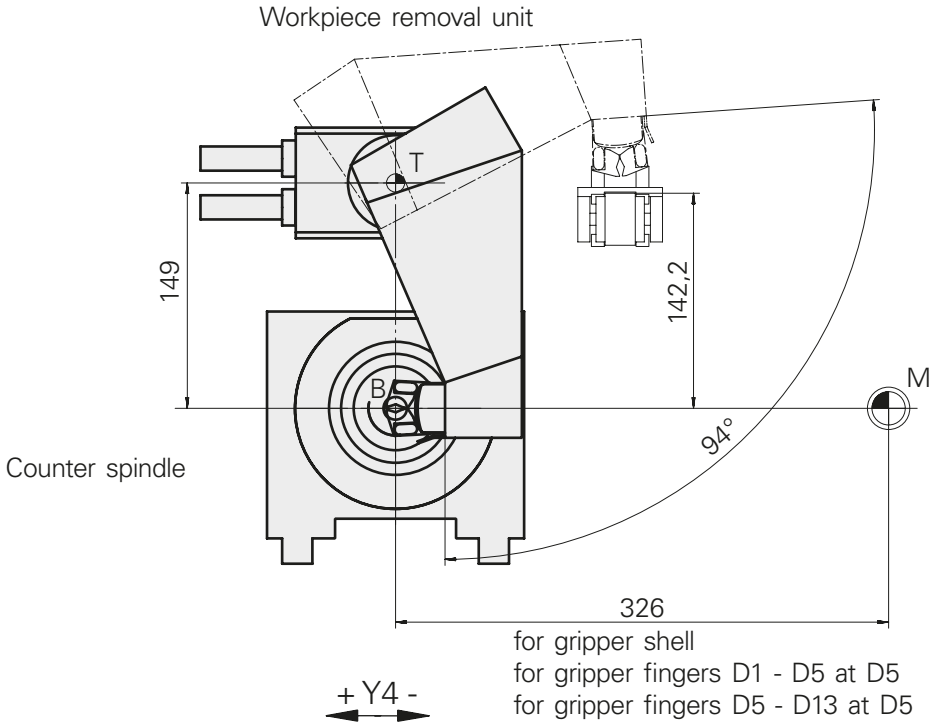
Working area TRAUB TNL12.2

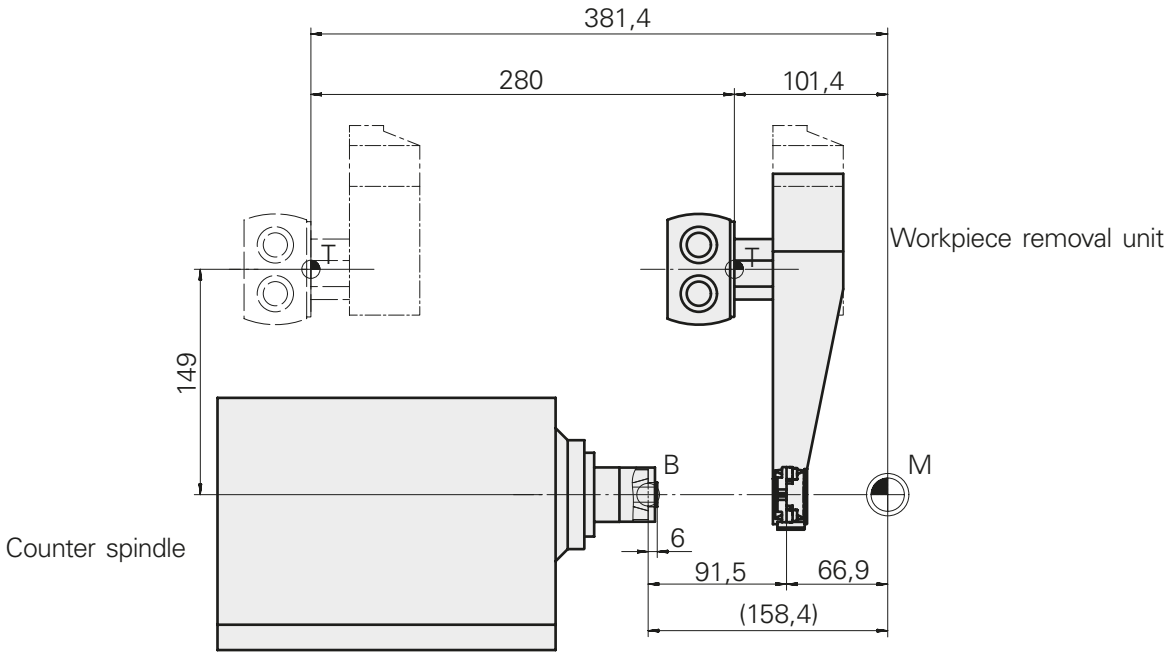
Flushing through the back working attachment



