



**INDEX G420**

**INDEX G520**

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.

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<b>Technical information .....</b>	<b>5</b>
Tool holder selection .....	5
Warranty .....	5
Information on wear parts .....	5
Inspection of live tool holders .....	5
Tool holders with cooling lubricant supply .....	6
Cooling lubricant filtering .....	6
Cleaning live tool holders .....	6
Speed ratio specifications on tool holders .....	6
Direction of rotation specification .....	7
Tightening torque .....	8
Coolant supply .....	8
Replacement seals for tool shank .....	8
Sealing air port .....	8
Tool holders with fixation .....	9
High-pressure unit .....	9
Load limits of live tools .....	9
Live tool holders .....	10
Weight distribution on turret head .....	11
Collision .....	11
Tool change on live tool holders .....	11
Upper tool carrier, with motorized milling spindle .....	12
1 live tool station INDEX CAPTO C6 .....	12
Coolant adapter, INDEX CAPTO C6 .....	13
Coolant adapter set and socket wrench .....	13
Fitting/removing the coolant adapter set .....	13
Upper tool carrier, with motorized milling spindle .....	14
1 live tool station HSK63 .....	14
Ultimate strength, HSK63 .....	14
Coolant adapter, HSK63 .....	15
Coolant adapter set and socket wrench .....	15
Replacement seals for the coolant adapter set .....	15
Installation of coolant adapter set .....	15
Tool holders with HSK shank .....	16
Balanced tool holders – balance quality .....	16
Balancing – Tool holder with tool .....	16
Balancing – Tool holder without tool .....	17
Tool magazine 1+2 .....	18
INDEX CAPTO C6 .....	18
HSK63 .....	19
Notes on how to use the diagram when using tool holders .....	20
<b>Usage information .....</b>	<b>21</b>
Modular system of INDEX G420, INDEX G520 .....	21

Work area of INDEX G420 .....	22
Motor milling spindle, tool carrier XYZ, VDI40 with 12 stations (SW380)	
Main/counter spindle, spindle clearance D120mm, turning length 1600mm .....	22
Tailstock.....	22
Work area of INDEX G420, INDEX G520.....	24
Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)	
Main/counter spindle, spindle clearance D120mm, turning length 1600mm .....	24
Tailstock.....	24
Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)	
Main/counter spindle, spindle clearance D120mm, turning length 2300mm .....	26
Tailstock.....	26
Swivel range.....	28
Tool carrier XYZ bottom left, VDI40 with 12 stations.....	28
Tool carrier XYZ bottom right, VDI40 with 12 stations.....	29
Tool carrier XZ bottom left, VDI40 with 18 stations .....	30
Tool carrier XZ bottom right, VDI40 with 18 stations .....	31
Performance diagram.....	32
Motor milling spindle .....	32
Live tools with tooling system INDEX CAPTO C6.....	32
Live tools with tooling system HSK63 .....	33
Live tools with tooling system VDI40 .....	34
Tool carrier XYZ bottom, VDI40 with 12 stations.....	34
Tool carrier XZ bottom, VDI40 with 18 stations.....	35

## Tool holder selection



For more information, please visit our iXshop at [ixshop.ixworld.com](http://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](mailto: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.

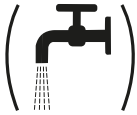
If one of the above-mentioned defects is detected during the inspection of the tool holders, they must be returned immediately for preventive maintenance or repair to the following address:

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



## Tool holders with cooling lubricant supply

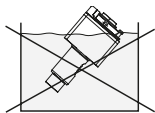
Tool holders marked with this symbol must be operated with cooling lubricant (no dry running permitted).



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  $\leq 50 \mu\text{m}$ .



## 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).

$$n_{\text{prog}} = n_{\text{tool}} \times i$$

$n_{\text{tool}}$  = speed at the cutting tool edge

$n_{\text{prog}}$  = 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  $i = 1:1.48$ )

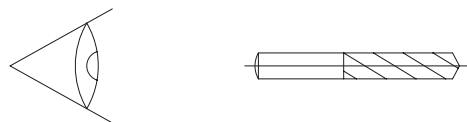
Speed reduction ratios are numbers greater than 1.

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:



### 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.

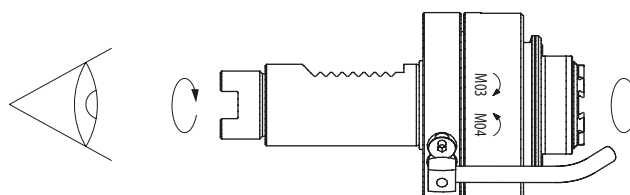


### Reversal of direction of rotation

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



## Tightening torque

The tightening torques of the clamping pieces to the tool holder mounting depends on the shank diameter of the tool holder.

Shank size	Tightening torque
ø 20mm	8 Nm
ø 25mm	20 Nm
ø 30mm	25 Nm
ø 40mm	40 Nm

## Coolant supply

For tools with W-serration and double clamping serration, the 2nd hole for coolant supply must be closed by the end plug and the seal.

The gaskets on the tool shank and the coolant bushing must be regularly checked for damages.

## Replacement seals for tool shank

The gaskets on the tool shank and the cooling lubricant bushing must be regularly checked for damages.

O-ring	Material number	Installation location
ø 18.77 x 1.78	10763730	Shank ø 20mm
ø 23.52 x 1.78	10823023	Shank ø 25mm
ø 28.3 x 1.78	10777976	Shank ø 30mm
ø 37.77 x 2.62	10066870	Shank ø 40mm
ø 9.75 x 1.78	10046965	Cooling lubricant adapter
ø 12.42 x 1.78	10824672	Cooling lubricant adapter

## Sealing air port

It must be ensured on all machines with sealing air ports that the sealing air ports in the tool carrier and in the tool holders are sealed/closed with M5x6 mm set screws.



## Tool holders with fixation



Except for very few cases, all tool holders have been pre-adjusted with high precision and sealed with the INDEX V bar / TRAUB adjusting bar / W-serration.

This setting must not be changed.

The INDEX V bar / TRAUB adjusting bar / W-serration ensures positional accuracy of the tool when re-inserted.

The tool holders are fixed around the shank axis by pins (DIN 69880).

DIN holders can be used.

Double serration of the tool holders allows several uses.

## High-pressure unit



The cooling lubricant up to 80 bar (e.g., for deep-hole drilling) is supplied through the standard cooling lubricant line.

## Load limits of live tools

The drive power and torques are indicated in the performance charts. These values represent the upper limit of the calculated theoretical performance values (average values). In case of interrupted cuts, e.g., for milling, the load peaks occurring when the cutting edge enters the material may be much higher than the theoretical torque according to the performance chart.



The cutter should be selected so that a cutting edge is constantly being used for cutting during the machining process.

## Live tool holders

Only the tool located in the working position is live.

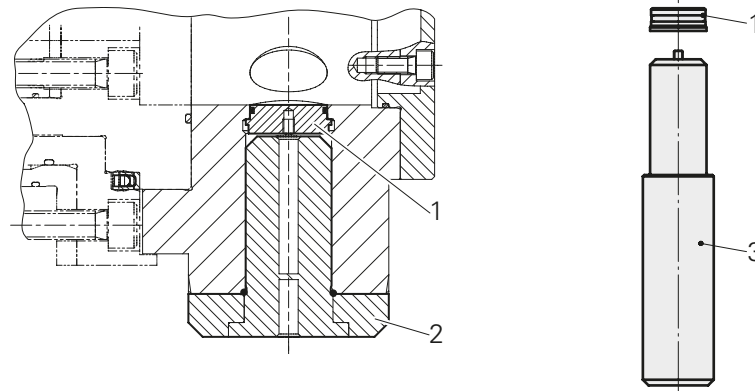
The live tool holders are inserted into the mounting bores in the tool carriers just like non-live tool holders.

Each turret station can accept one live tool.

The motor drives the tool that is exclusively in working position. In addition, the index drive is actuated by switching using the same motor.



The sealing washer (1) must be removed first.



Tool carrier XYZ VDI40 with 12 stations

- |   |                |          |
|---|----------------|----------|
| 1 | Sealing washer | 12014790 |
| 2 | Blanking plug  | 10911003 |
| 3 | Mounting pin   | 10682808 |

Tool carrier XZ VDI40 with 18 stations

- |   |                |          |
|---|----------------|----------|
| 1 | Sealing washer | 12014790 |
| 2 | Blanking plug  | 10573819 |
| 3 | Mounting pin   | 10682808 |



Before using the machine, make sure that all mounting bores without a tool have been closed with a sealing washer and that the gasket on all tool holders is not damaged.



Any mounting bores not used must be closed with blanking plugs during machining processes.

## Weight distribution on turret head



Tool holders may have considerably different weights depending on their function and equipment. Therefore, be sure to balance the tool holders evenly around the turret head when tooling.

## Collision

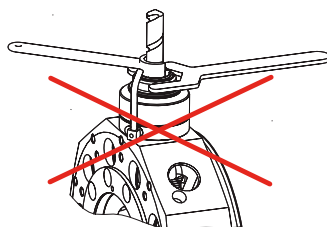


After a collision has occurred, check whether the tool carrier has been displaced. If this is the case, the tool carrier must be realigned to ensure that the drive and tool holder gears accurately engage with each other.

## Tool change on live tool holders

To avoid damaging or changing the adjustment of the drive train in the turret, tools must **not** be changed on the live tool holders inserted in the turret.

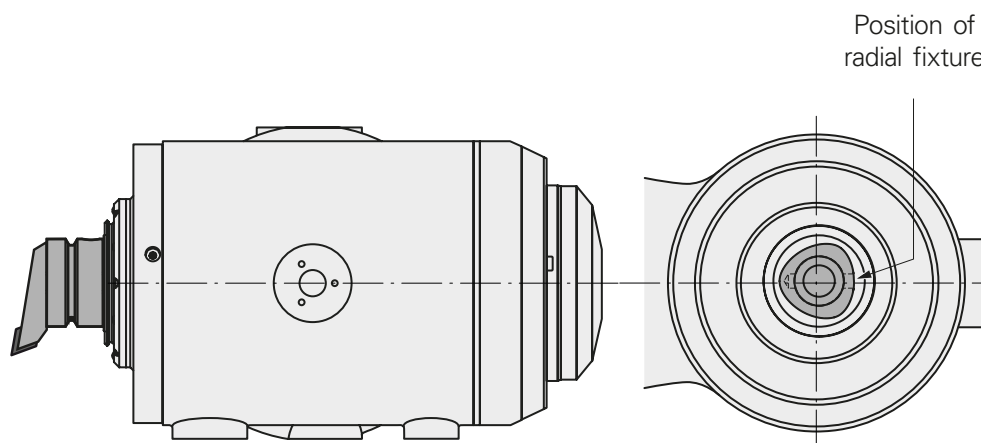
Tools in live tool holders must be changed outside the machine.



