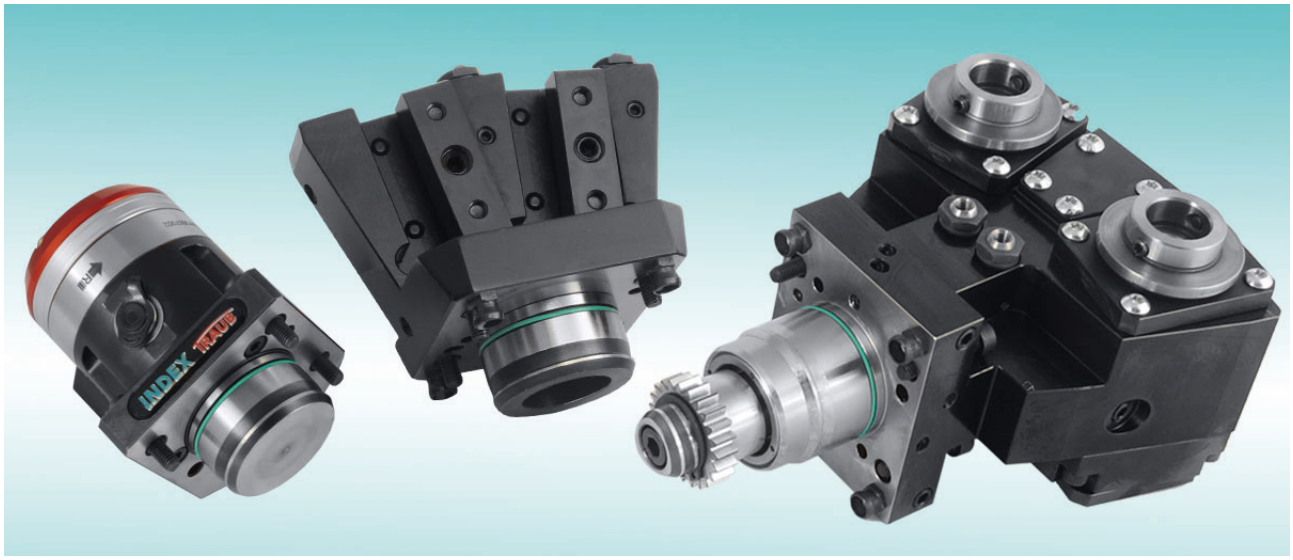
TRAUB



TRAUB TNL 32-9 from machine no. 109

Tool holder Technical Information

*better.parts.**faster.***

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

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 by INDEX TRAUB, 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 cooling lubricant 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

Tool holders with cooling lubricant supply

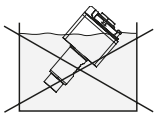
Tool holders marked with this symbol must be operated with cooling lubricant (no dry running permitted).

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**.

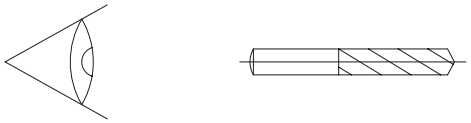
This gives speed **increase** ratios as numbers **less than 1**.
Example: i = 0.333 (corresponds to i = 1:3)
i = 0.676 (corresponds to i = 1:1.48)

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

The tool holder speed ratio is engraved on TRAUB TNL tool holders.

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 ↶

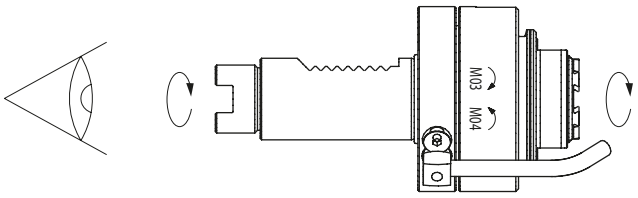
No reversal of rotation
When the holder drive shaft has the **same** direction of rotation as the tool cutting edge, the clockwise direction of run must be specified by M03 (clockwise rotation). Accordingly, counter-clockwise rotation must be specified by M04.

M04 ↷ M03 ↶

Reversal of 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 rotation



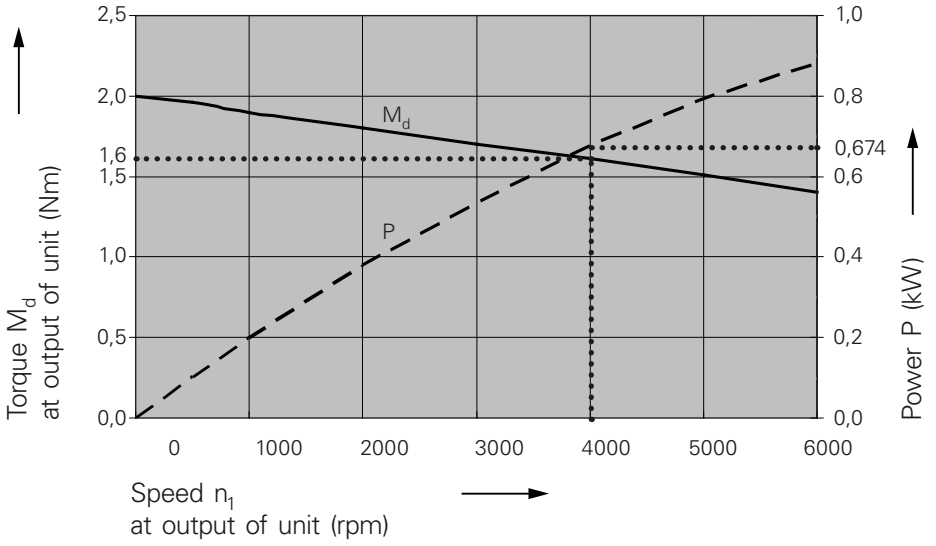
Notes on how to use the diagram when using tool holders

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

Tool turret

The TNL 32-9 is equipped with 2 tool turrets: The tool turrets consist of the swivel drive, turret head, tool drive, and axis drives.

Swivel drive as rotary axis

The tool turrets are equipped with a rotary axis. It consists of a cycloidal gearbox (eccentric gearbox) in which the torque is transmitted via curved disks.
This allows high impact loads on the drive (up to 500%), low-wear operation, and low friction losses.
The gearbox is not self-locking. Therefore, the turret head is connected directly with a measuring system that reports the exact position and compensates the cutting forces. This allows top precision turning and milling operations.