Working area TRAUB TNL12.2

Gripping position of workpiece removal unit



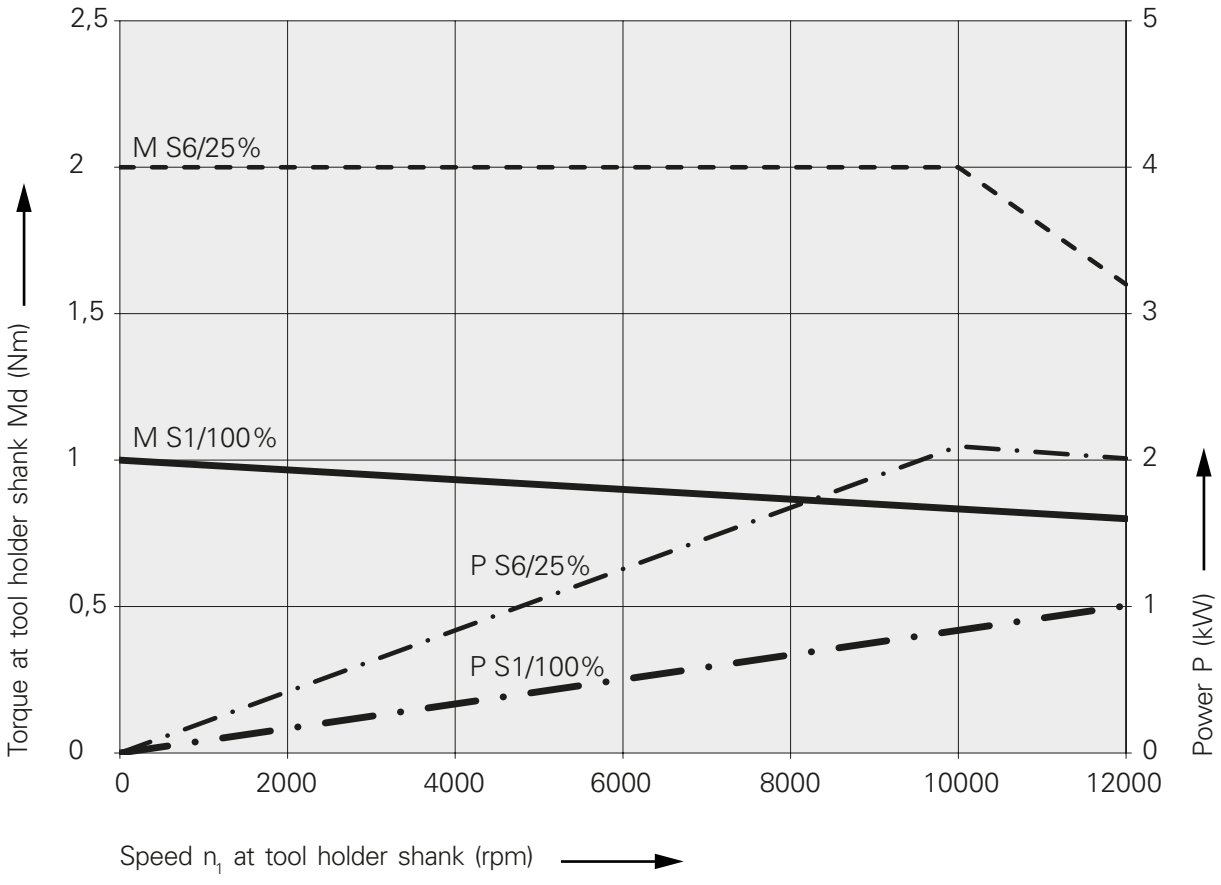


Performance chart

Live tools, upper/lower tool turrets

Speed range 0-12,000 rpm

For information on how to use the diagram, see Chapter "Technical Information".