## Upper tool carrier, with motorized milling spindle

### 1 live tool station INDEX CAPTO C6

A live tool holder can be used on the motorized milling spindle



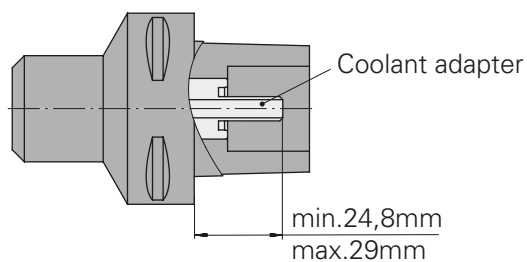
No rotation is permitted when using blanking plugs!



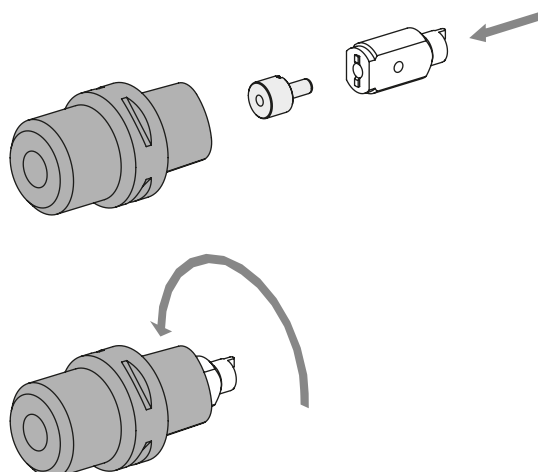
#### **Caution!**

Risk of damage by ingress of cooling lubricant!

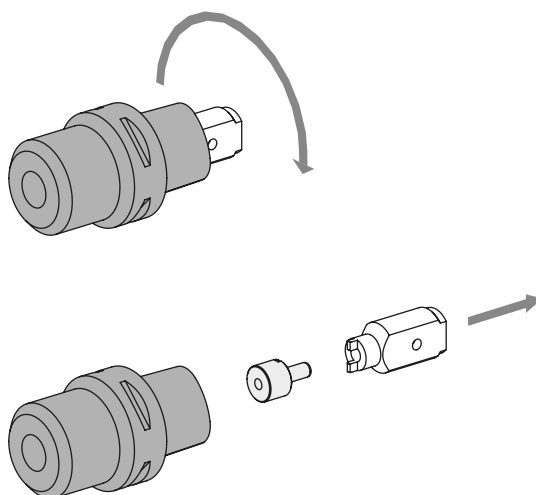
Tool holders in the motorized milling spindle may only be **with** installed coolant adapters!

**Coolant adapter, INDEX CAPTO C6****Coolant adapter set and socket wrench**

Coolant adapter set INDEX CAPTO C6	10865732
Socket wrench INDEX CAPTO C6	12144844

**Fitting/removing the coolant adapter set**

For removal, the socket wrench must be turned through 180°.

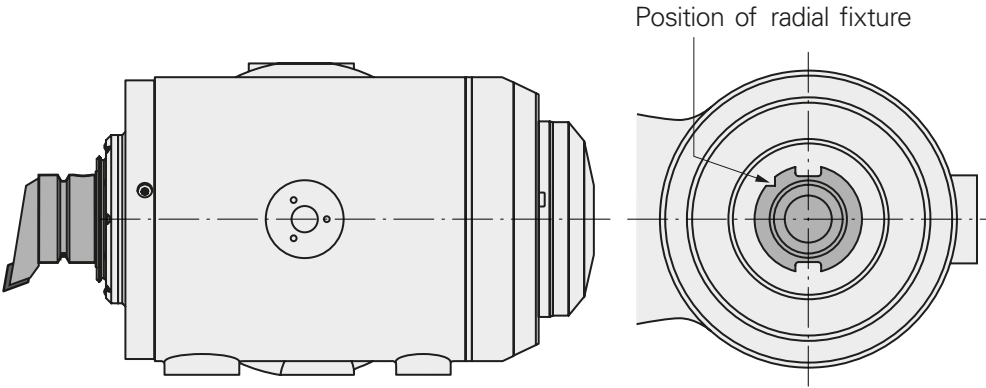


Upper tool carrier, with motorized milling spindle

1 live tool station HSK63

A live tool holder can be used on the motorized milling spindle

HSK63 with form T on turning tools  
HSK63 with form A on drilling and milling tools



No rotation is permitted when using blanking plugs!



**Caution!**  
Risk of damage by ingress of cooling lubricant!  
Tool holders in the motorized milling spindle may only be **with** installed coolant adapters!

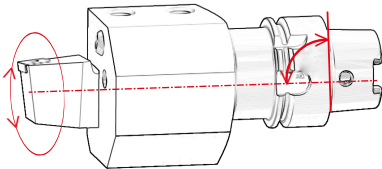
Ultimate strength, HSK63



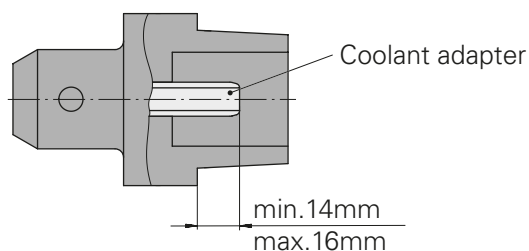
Damage to motor milling spindle, tool holder, workpiece possible.  
Observe the ultimate strength of the tool systems.

Ultimate strength of the tool systems according to VDMA 34181:

HSK	Torsional moment about axis of rotation [Nm]	Ultimate bending moment transverse to the flat position [Nm]
63	200	550



### Coolant adapter, HSK63



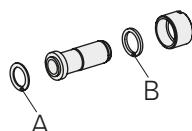
### Coolant adapter set and socket wrench

Coolant adapter set HSK63 max. 80bar	11074450
Coolant adapter set HSK63 max. 120bar	12024087
Socket wrench HSK63	10352082

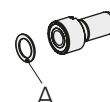
### Replacement seals for the coolant adapter set

The sealing rings on the coolant adapter set must be inspected regularly for damage.

max. 80bar

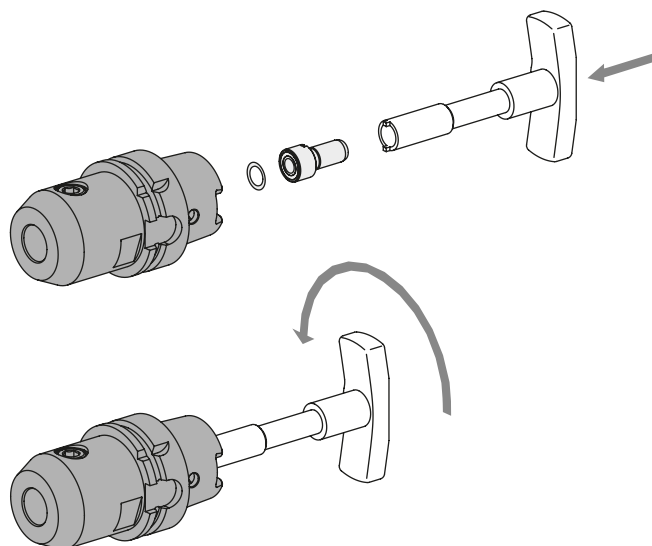


max. 120bar



	O-ring	Material number	Installation location
A	ø 10 x 2,5	10272045	HSK63 max. 80bar, face side
B	ø 11 x 2,0	10401120	HSK63 max. 80bar, inside
A	ø 10 x 2,5	10272045	HSK63 max. 120bar, face side

### Installation of coolant adapter set



# Tool holders with HSK shank

## Balanced tool holders – balance quality

When operating rotating tools in the tool spindle (milling spindle), balanced tool holders must be used.



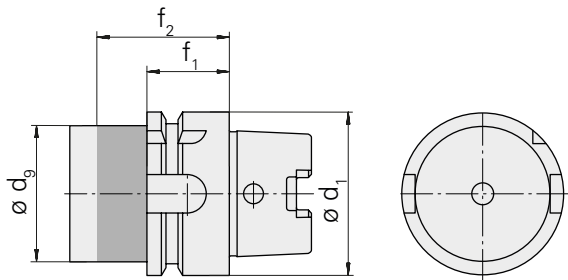
**Caution!**  
**Rotating tool holders (including tools) must have a balance quality of G6.3 or better in relation to the respective speed used!**

## Balancing – Tool holder with tool

according to DIN 69893-1 as of April 2011

If balancing of the hollow taper shank is required after tools or equipment (e.g., adapters) are mounted on the shank, this should be restricted to the preferred balancing zone.

### Balancing zone



Nominal size	25	40	50	63	80
$d_1$ h10	25h10	40h10	50h10	63h10	80h10
$d_9$ max.	20	34	42	53	68
$f_1$ $^{0}_{-0.1}$	10	20	26	26	26
$f_2$ min.	20	35	42	42	42

Dimensions in mm

To ensure free interchangeability of the individual components of this tool mounting system, all parts (e.g., tool, tool holder, etc.) should be individually balanced.



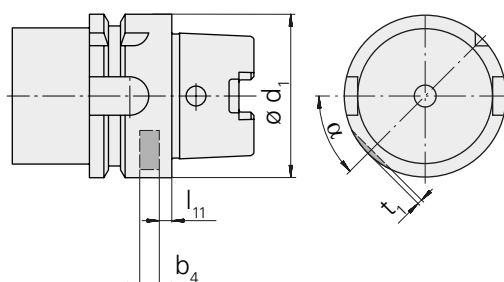
## Balancing – Tool holder without tool

according to DIN 69893-1 as of April 2011

If balancing of the hollow taper shank is required before tools or equipment (e.g., adapters) are mounted on the shank, this can be done with a balancing surface and a balancing bore.

The balancing surface is used exclusively to compensate for the orientation notch. The installation space for a data carrier according to DIN 69873 is not taken into account.

