INDEX

INDEX G220

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

INDEX

INDEX

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.

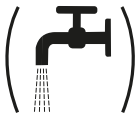
The drive pinion and drive clutch of the live tool holders must be subjected to a visual inspection for damage or wear.

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

Tool holders with cooling lubricant supply

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

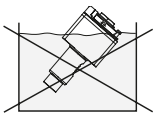


Tool holders marked with this symbol can be converted from external cooling lubricant supply to internal cooling lubricant supply.
Observe dry running capability of IC attachment!

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

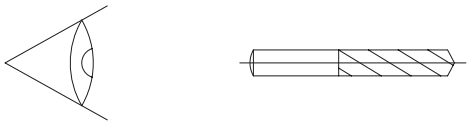
This means the speed increase or speed reduction is not specified as a fraction but as **a number**.

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

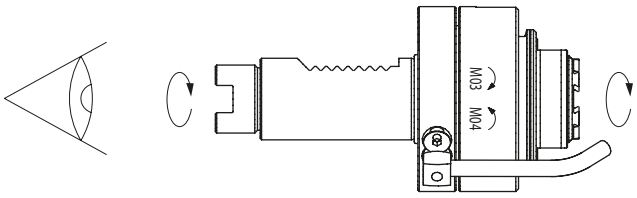
No reversal of direction of rotation
When the holder drive shaft has the **same** direction of rotation as the tool cutting edge, the clockwise direction of run must be specified by M03 (clockwise rotation). Accordingly, counter-clockwise rotation must be specified by M04.

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



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

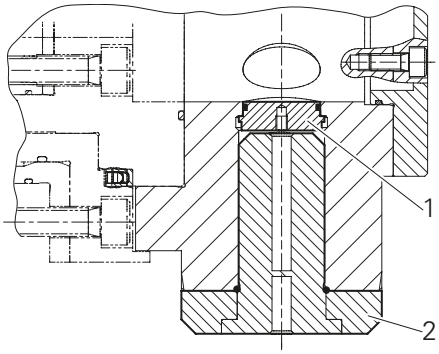
Only the tool located in the working position is live.

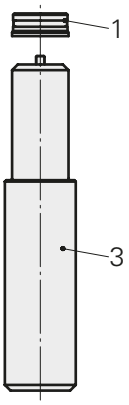
The live tool holders are inserted into the mounting bores in the tool carriers just like non-live tool holders.

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.





VDI25	1	Blanking plug	10276629
	2	Blanking plugs	11046612
	3	Mounting pin	10010523
VDI30	1	Blanking plug	10346973
	2	Blanking plugs	10581081
	3	Mounting pin	10066228

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.

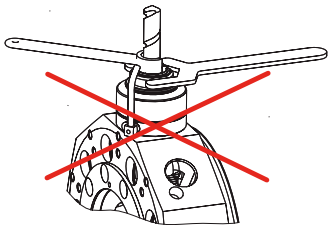
Collision

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.

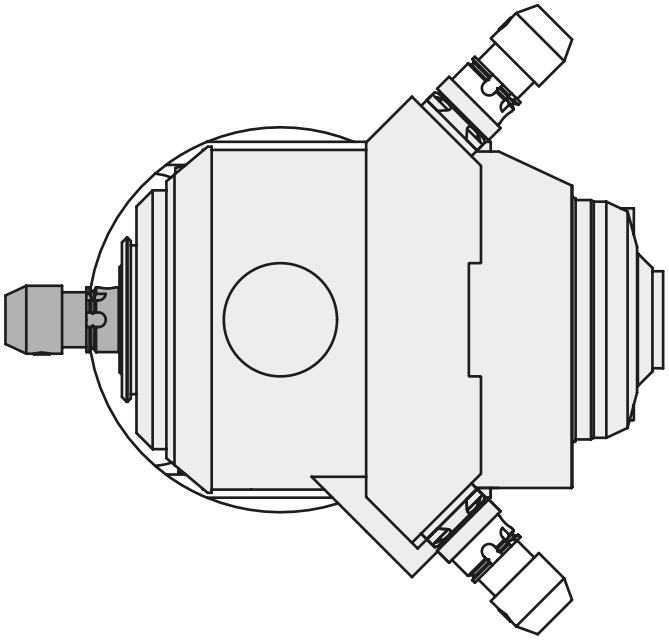
Tools in live tool holders must be changed outside the machine.