Turret head

Each turret head has 10 tool stations for stationary and live tool holders.
All stations are equipped with a cooling lubricant transfer unit. The tool stations 5 and 7 on the upper and lower turrets are equipped with an additional fluid transfer station. They can be used either as a sealing air port or as a high-pressure port for cooling lubricant. In either case, the appropriate tool holders and valves must be available.
The turret heads have fixing inclines for the fixing pins of the tool holders on both sides along their circumference.

Live tool holder, turret head

When using live tool holders in the turret head, only tool holders with a spur gear with 23 teeth may be used.

When using live tool holders with a different number of teeth, such as TRAUB TNL 18 with 18 teeth, the tool drive will be destroyed.

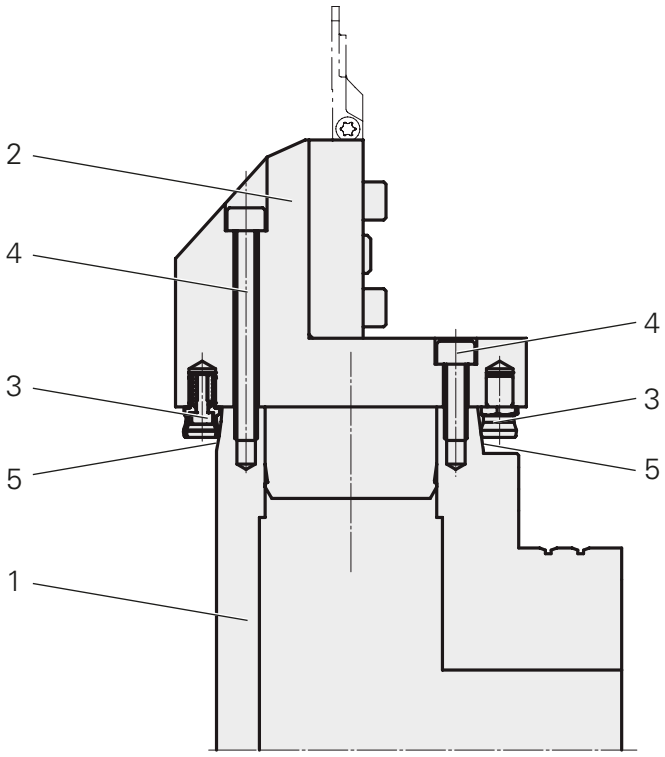
Tool holder system on tool turret

The tool holder system is a compact shank.

The turret head has a locally hardened fixing incline on both sides along its circumference. When the tool holder is inserted into the turret head, the tool holder aligns itself automatically with the fixing inclines by means of the fixing pins. The tool holders are fastened to the face of the stations using cylinder head screws.
Most of the tool holders have elastic fixing pins. The width tolerance of the turret head is offset by the elasticity of the fixing pins, also the turret will not be damaged in a collision.
The fixing bolts are eccentrically arranged and are adjusted to the exact position for INDEX and sealed.

The customer may not manipulate the adjusted and sealed fixing pins of the tool holders.

The fixing pins can be replaced and readjusted by INDEX, e.g., after a collision.



1 Turret head
2 Tool holder
3 Fixing pin
4 Cylinder head screws
5 Fixing incline

Tool drive on the tool turret

All 10 tool mountings on the upper turret and all 10 tool mountings on the lower turret can be live.

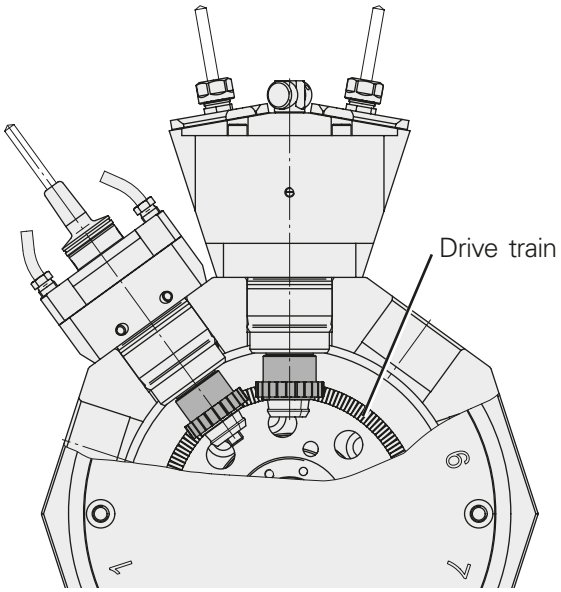
The tools are driven by an overall drive or Dual Drive depending on the machine equipment

The tool holders can be used for both machine drives (see conversion of live tool holders when changing the drive train).

Upper and lower tool turrets

Tool drive as overall drive

The overall drive consists essentially of the AC motor, drive shaft with crown wheel and the controller.
The overall drive makes engaging and disengaging the drive shaft with/from the tool holders as well as acceleration and deceleration superfluous.
As a result, the turret head can be swiveled with the H axis while the drive is running. Depending on the direction of swivel or rotation, the speed is shortly increased or decreased when swiveling the turret. When swiveling from station to station, the tool drive should not be run at top speed to relieve the tool holders.
The speed of the tool holder drive pinion can be programmed with the AC-controlled three-phase motor in the range 0 to 12,000 rpm.