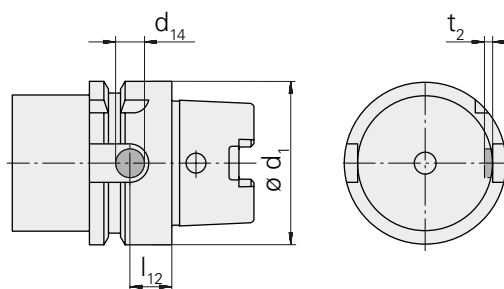
### Balancing surface



Nominal size	25	40	50	63	80
$b_4$	3	6.0	6.0	6.0	6.0
$l_{11}$	7	4.0	4.0	4.0	4.0
$t_1$	1.2	1.3	1.6	1.7	2.6
$\alpha$	45°	45°	45°	45°	45°

Dimensions in mm

### Balancing bore



Nominal size	25	40	50	63	80
$d_{14}$	5.8	8.0	11.0	14.0	16.0
$l_{14}$	-	-	-	-	-
$t_2$	2.5	2.5	2.7	2.7	3.0

Dimensions in mm

## Tool magazine 1+2

### INDEX CAPTO C6

Max. weight of single tool 10kg

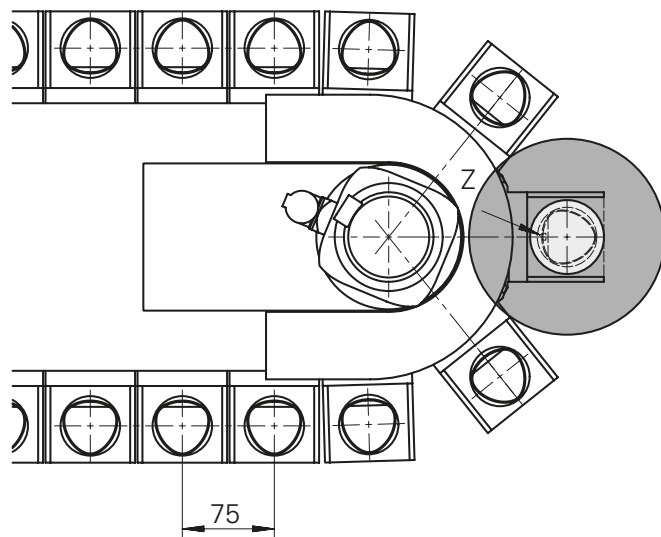
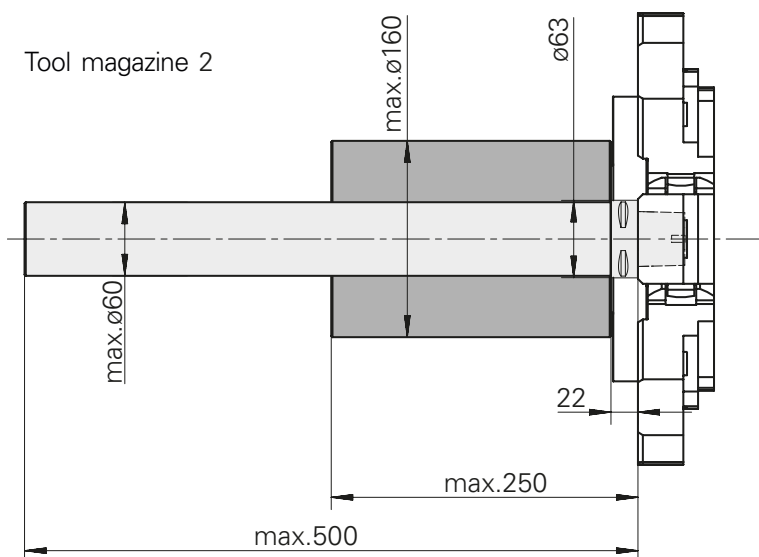
Max. tilting torque 15Nm



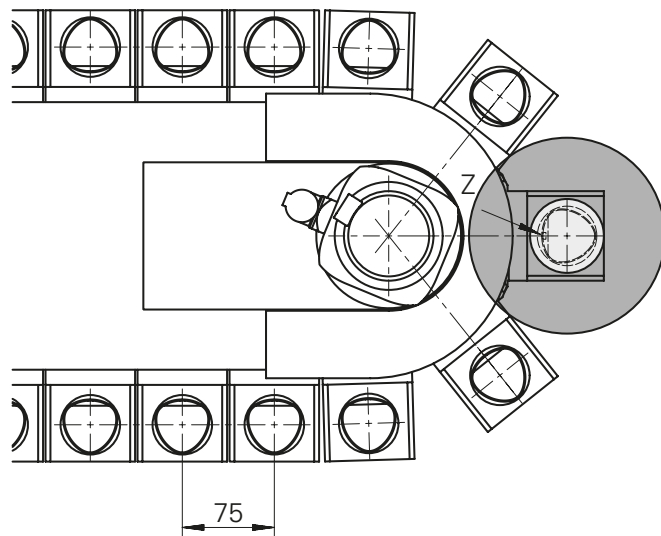
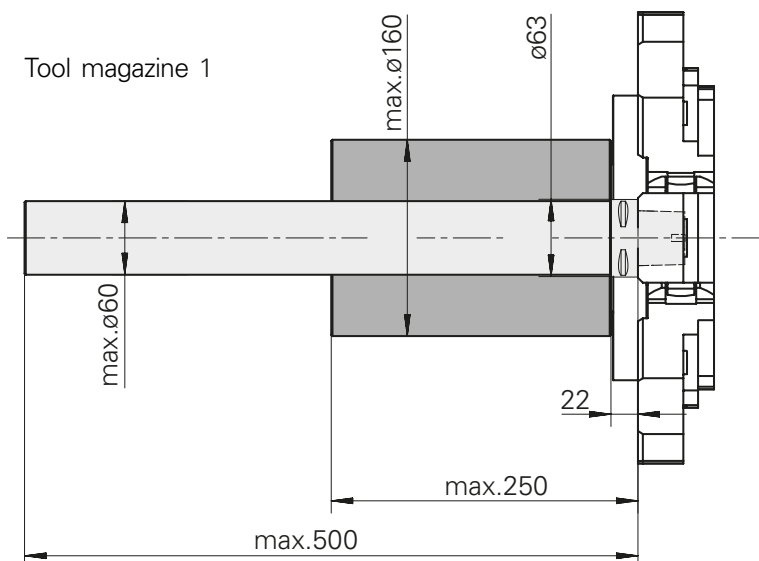
If tools with a diameter greater than  $D_{\text{Norm}} = 70\text{mm}$  are used, the two adjacent pockets in the tool magazine must remain empty.

The maximum allowable tool weight is 10kg.

Tool magazine 2



Tool magazine 1



Z = Position of radial fixture

## Tool magazine 1+2

### HSK63

Max. weight of single tool 10kg

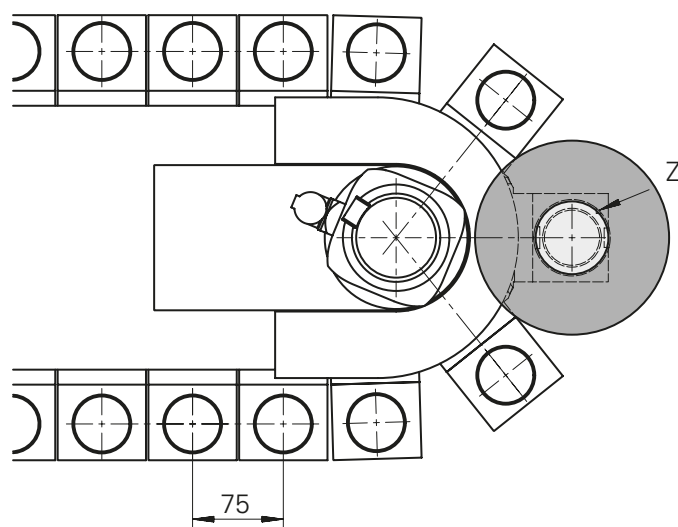
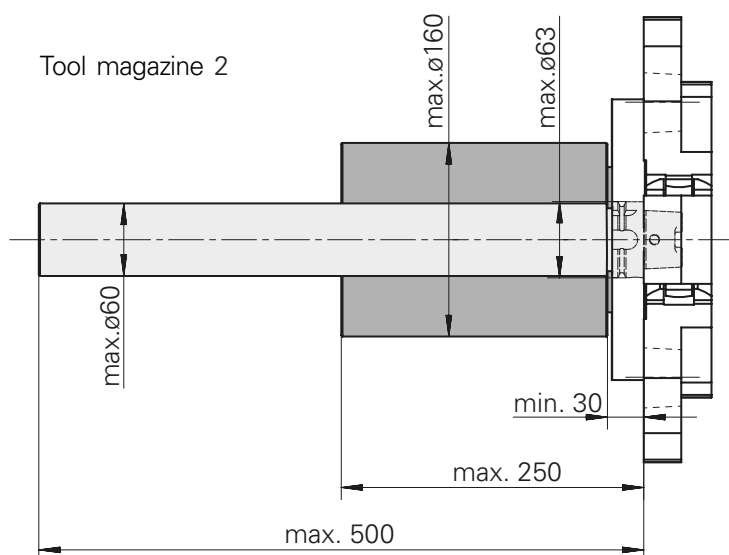
Max. tilting torque 15Nm



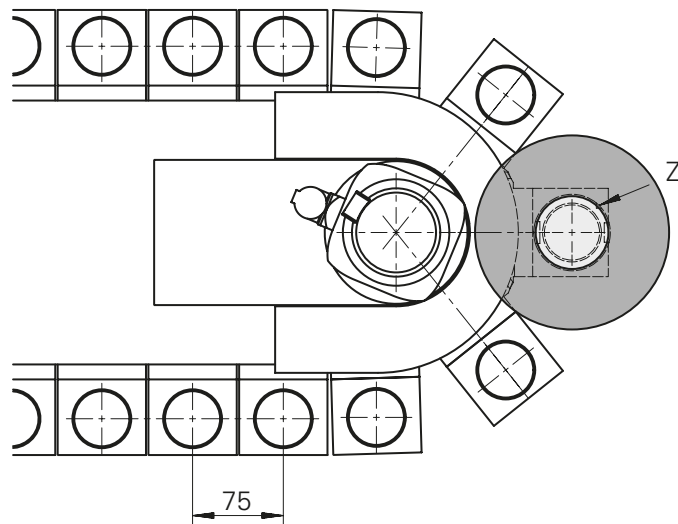
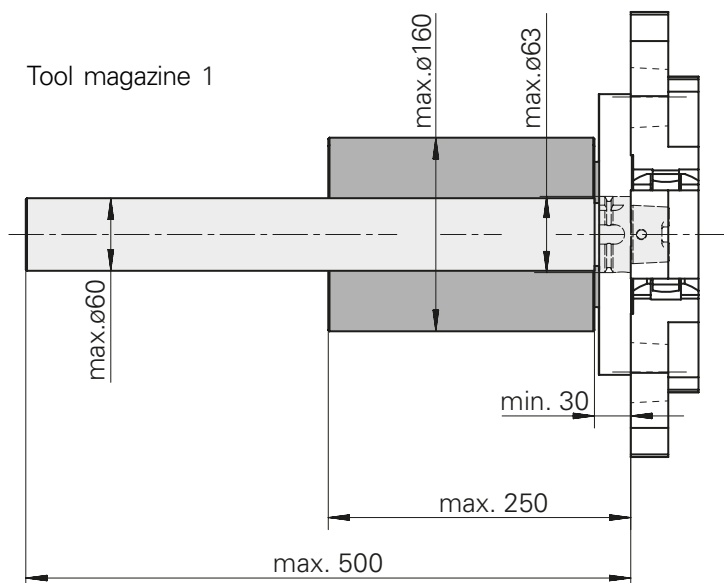
If tools with a diameter greater than  $D_{\text{Norm}} = 70\text{mm}$  are used, the two adjacent pockets in the tool magazine must remain empty.

The maximum allowable tool weight is 10kg.