Upper tool carrier, with motorized milling spindle

1 live tool station HSK40

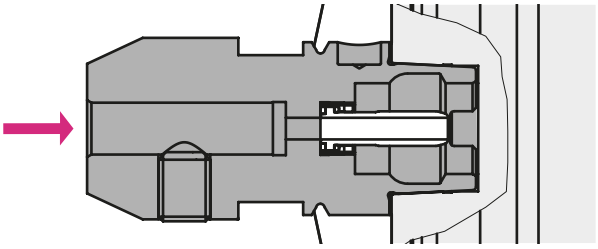
A live tool holder can be used on the motorized milling spindle



No rotation is permitted when using blanking plugs!

Caution!
Risk of damage by ingress of cooling lubricant!

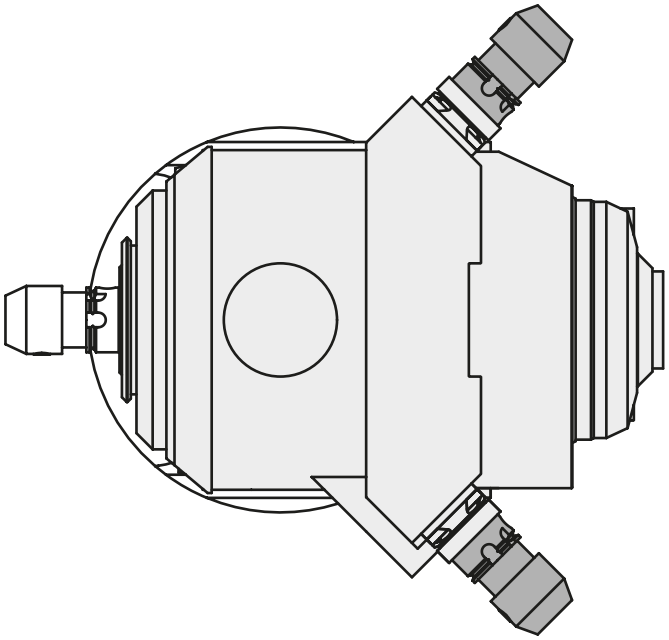
Tool holders in the motorized milling spindle may only be **with** installed coolant adapters!



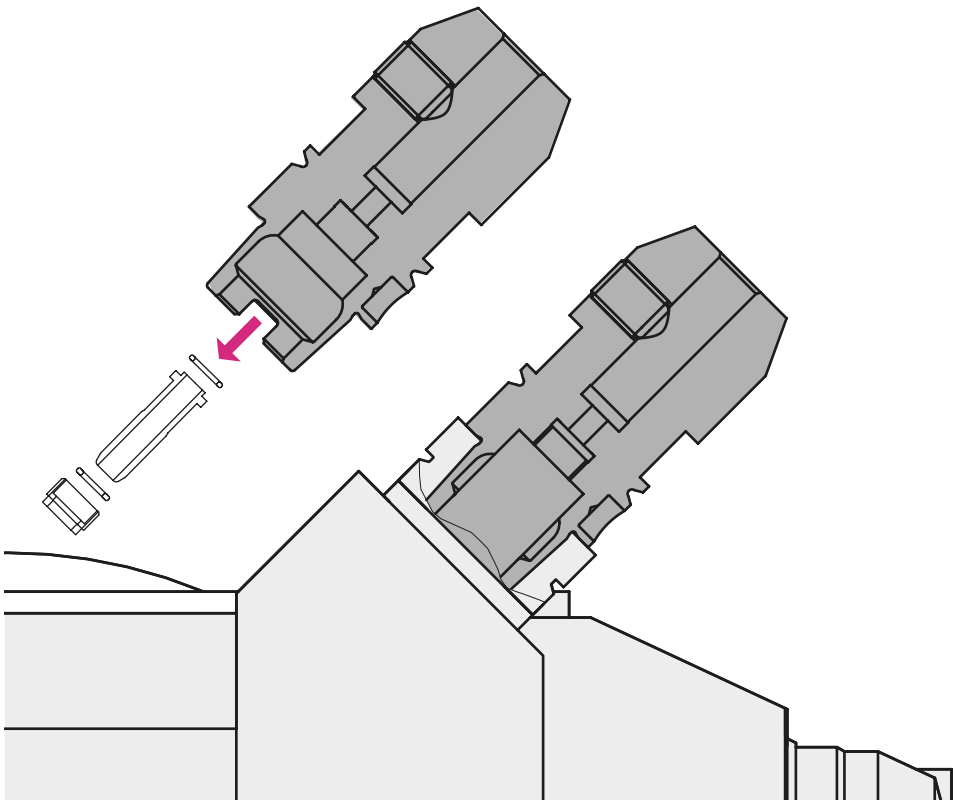
Upper tool carrier, with motorized milling spindle

4 stationary tool stations HSK40

Up to four stationary tool holders can be installed on the additional tool stations.