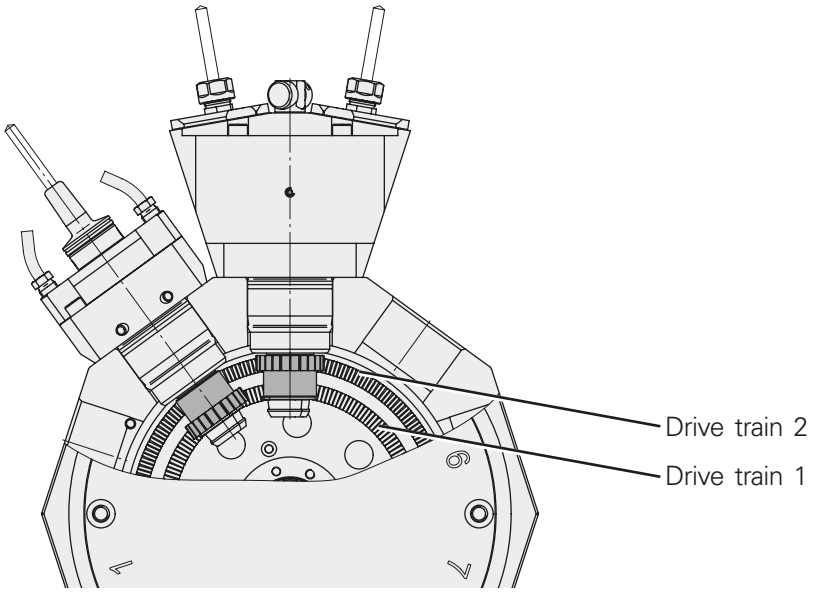


Upper and lower tool turrets

Upper and lower tool turrets

Tool drive as Dual Drive (option)

Dual Drive essentially consists of two AC motors, drive shafts with crown wheels (drive train 1 and drive train 2) and the controller.
Due to the two separately driven crown wheels, for example, while the drive train 1 is being used, the drive train 2 can be shut down and ramped up to its desired speed and direction of rotation only just before it is going to be used.
This means that the drive train 2 is ready for use immediately after swiveling the turret. In turn, while the drive train 2 is being used, the drive train 1 can be shut down and then started up again to the desired speed and direction shortly before the next use. This type of drive reduces the tool holder wear and secondary times.
The speed of the tool holder drive pinion can be programmed with the AC-controlled three-phase motor in the range 0 to 12,000 rpm.

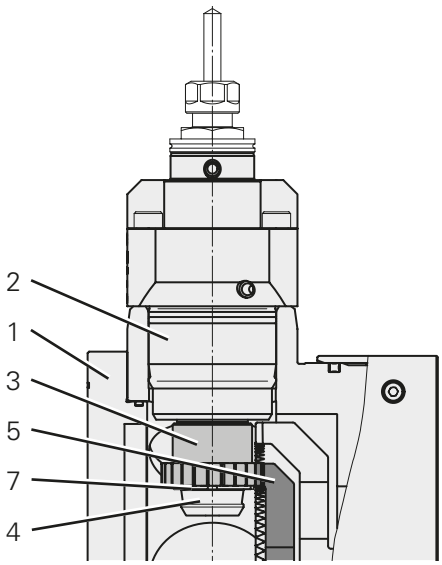


Upper and lower tool turrets

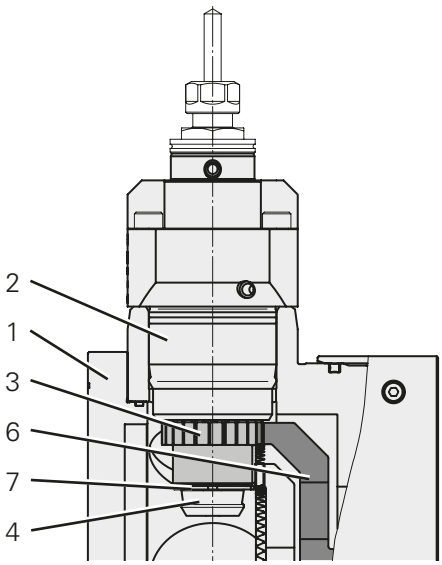
Conversion of live tool holders when changing the drive train

The drive pinion (3) of the tool holder can be converted from drive train 1 (5) to drive train 2 (6), or vice versa.
For this purpose, remove the retaining ring (7) on the drive shaft (4).
Next, pull off the drive pinion (3) from the drive shaft (4).
Now rotate it accordingly and then mount it again on the drive shaft (4).
After mounting the drive pinion (3), reinstall the retaining ring (7) and check it for proper fit.
Now the tool holder is ready again.

Drive train 1



Drive train 2



1 Turret head
2 Tool holder
3 Drive pinion
4 Drive shaft
5 Drive train 1 (internal crown wheel)
6 Drive train 2 (external crown wheel)
7 Retaining ring

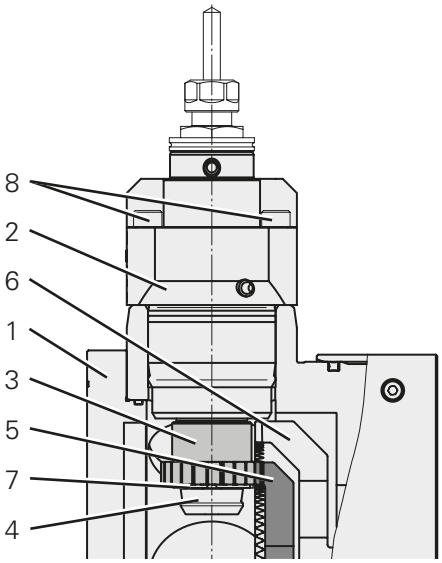
Attaching/detaching the live tool holders to/from the tool turret

Swivel the turret head (1) into the required position.
Carefully remove chips and dirt from the tool holder (2) (or the blanking plug) to be replaced and its surrounding area using a cleaning gun.

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

Clean the removed tool holder (2) and tool mountings.
Check that the proper mounting screws (8) have been installed on the replacement tool holder (2). The mounting screws (8) should not protrude more than 12 mm from the tool holder (2).
Clean and install the tool holder (2).

For live tool holders (2), the spindle must be slightly moved so that the drive pinion (3) can be pushed into the crown wheel (5 or 6).
Tighten the mounting screws (8). Tightening torque Ma=14 Nm.



1 Turret head
2 Tool holder
3 Drive pinion
4 Drive shaft
5 Drive train 1 (internal crown wheel)
6 Drive train 2 (external crown wheel)
7 Retaining ring
8 Mounting screws

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.