Tool magazine 2



Tool magazine 1



Z = Position of radial fixture

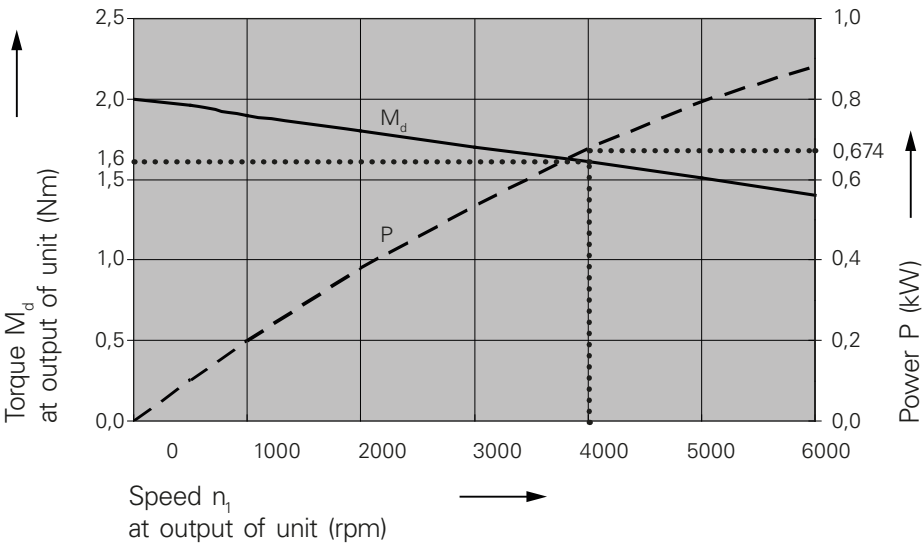
Notes on how to use the diagram when using tool holders

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  $i \neq 1$ , 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.

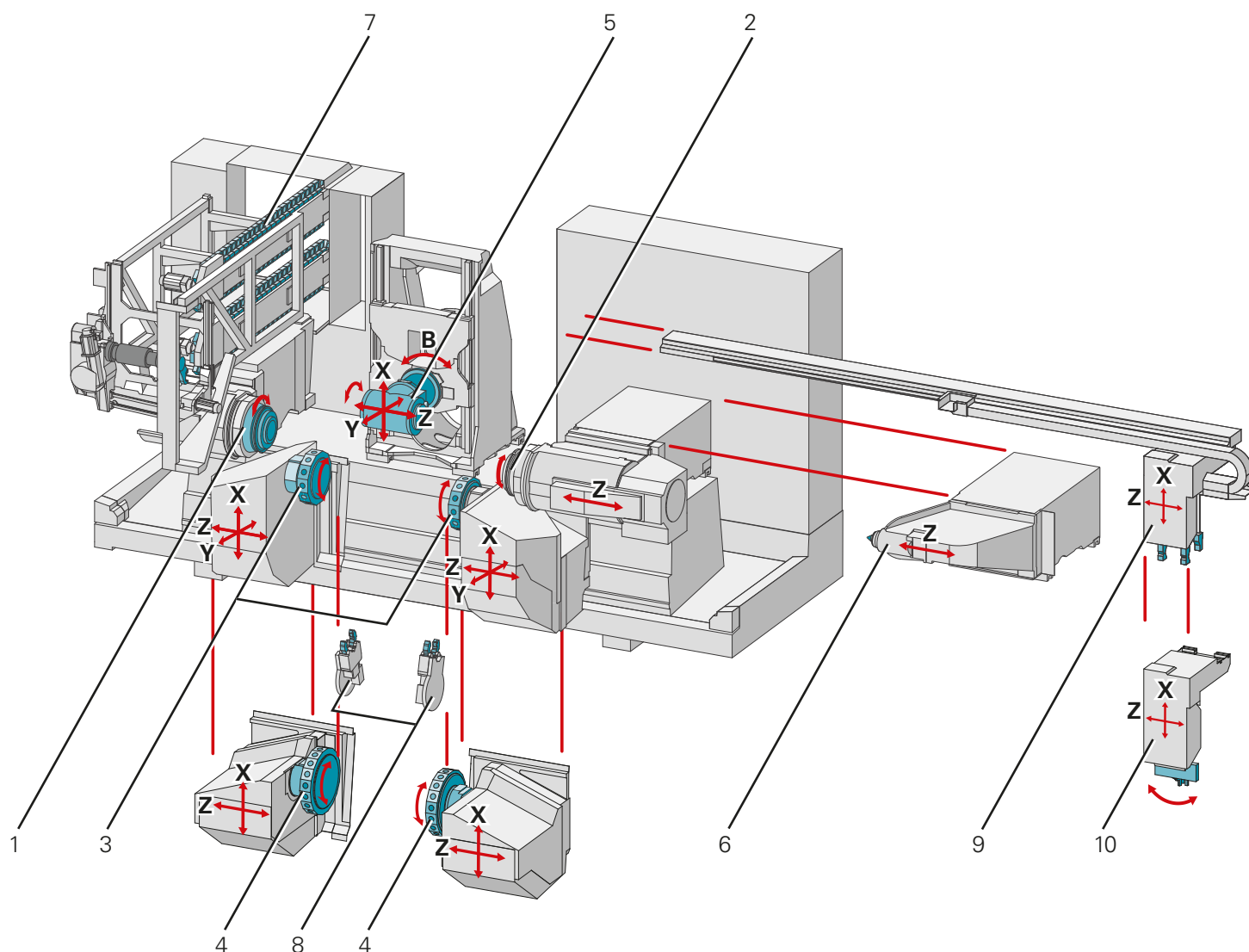
Example (at 100% duty cycle):

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



The transmission ratio and the technical data of each tool holder are available in our iXshop at [ixshop.ixworld.com](http://ixshop.ixworld.com)

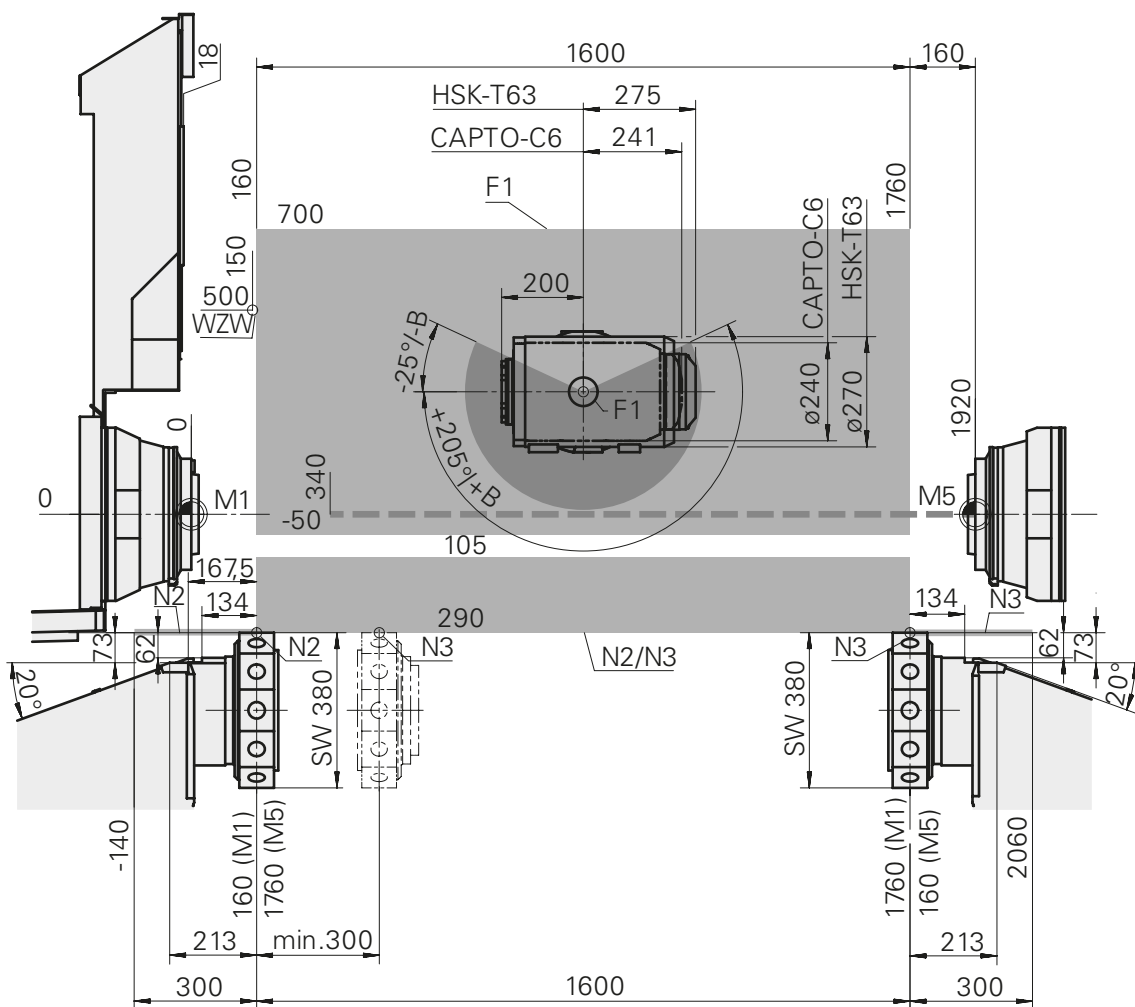
## Modular system of INDEX G420, INDEX G520



- 1 Main spindle
- 2 Counter spindle
- 3 Lower tool carrier VDI40 - XZY (INDEX G420)
- 4 Lower tool carrier VDI40 - XZ (INDEX G420/G520)
- 5 Motor milling spindle - XYZB

- 6 Tailstock
- 7 Tool magazine
- 8 Lower turret steady rests (optional)
- 9 Shaft type workpiece handling unit (optional)
- 10 Flange type workpiece handling unit (optional)

**Motor milling spindle, tool carrier XYZ, VDI40 with 12 stations (SW380)**  
**Main/counter spindle, spindle clearance D120mm, turning length 1600mm**

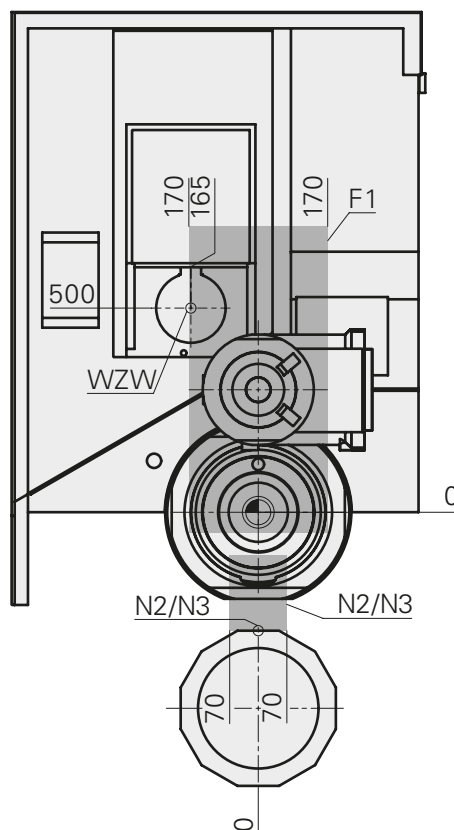


Technical drawing of the N5 cable assembly. The side view on the left shows a multi-stranded cable with a diameter of 210 and a mounting bracket labeled M1. The top view on the right shows a square connector with a central pin and a diameter of 150. The cable length is indicated as 1700, with a minimum clearance of 60 from the connector. The cable is labeled N5.