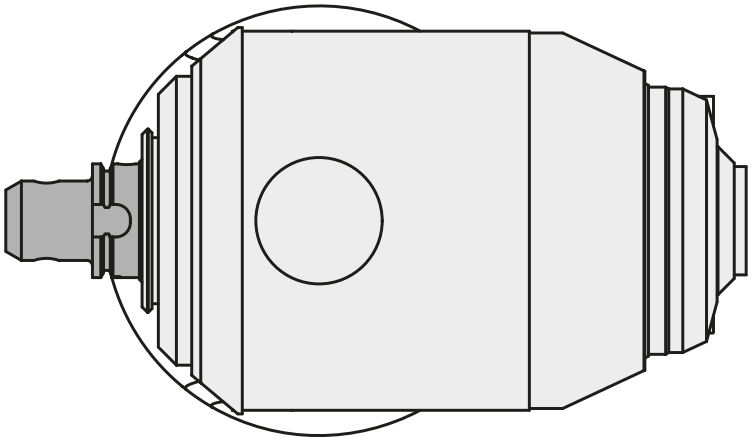
Tool holders on the additional tool stations can only be used **without** installed coolant adapters!



Upper tool carrier, with motorized milling spindle

1 live tool station HSK63

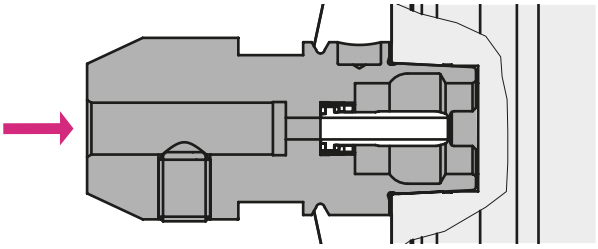
A live tool holder can be used on the motorized milling spindle



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!

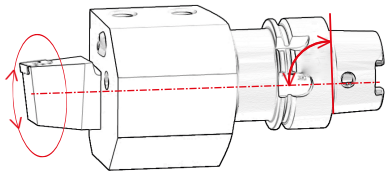


Ultimate strength, HSK40, HSK63

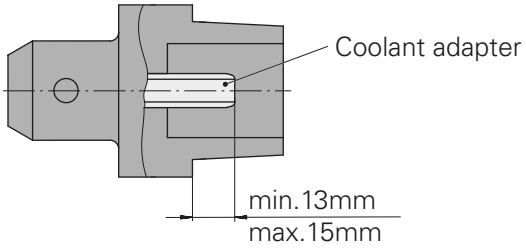
Damage to motor milling spindle, tool holder, workpiece possible.
Observe the ultimate strength of the tool systems.

Ultimate strength of the tool systems according to VDMA 34181:

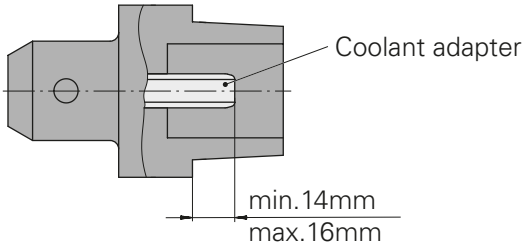
HSK	Torsional moment about axis of rotation [Nm]	Ultimate bending moment transverse to the flat position [Nm]
40	50	180
63	200	550



Coolant adapter, HSK40



Coolant adapter, HSK63



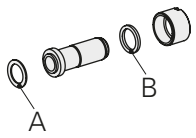
Coolant adapter set and socket wrench

Coolant adapter set HSK40 max. 80bar	10581780
Coolant adapter set HSK40 max. 120bar	12024083
Socket wrench HSK40	10532354
Coolant adapter set HSK63 max. 80bar	11074450
Coolant adapter set HSK63 max. 120bar	12024087
Socket wrench HSK63	10352082

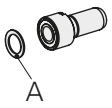
Replacement seals for the coolant adapter set