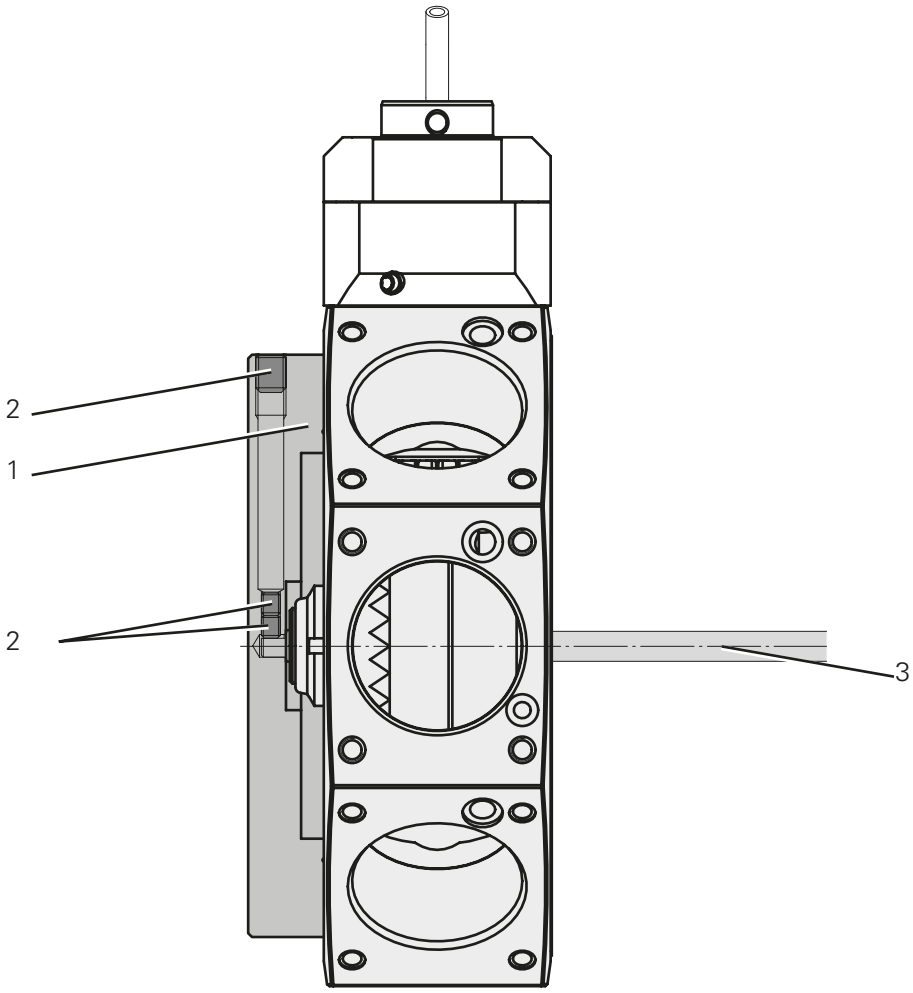
The tool holder may be operated in setup mode without cooling lubricant only for a short time. During this time, the leakage of the adding valves and the reserves in the supply line are used for lubrication.

For the rear end machining unit, 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. Therefore, all unused live tool holders should be removed and the respective tool mountings should be closed with blanking plugs.

Cleaning the tool drive

On the upper and lower tool turrets

When cleaning the tool drive inside the turret head, the flange must not be removed, because otherwise the machine needs to be readjusted.



1 Flange
2 Sealed screw
3 Measuring bar

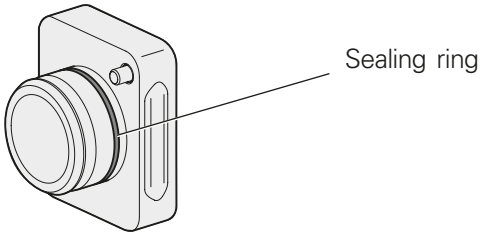
Blanking plug

The machine may be operated only when all unused tool stations are closed with blanking plugs.

A limited number of blanking plugs is included.
Additional plugs must be ordered separately.

The sealing rings on the blanking plugs must be inspected regularly for damage. Replace any damaged sealing ring.

Tool turret



WFB interface

Mounting

First tighten a threaded taper pin by loosening and retightening it 1-2 times. This results in optimum positioning of the components. Then tighten the 2nd threaded taper pin (in the same way as above).
For the recommended torques, please see the table below.

Care and maintenance

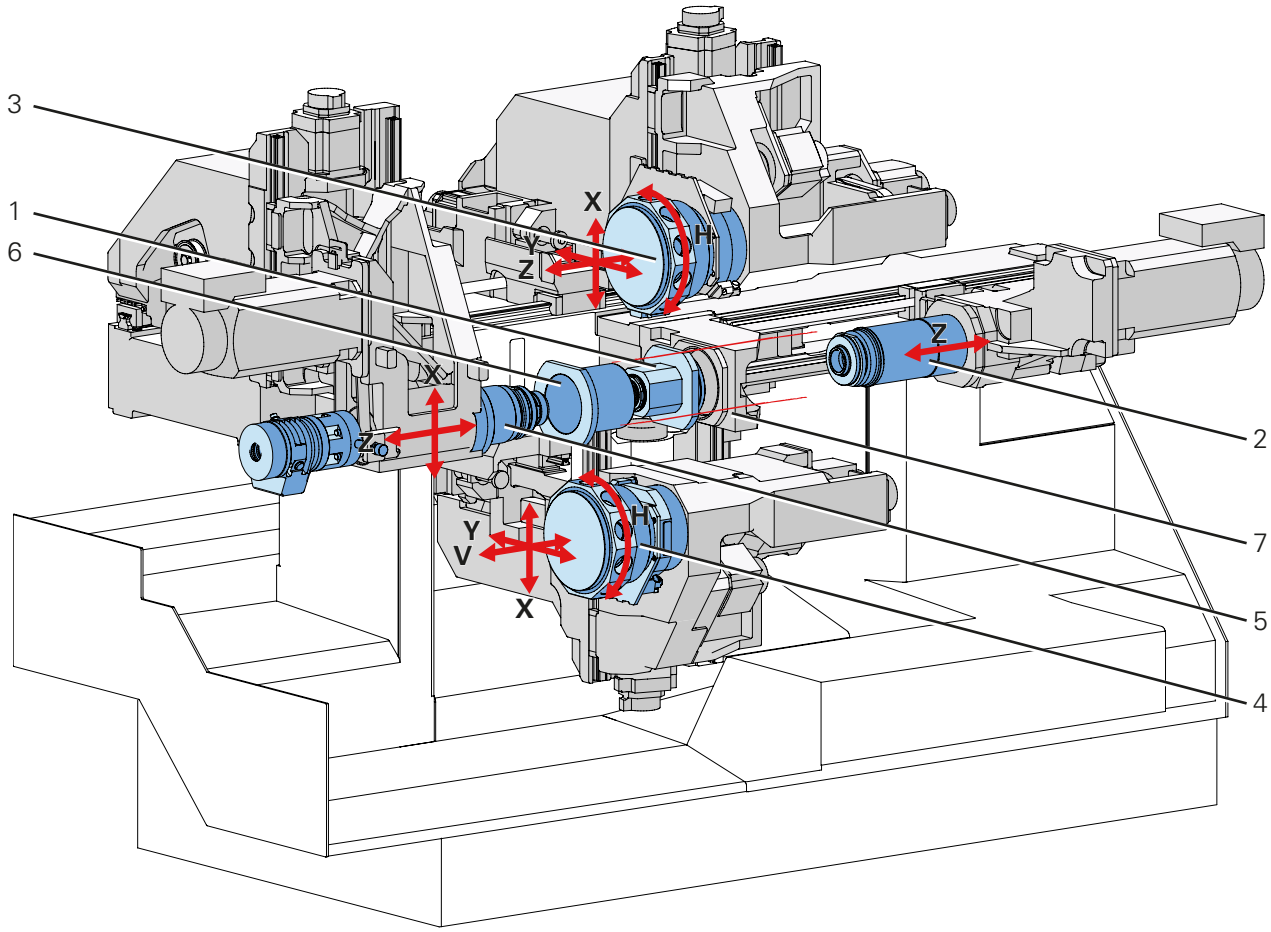
The surfaces of the faces, taper bore and tapers must be cleaned and covered with an oil lubricating film. For best fastening results and to ensure that the threaded taper pins can easily be loosened, it is recommended to apply Molykote 1000 or a similar hot screw compound to the threaded taper pins.