## Work area of INDEX G420

Motor milling spindle, tool carrier XYZ, VDI40 with 12 stations (SW380)

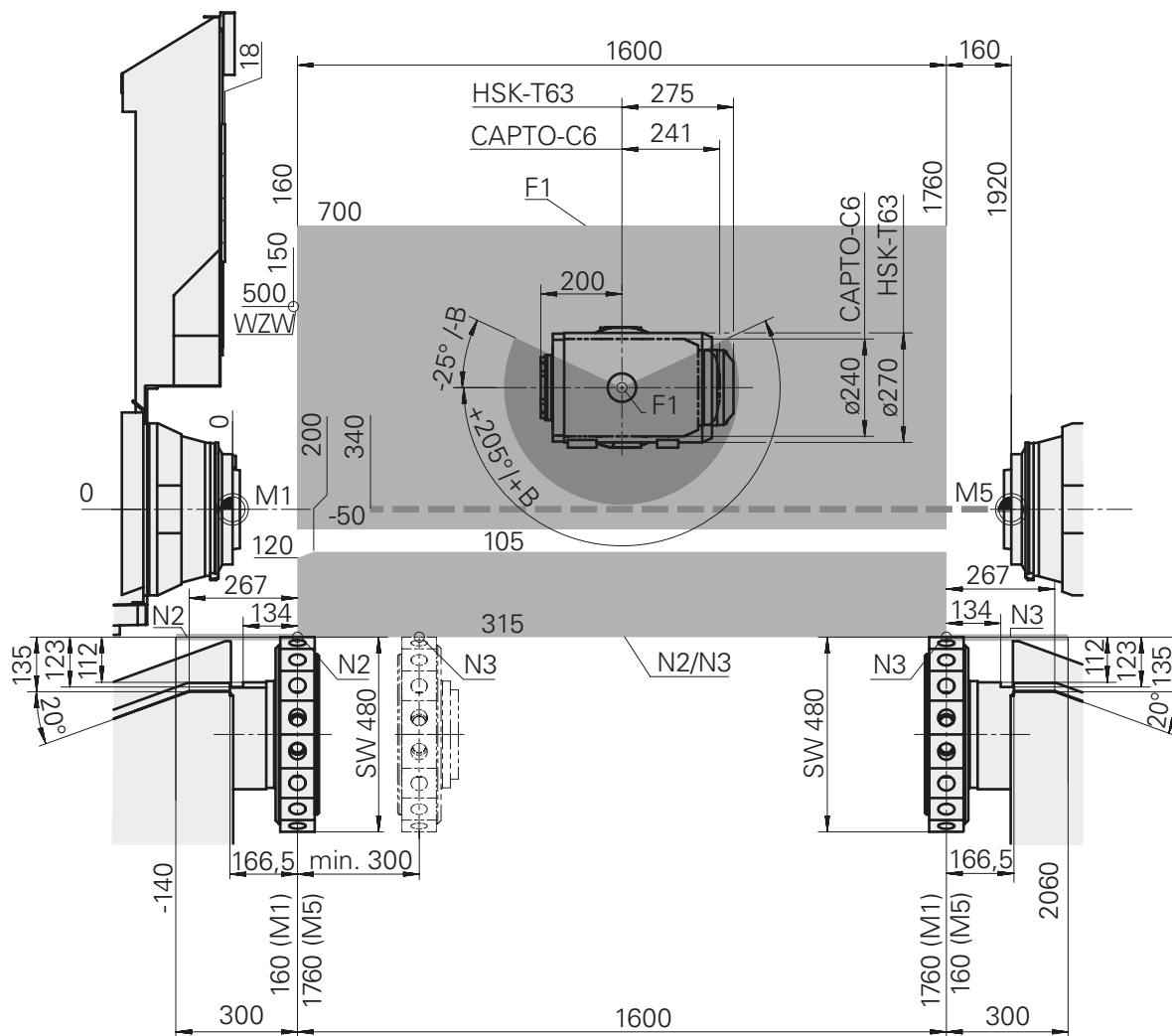
Main/counter spindle, spindle clearance D120mm, turning length 1600mm



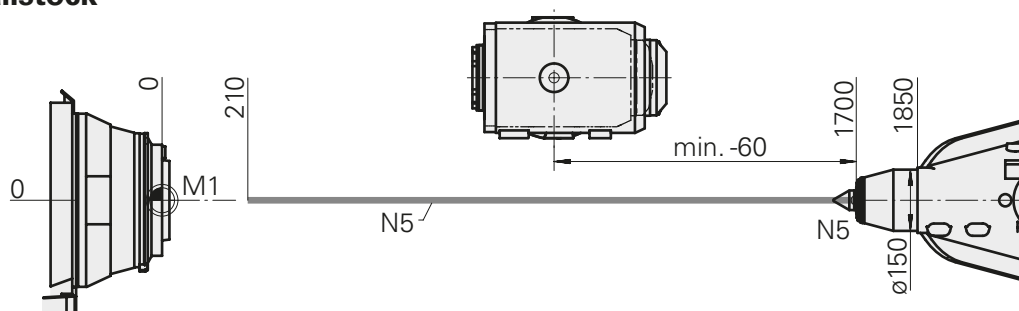
## Work area of INDEX G420, INDEX G520

**Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)**

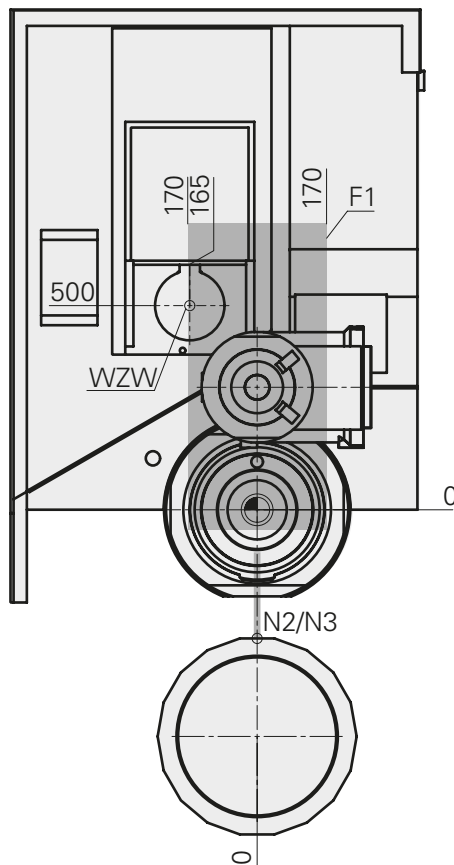
**Main/counter spindle, spindle clearance D120mm, turning length 1600mm**



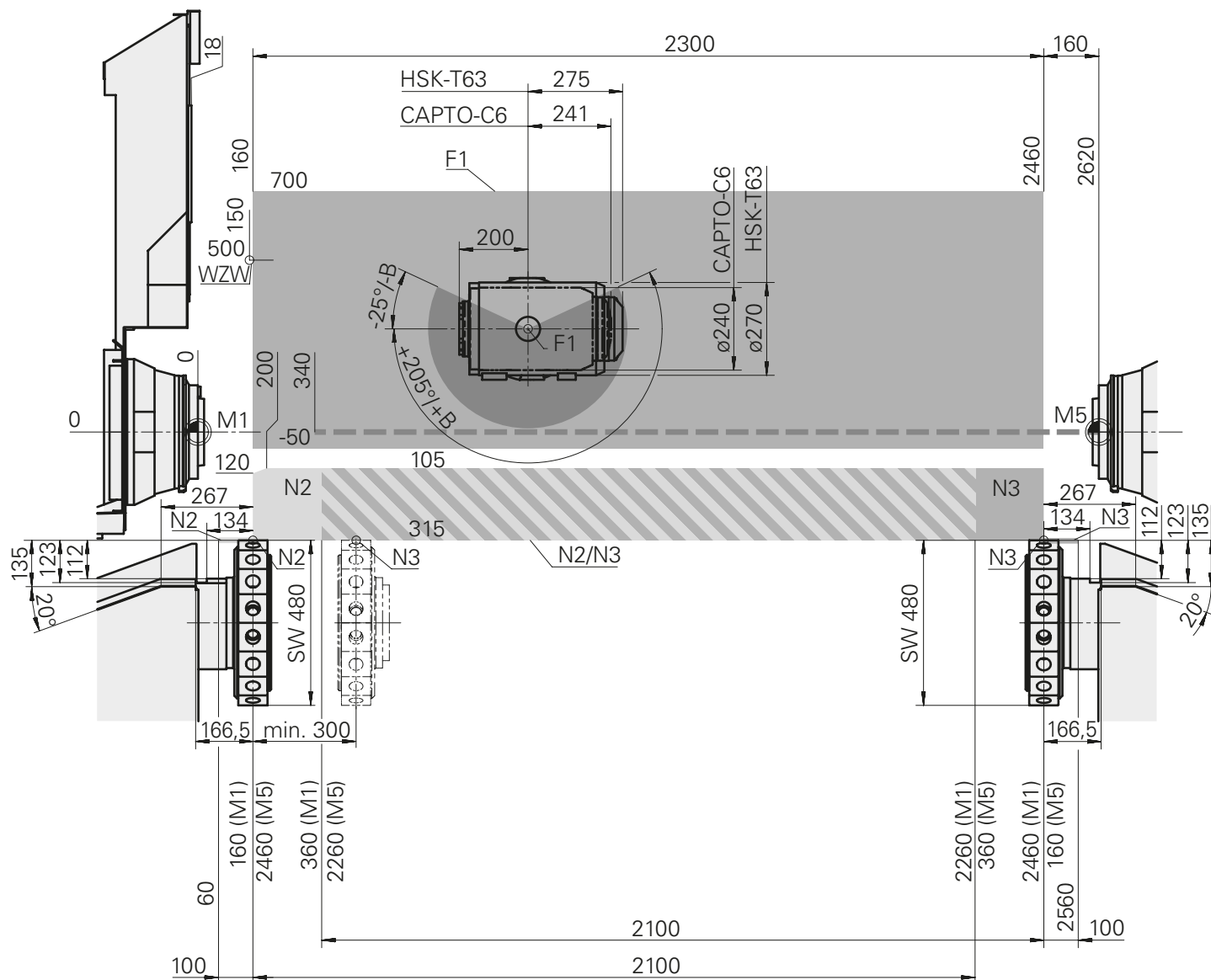
## Tailstock





**Work area of INDEX G420, INDEX G520****Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)****Main/counter spindle, spindle clearance D120mm, turning length 1600mm**

**Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)**  
**Main/counter spindle, spindle clearance D120mm, turning length 2300mm**

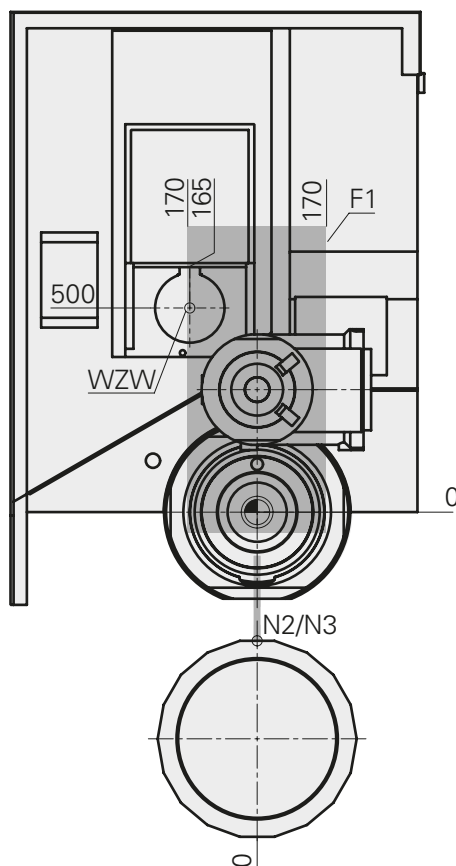


Technical drawing of the N5 cable assembly. The side view on the left shows the cable profile with dimensions 0, 210, and M1. The top view on the right shows the cable cross-section with dimensions 2400, 2550, and Ø150. A dimension of min. -60 is indicated for the cable length. The cable is labeled N5.