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

max. 80bar

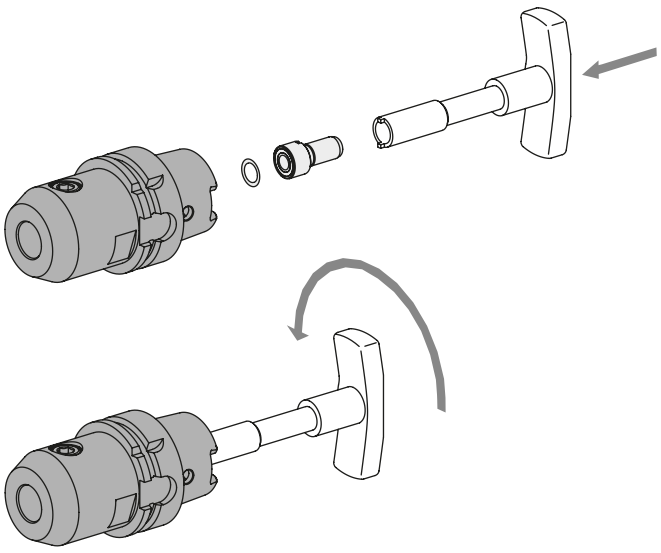


max. 120bar



O-ring		Material number	Material number
A	ø 10 x 2,5	10545698	HSK40 max. 80bar, face side
B	ø 11 x 2,0	10545698	HSK40 max. 80bar, inside
A	ø 10 x 2,5	10545698	HSK40 max. 120bar, face side
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!

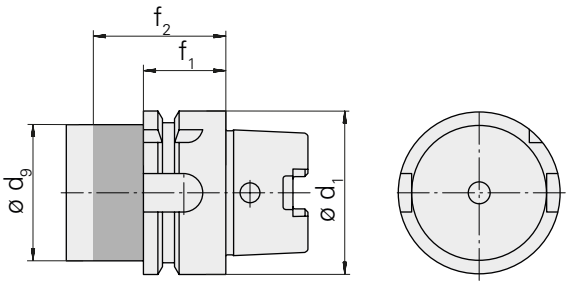
Rotating tool holders (including tools) must have a balance quality of G6.3 or better in relation to the respective speed used!

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	25 h10	40 h10	50 h10	63 h10	80 h10
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.

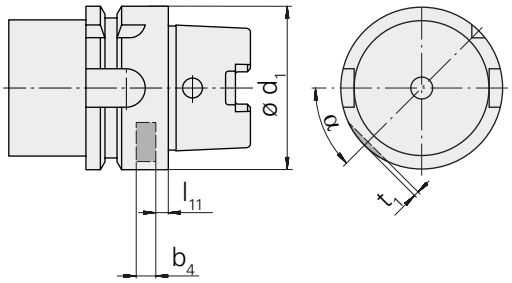
Balancing – Tool holder without tool

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.