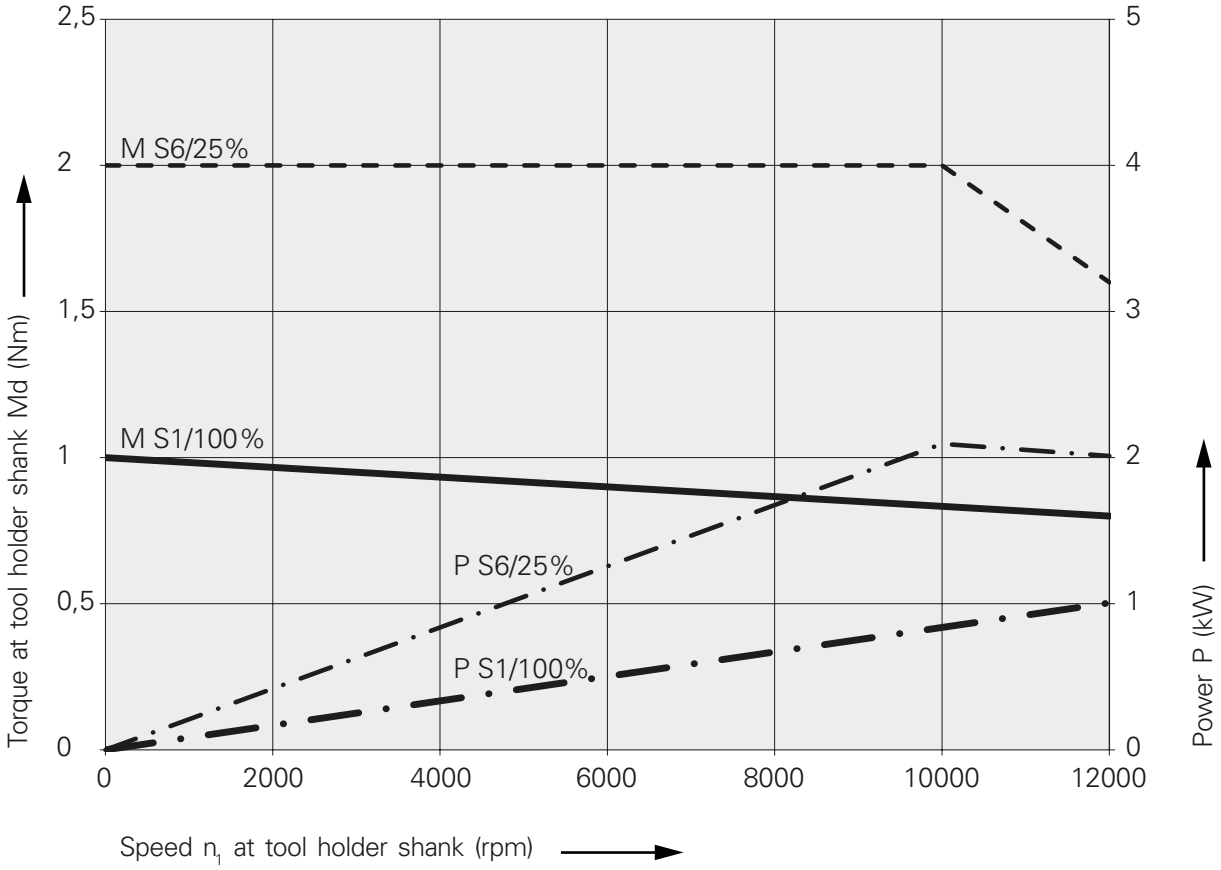


Performance chart

Live tools, back and front working attachments, stations T1 and T4

Speed range 0-12,000 rpm

For information on how to use the diagram, see
Chapter "Technical Information".