## Work area of INDEX G420, INDEX G520

Motor milling spindle, tool carrier XZ, VDI40 with 18 stations (SW480)

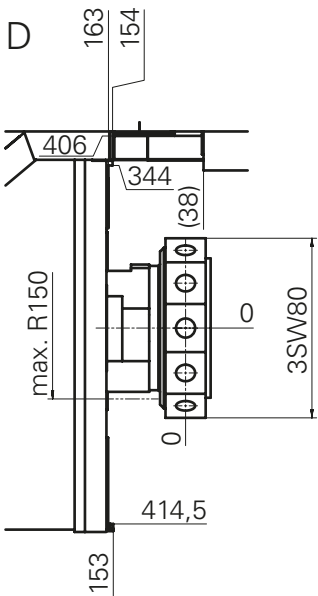
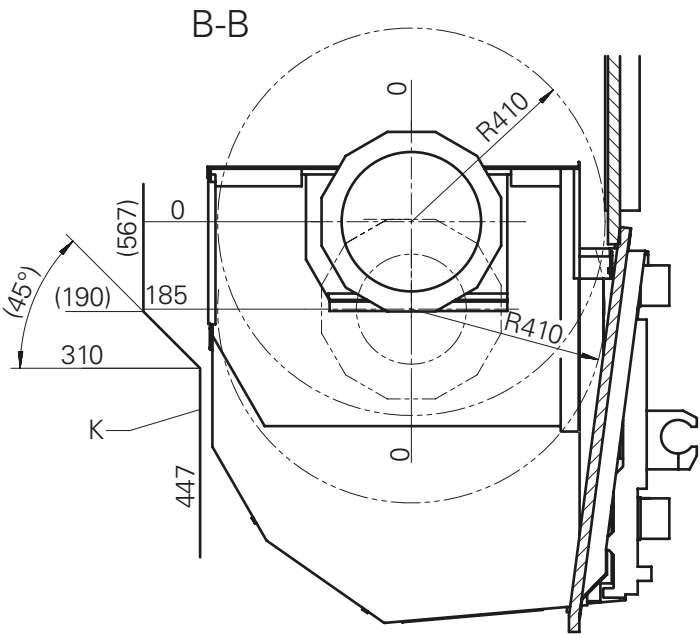
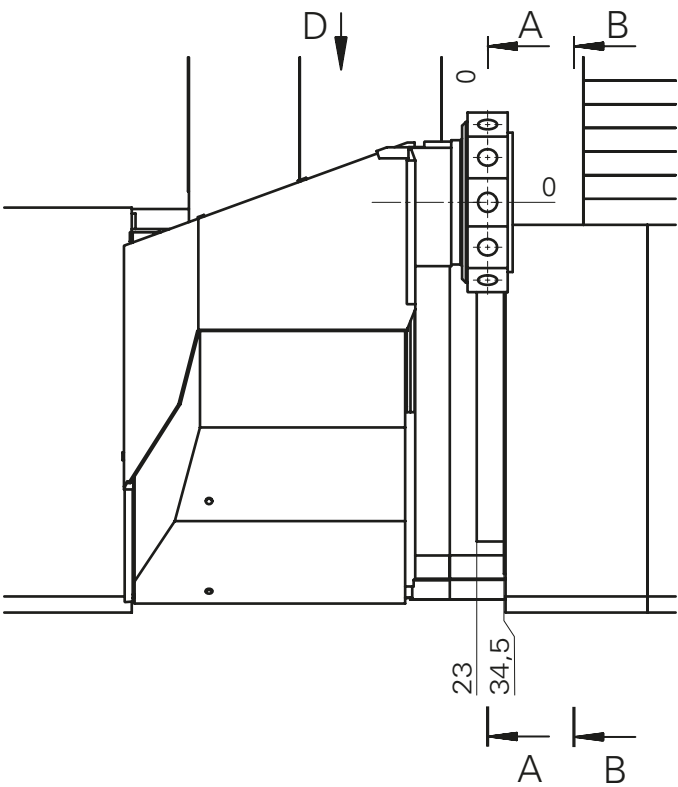
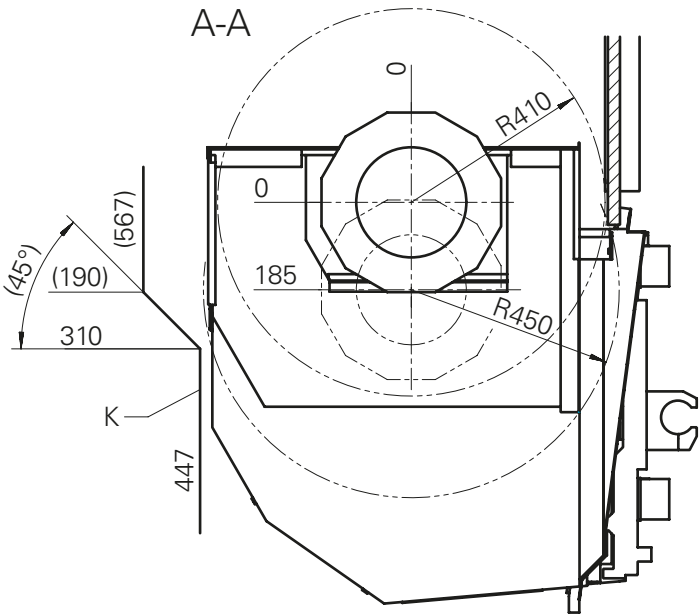
Main/counter spindle, spindle clearance D120mm, turning length 2300mm



Swivel range

Tool carrier XYZ bottom left, VDI40 with 12 stations

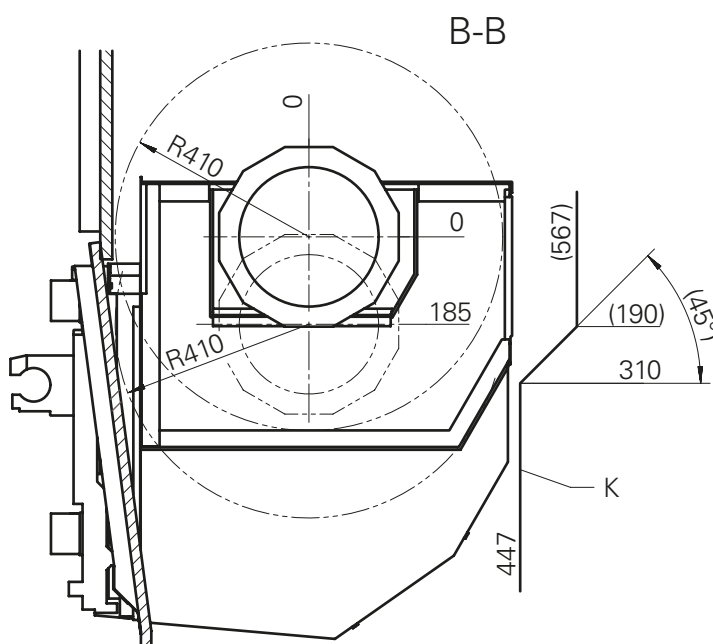
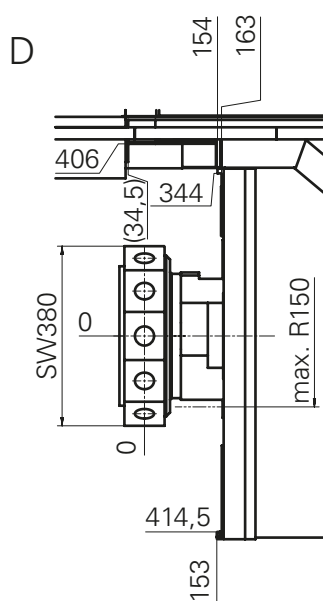
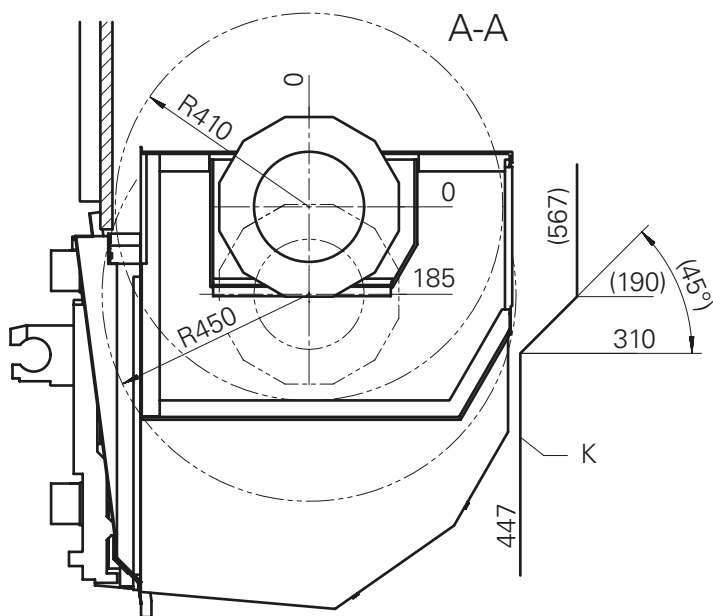
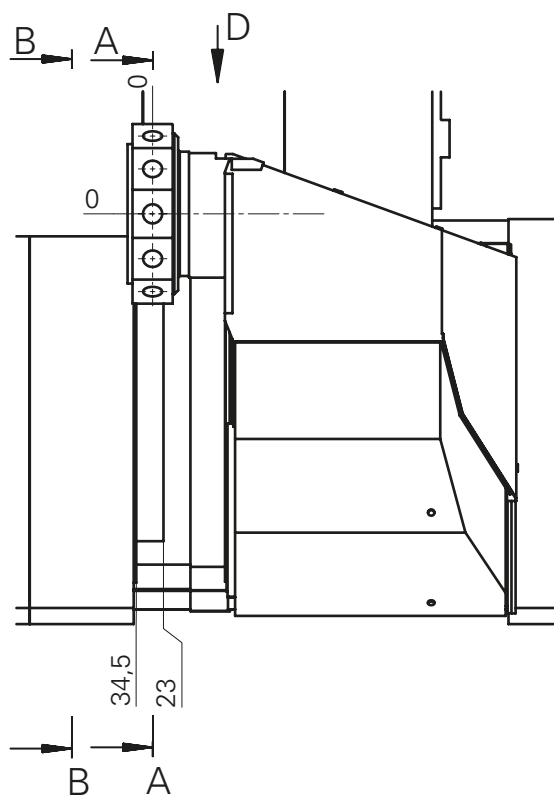
K = work area door contour