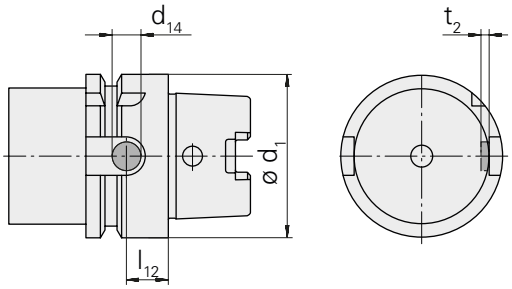
Balancing surface



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
α	45°	45°	45°	45°	45°

Dimensions in mm

Balancing bore

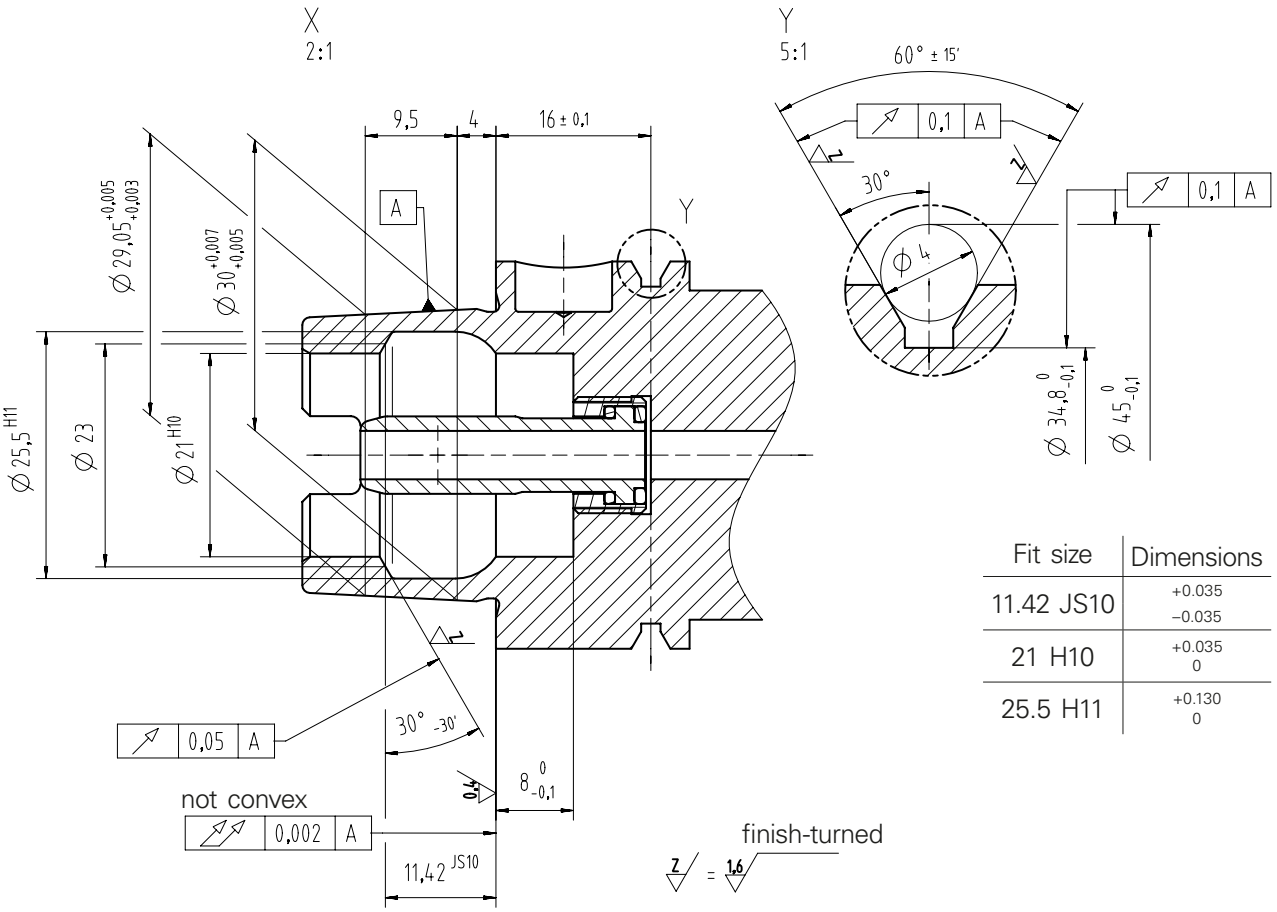


Nominal size	25	40	50	63	80
d_{14}	5.8	8.0	11.0	14.0	16.0
l_{14}	-	-	-	-	-
t_2	2.5	2.5	2.7	2.7	3.0

Dimensions in mm

HSK tool dimensions HSK40 A

Dimensions to be checked acc. to HSK40 A



Fit size	Dimensions
11.42 JS10	+0.035 –0.035
21 H10	+0.035 0
25.5 H11	+0.130 0

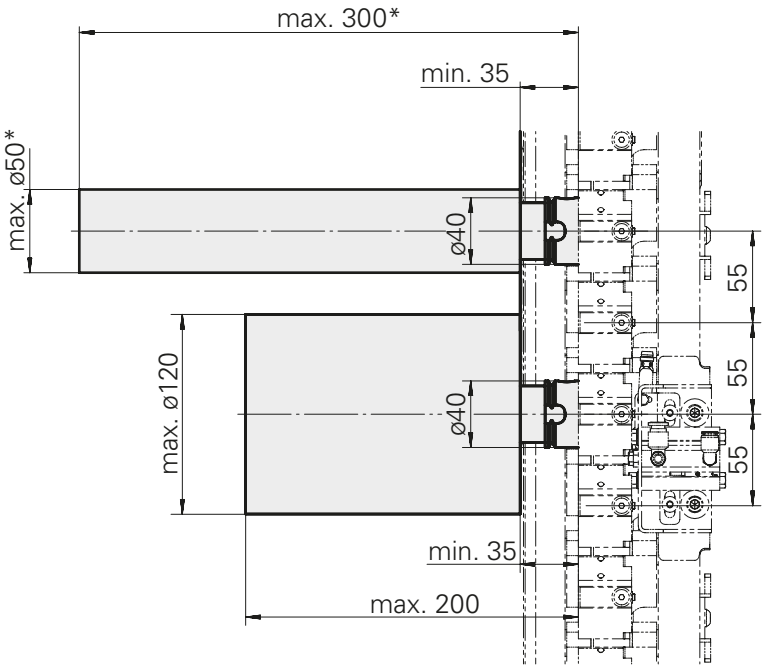
HSK tool dimensions HSK40 A

Tool magazine 1

Max. weight of single tool 3 kg
Average weight per chain 1.5 kg

If tools with a diameter greater than D_{Norm} = 50 mm are used, the two adjacent pockets in the tool magazine must remain empty.