Tightening torques

Recommended tightening torques		
Size	Threaded taper pin	Tightening torque
WFB 20-12	M6x1	4 Nm
WFB 24-16	M8x1	10 Nm
WFB 32-20	M10x1	20 Nm
WFB 40-25	M12x1	25 Nm
WFB 50-32	M14x1	30 Nm

Recommended tightening torques when using mandrel gauges		
Size	Threaded taper pin	Tightening torque
WFB 20-12	M6x1	5 Nm
WFB 24-16	M8x1	5 Nm
WFB 32-20	M10x1	10 Nm
WFB 40-25	M12x1	10 Nm
WFB 50-32	M14x1	15 Nm

Modular system of the TRAUB TNL 32-9

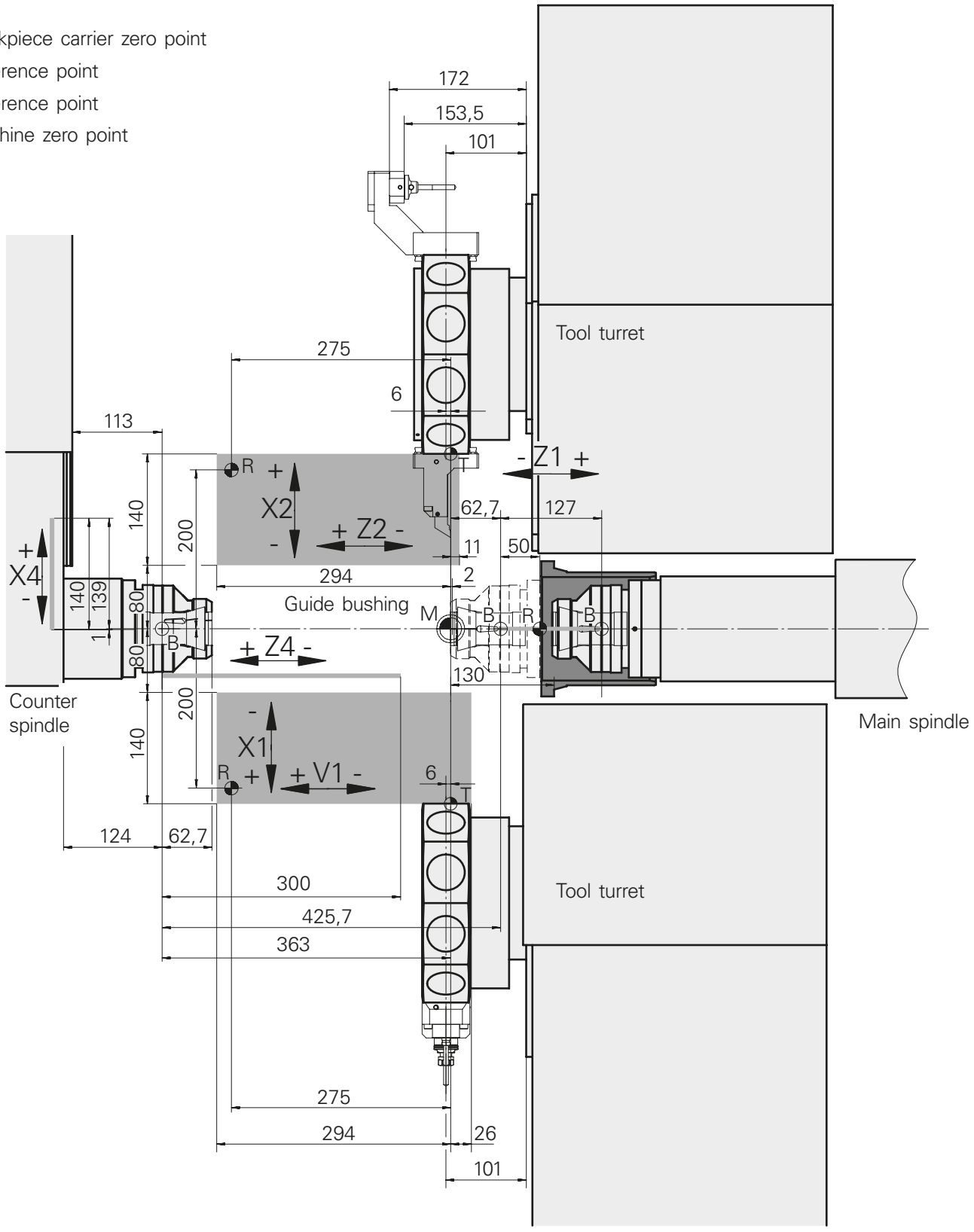


1 Guide bushing unit
2 Main spindle - Z
3 Upper tool turret - XYZH
4 Lower tool turret - XYVH
5 Counter spindle XZ
6 Guide bushing
7 Guide bushing carrier