## Swivel range

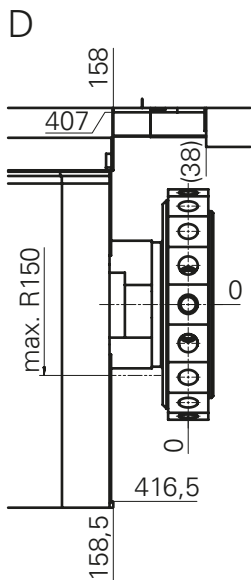
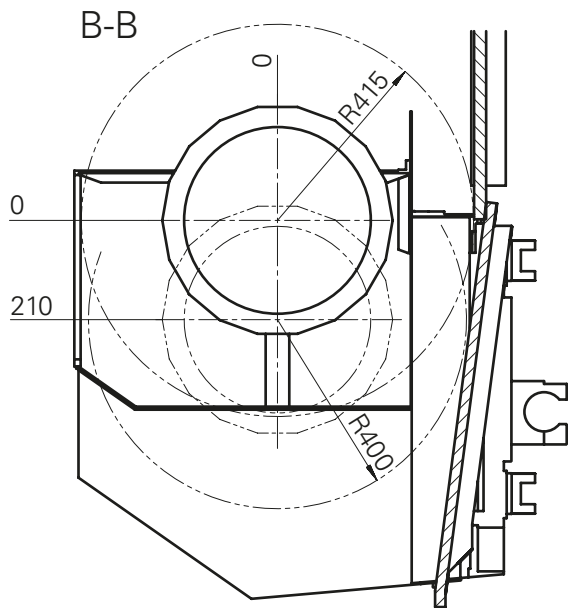
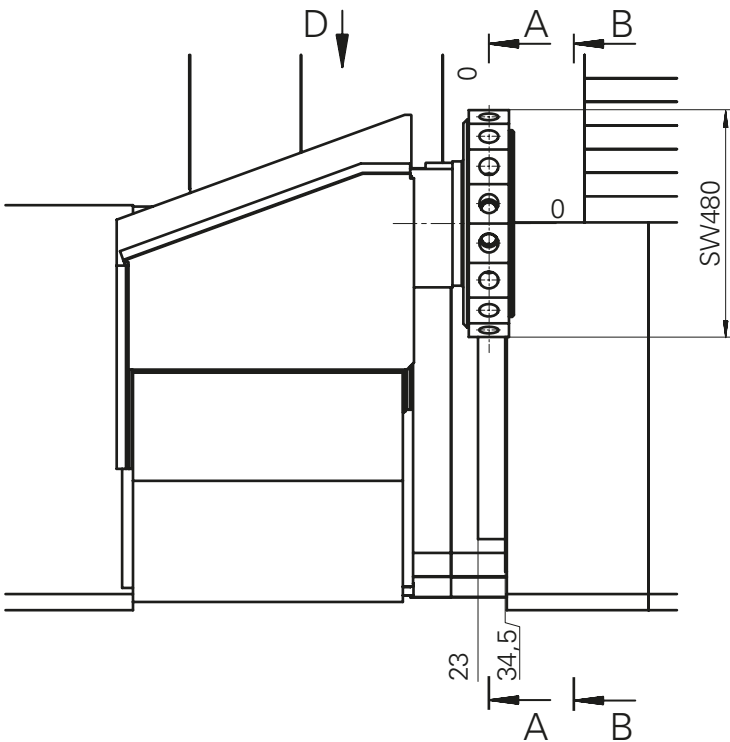
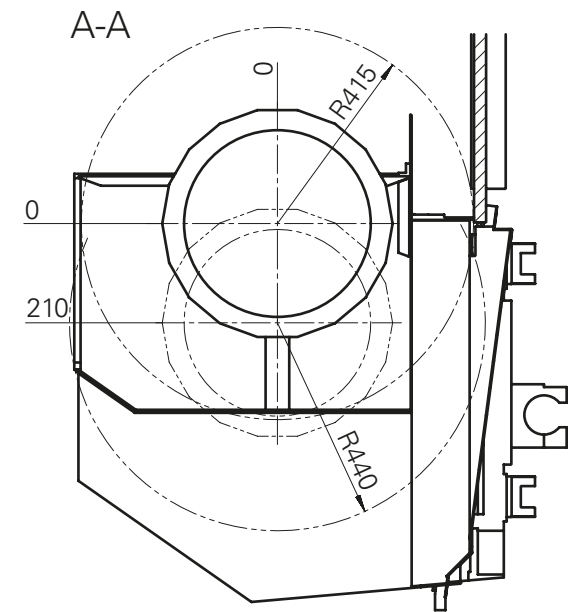
### Tool carrier XYZ bottom right, VDI40 with 12 stations

K = work area door contour



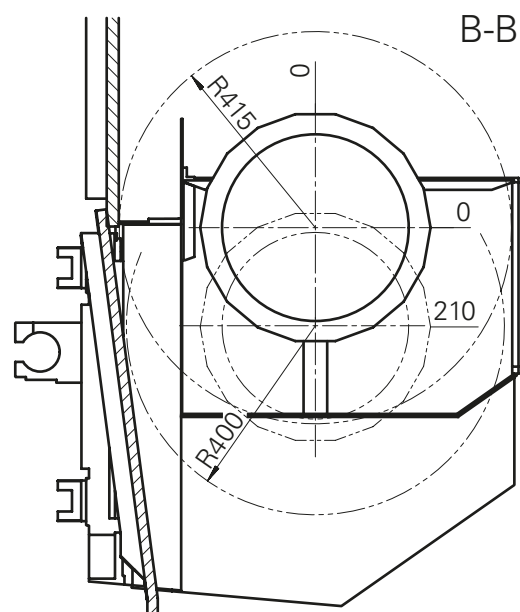
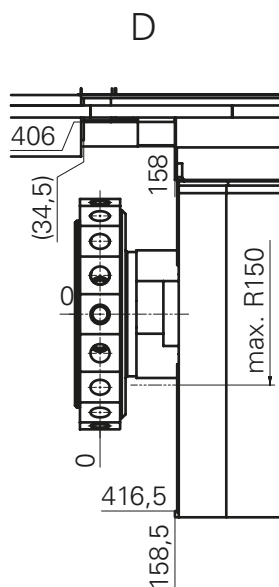
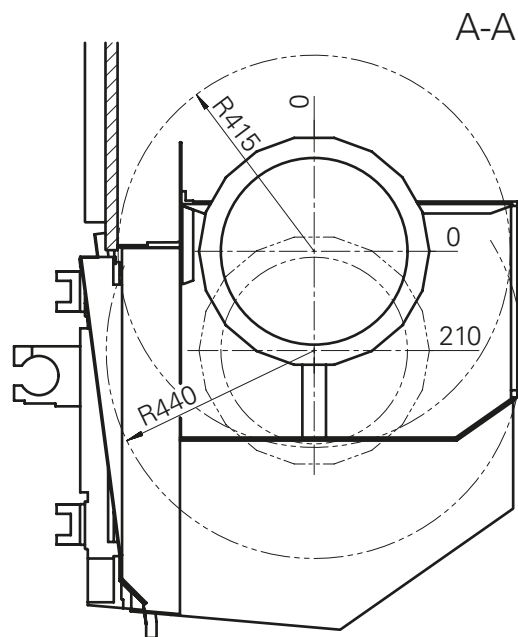
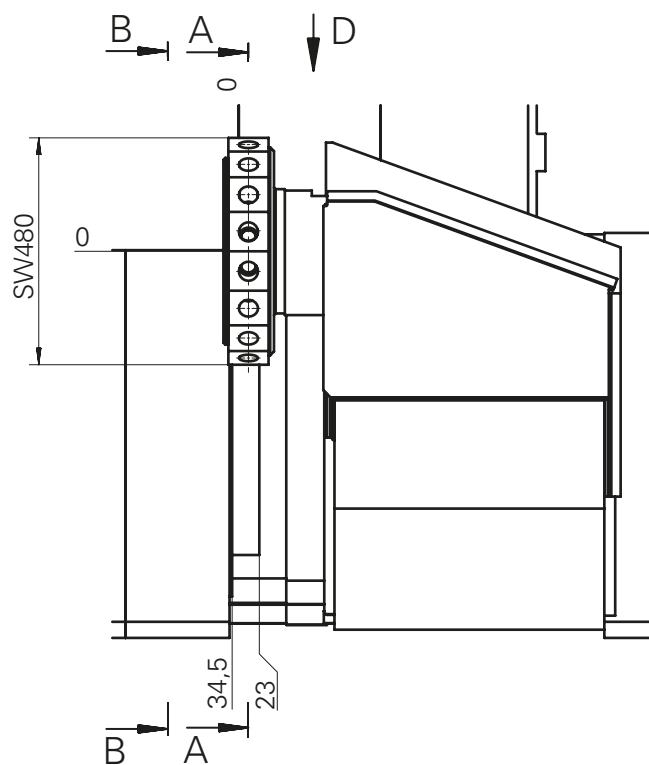
Swivel range