The maximum allowable tool weight is 3kg.



* = Special tool change cycle for tool L = 200 to 300 mm

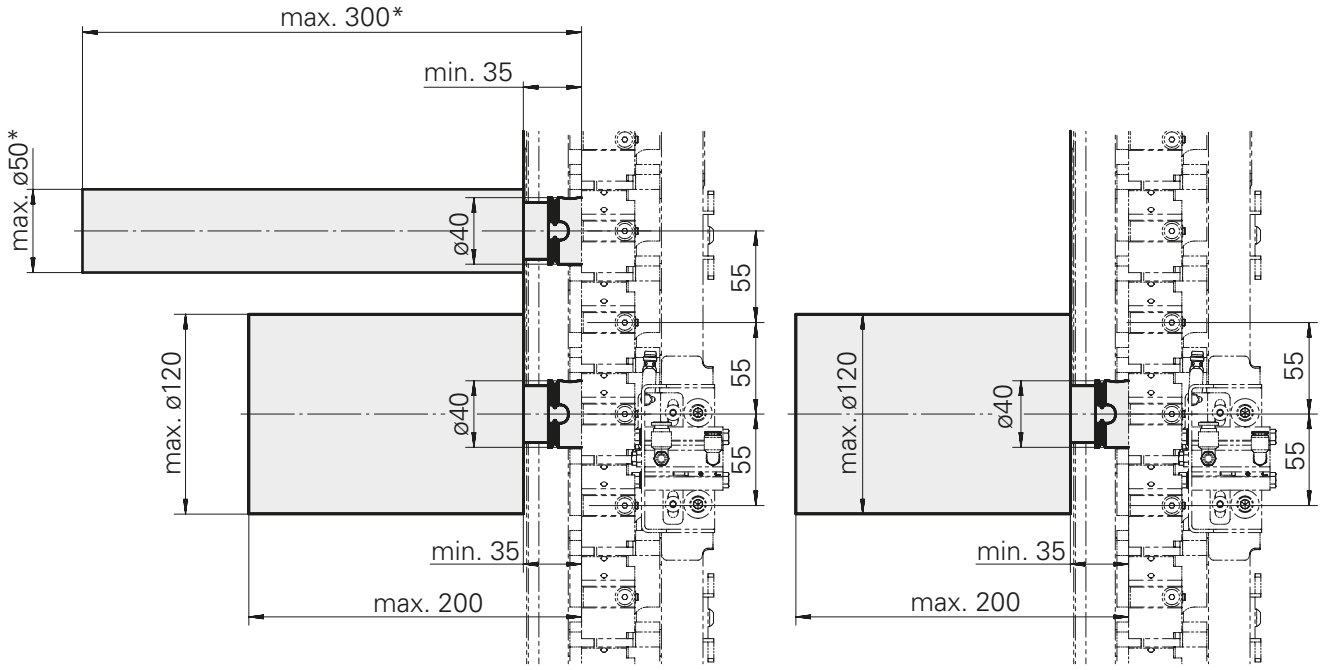
HSK tool dimensions HSK40 A

Tool magazine 1+2

Max. weight of single tool 3 kg
Average weight per chain 1.5 kg

If tools with a diameter greater than D_{Norm} = 50 mm are used, the two adjacent pockets in the tool magazine must remain empty.