Working area TRAUB TNL 32-9

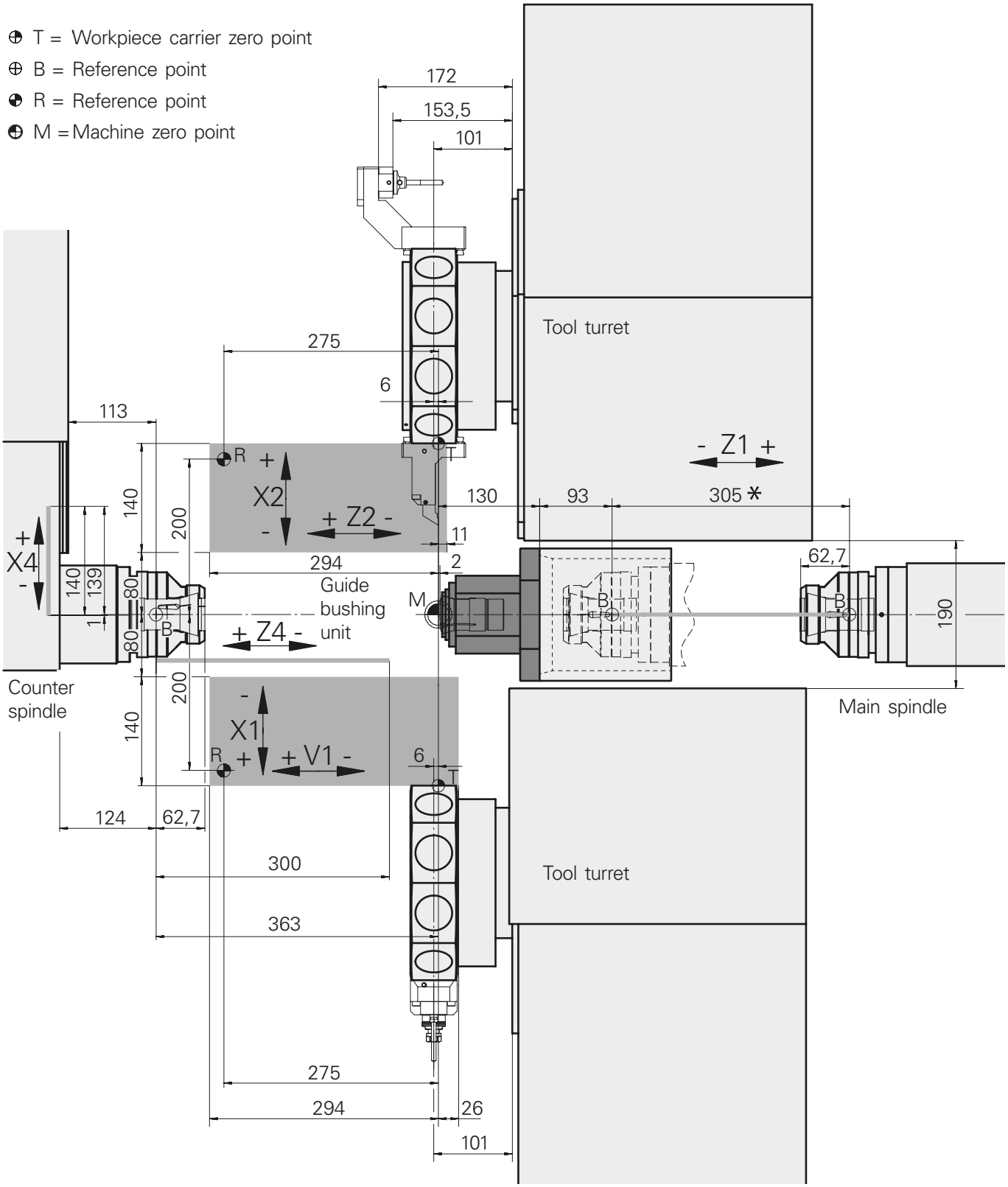
Fixed headstock turning

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



Working area TRAUB TNL 32-9

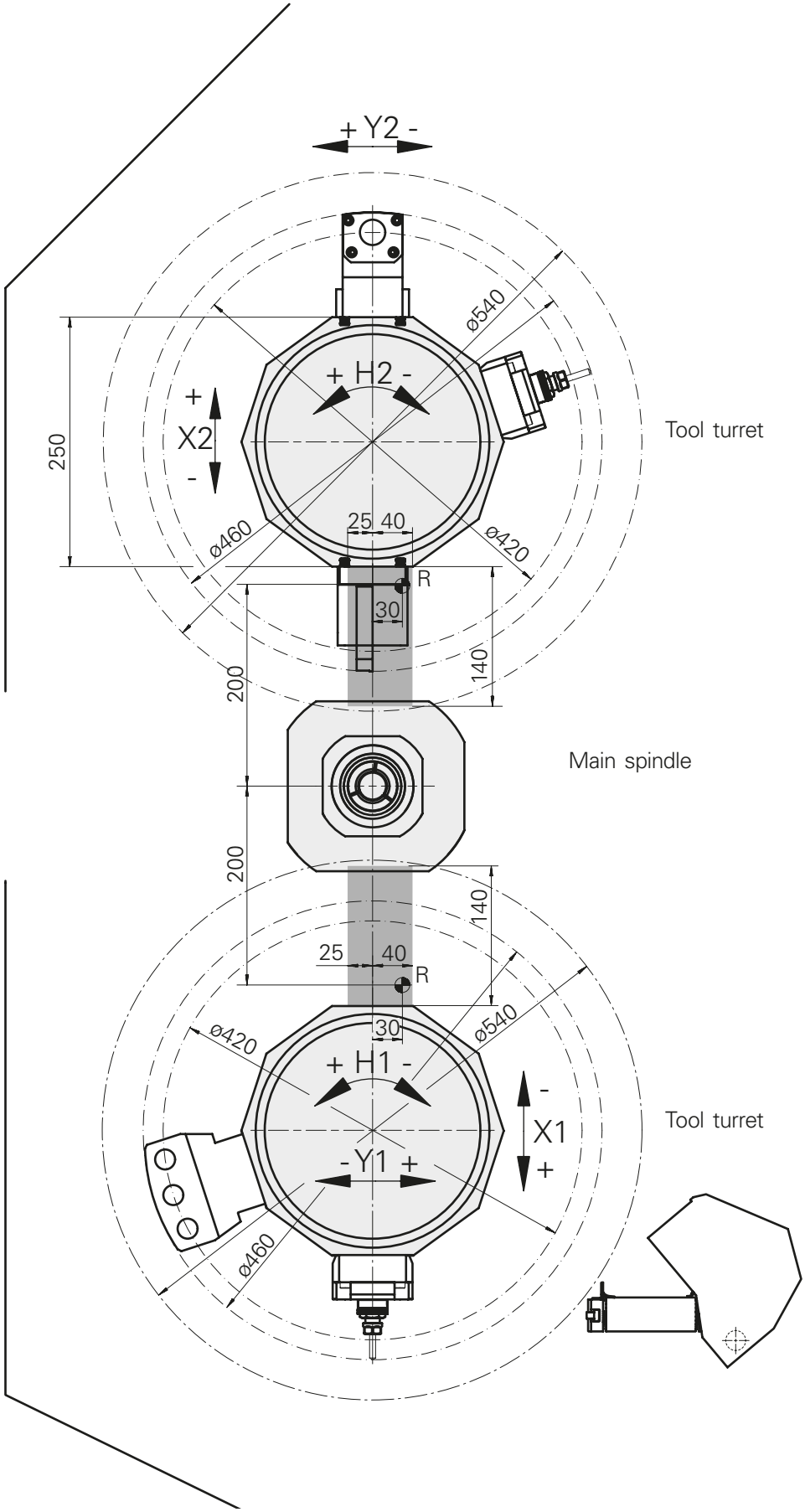
Sliding headstock turning



*Stroke (Z1) depends on the clamping means

Working area TRAUB TNL 32-9

Side view

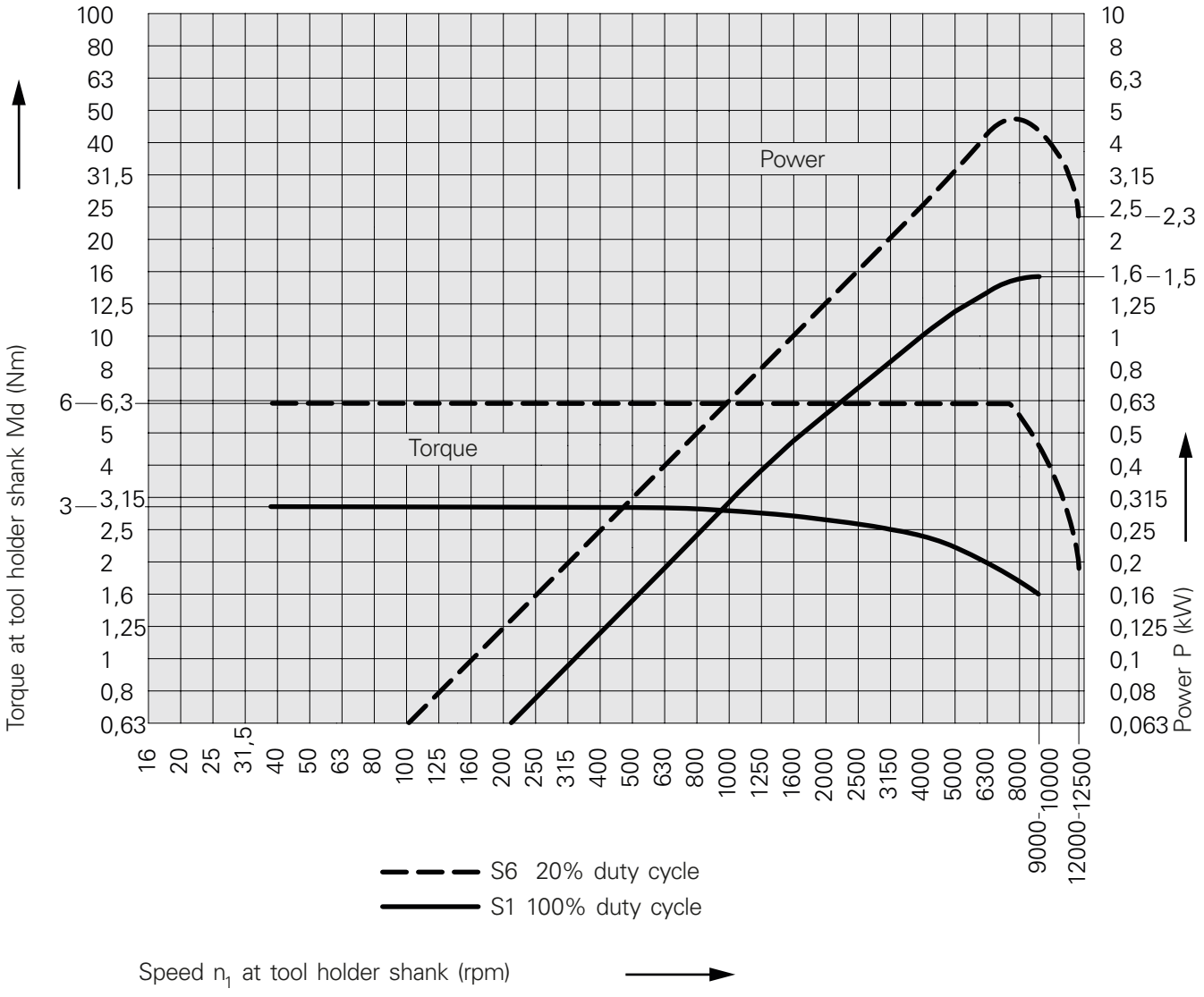


Performance diagram

Live tools, upper/lower tool turrets, Dual Drive

Speed range 0-12000 rpm

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

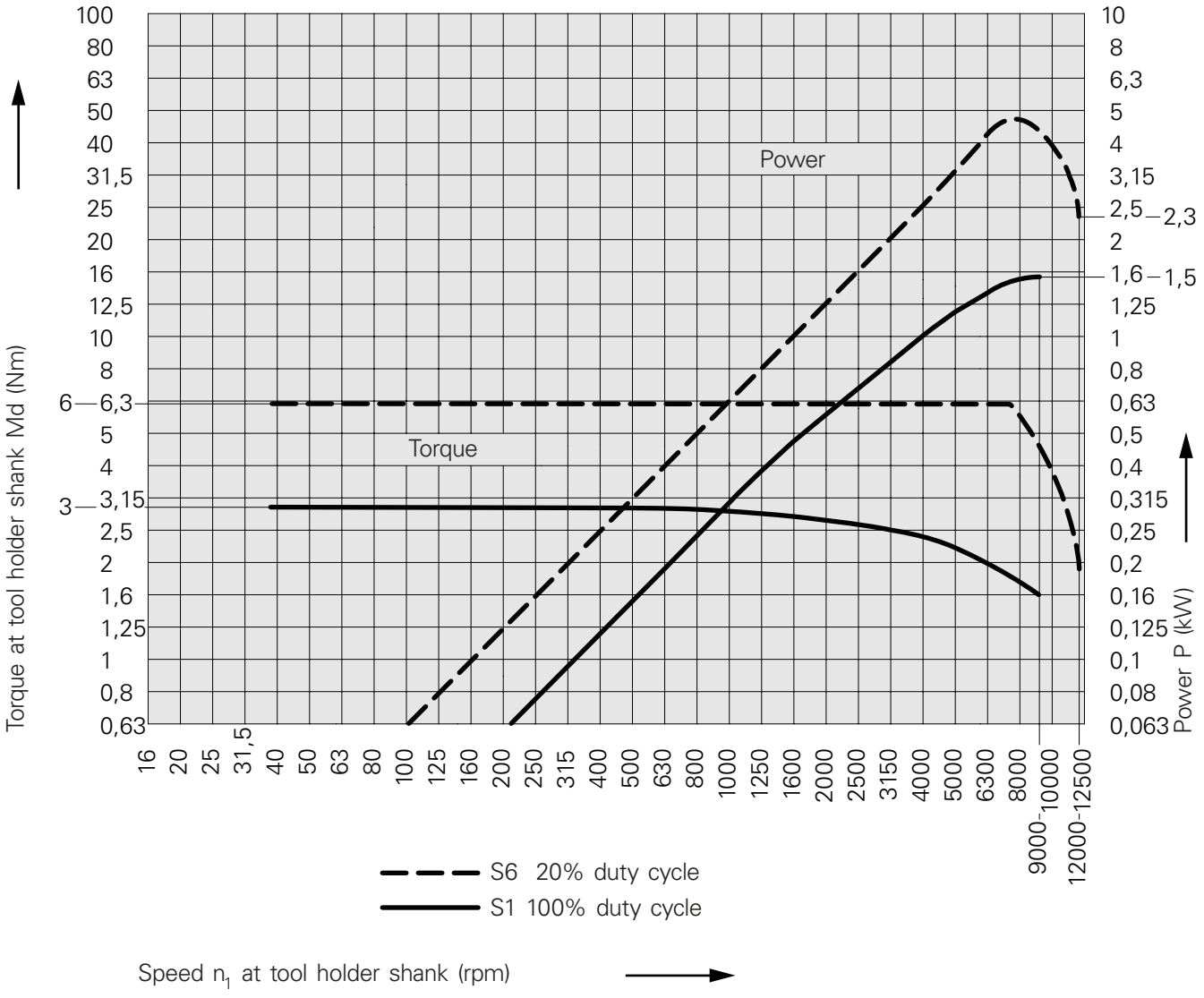