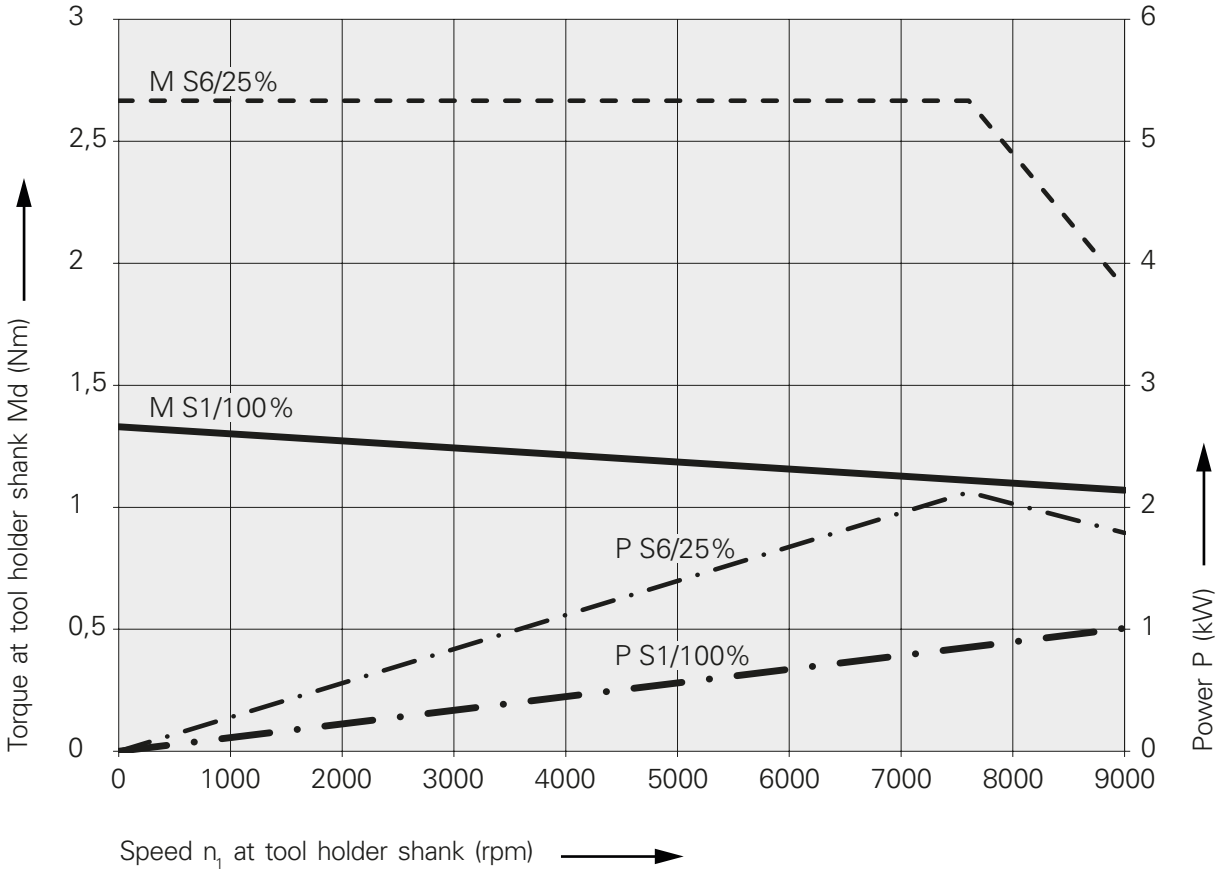


Performance chart

Live tools, back and front working attachments, stations T2 and T3

Speed range 0-9,000 rpm

For information on how to use the diagram, see
Chapter "Technical Information".



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