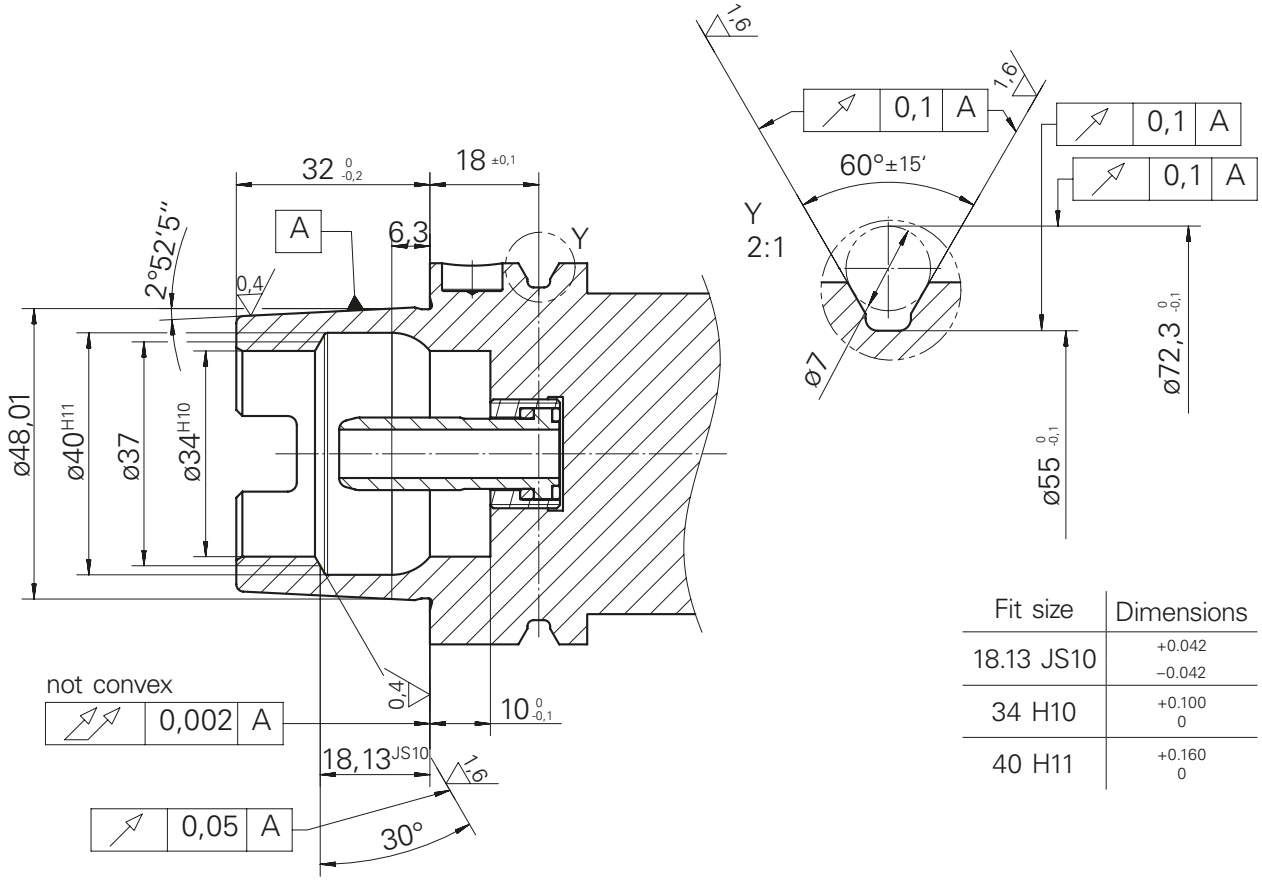
The maximum allowable tool weight is 3kg.



* = Special tool change cycle for tool L = 200 to 300 mm

HSK tool dimensions HSK63 A

Dimensions to be checked acc. to HSK63 A



Fit size	Dimensions
18.13 JS10	+0.042 –0.042
34 H10	+0.100 0
40 H11	+0.160 0

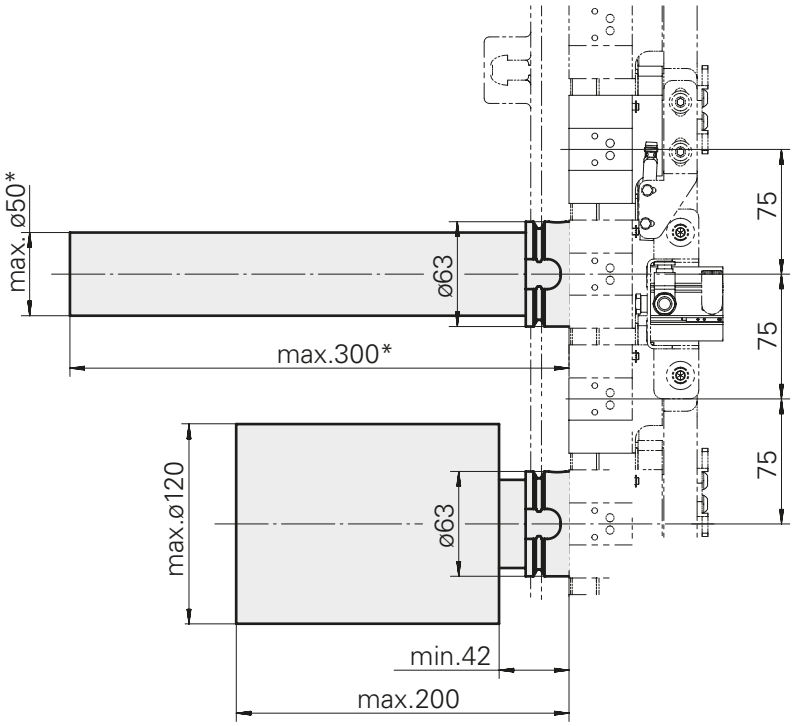
HSK tool dimensions HSK63 A

Tool magazine 1

Max. weight of single tool 5kg
Average weight per chain 2.5kg

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

The maximum allowable tool weight is 5kg.