Performance diagram

Live tools, upper/lower tool turret, overall drive

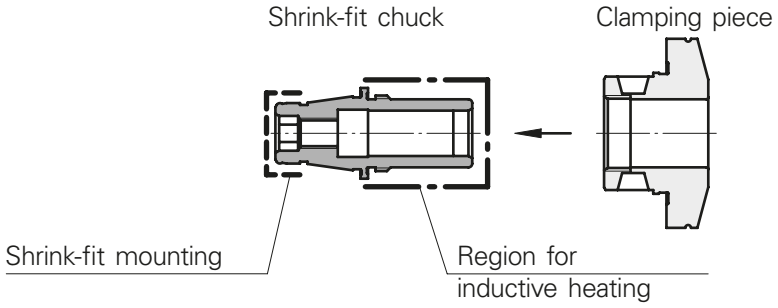
Speed range 0-12000 rpm

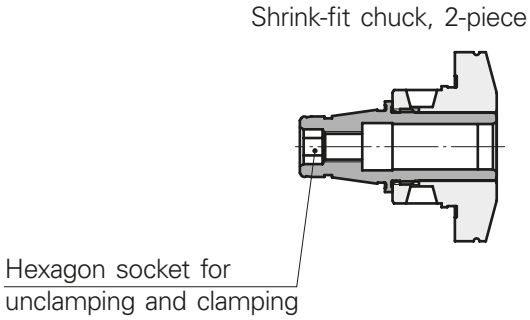
For information on how to use the diagram, see Chapter "Technical Information".



Quick-change insert WFB

User manual, 2-piece shrink-fit chuck





Working principle

1) Remove two-piece shrink-fit chuck.
   Only the socket hex inside the shrink-fit chuck may be used for unclamping and clamping.
2) Accept the shrink-fit chuck into the basic mounting (collet chuck) on the clamping collar.
3) Use induction heating and shrink-fit cutting tool.
4) Let the shrink-fit chuck cool down.
5) Mount the clamping piece and shrink-fit chuck as a unit.

Cleaning

After several shrink-fit cycles, the cylindrical section of the shrink-fit chuck should be cleaned with steel wool or the like.

Short type WFB shrink-fit chucks consist of the actual shrink-fit chuck and the clamping piece. The two parts are supplied assembled and bear the same label.

Only parts with identical labels may be assembled as a 2-piece shrink-fit chuck.

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