Tool carrier XZ bottom left, VDI40 with 18 stations



## Swivel range

**Tool carrier XZ bottom right, VDI40 with 18 stations**




Performance diagram

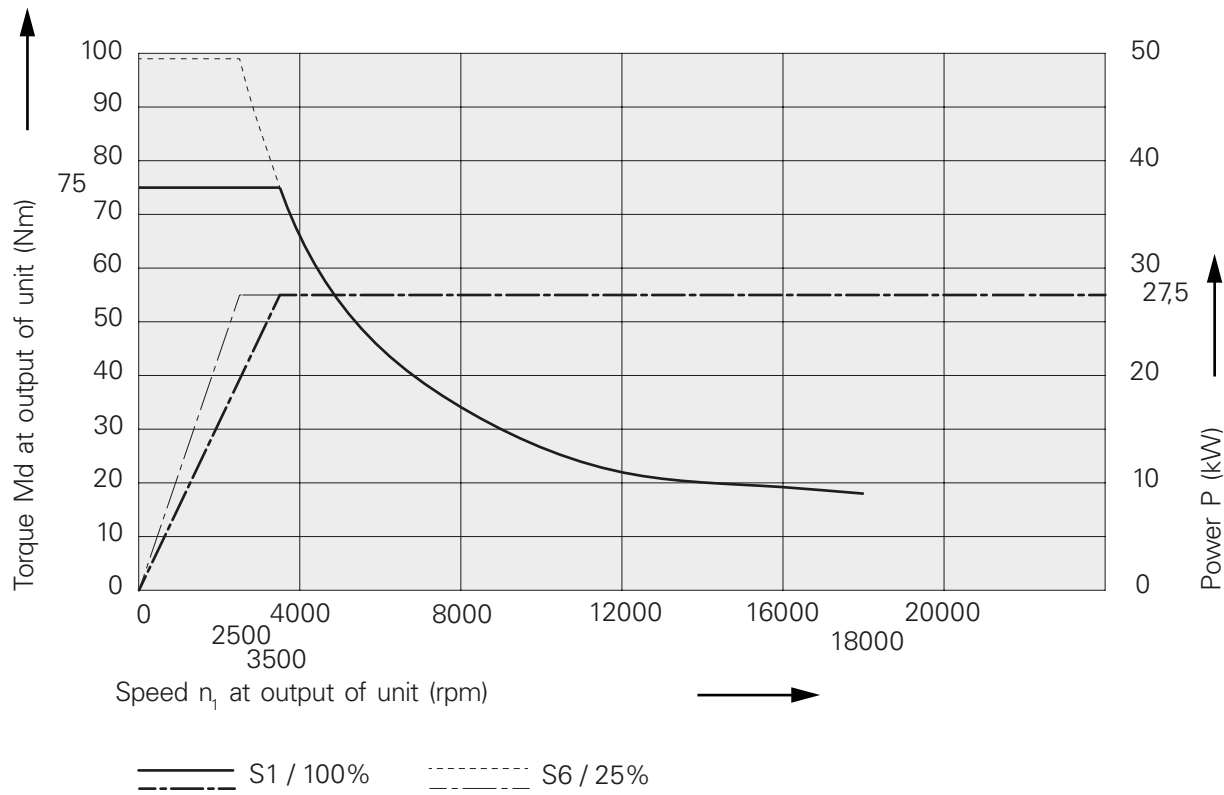
Motor milling spindle

Live tools with tooling system INDEX CAPTO C6

Speed range 0-18000rpm



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





## Performance diagram

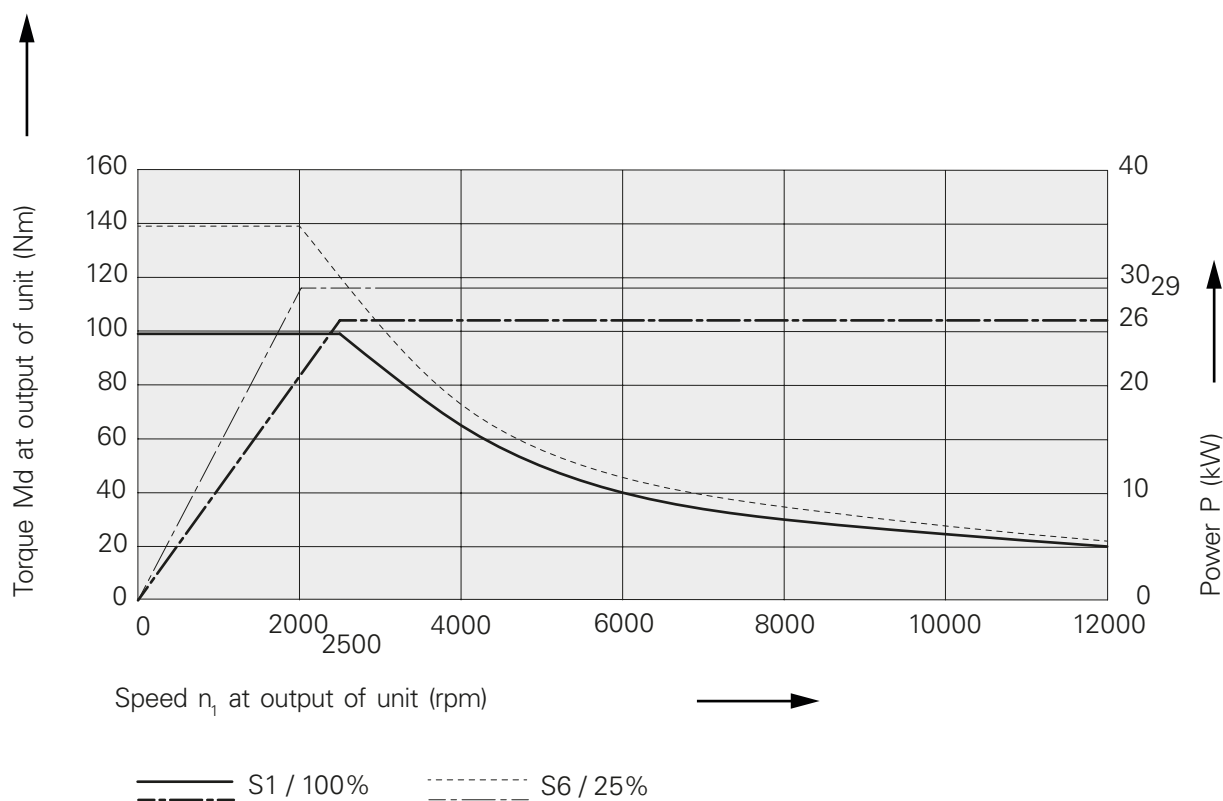
### Motor milling spindle

#### Live tools with tooling system HSK63

Speed range 0-12000rpm



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




Performance diagram

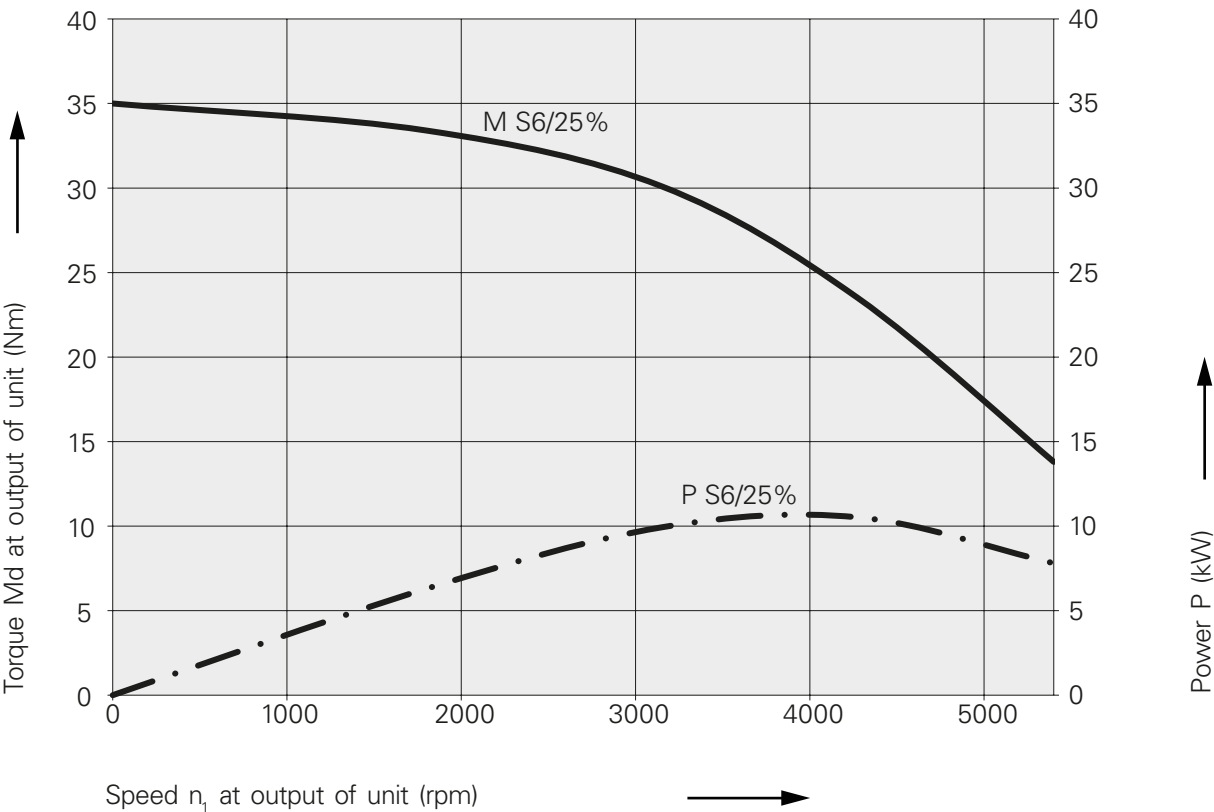
Live tools with tooling system VDI40

Tool carrier XYZ bottom, VDI40 with 12 stations

Speed range 0-5400rpm



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



## Performance diagram

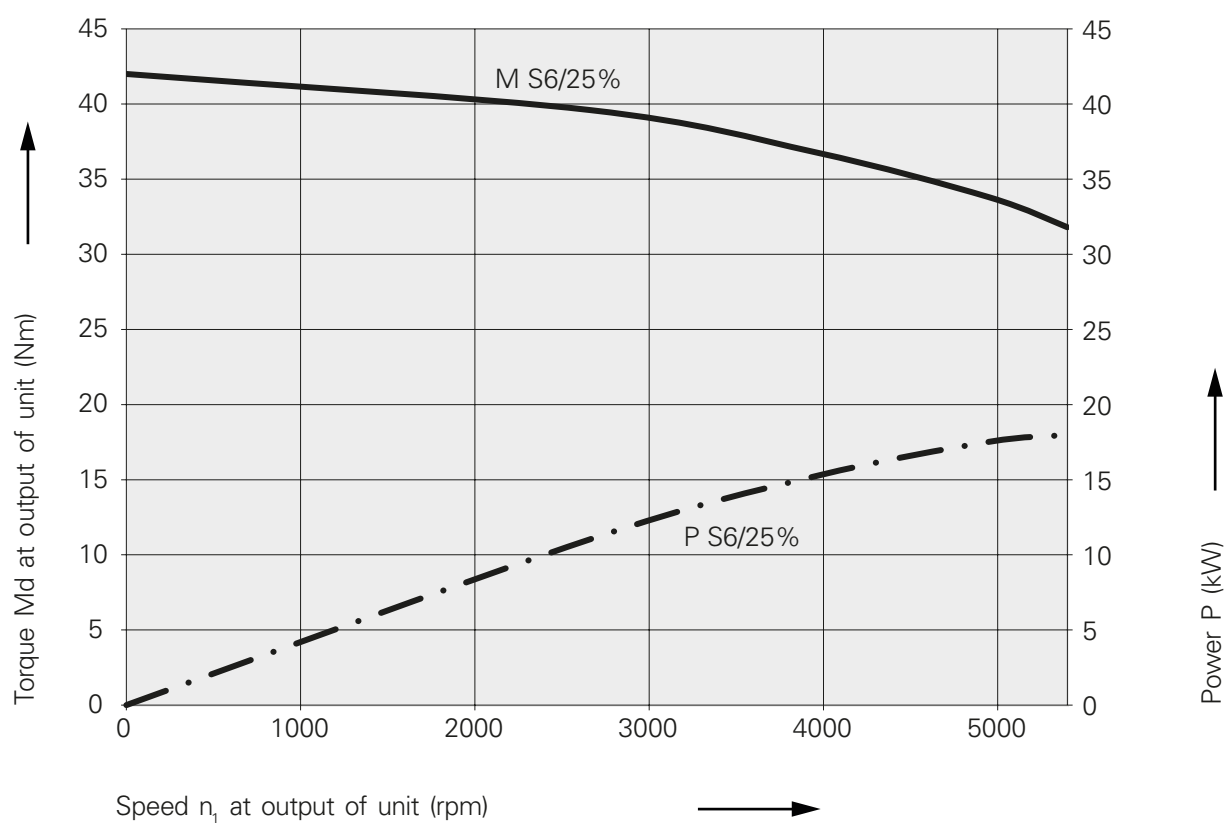
### Live tools with tooling system VDI40

#### Tool carrier XZ bottom, VDI40 with 18 stations

Speed range 0-5400rpm



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



# INDEX

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