* = Special tool change cycle for tool L = 200 to 300 mm

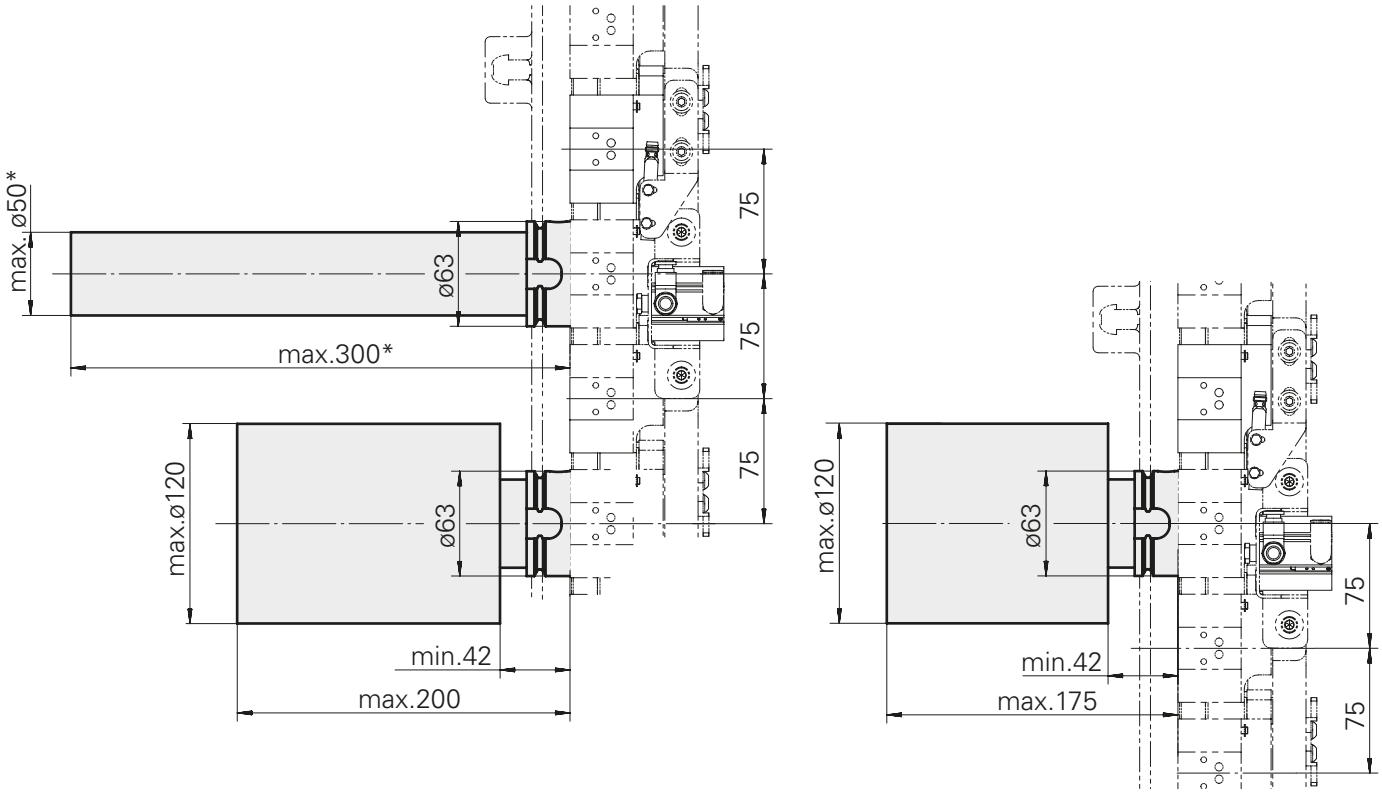
HSK tool dimensions HSK63 A

Tool magazine 1+2

Max. weight of single tool 5kg
Average weight per chain 2.5kg

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

The maximum allowable tool weight is 5kg.



* = Special tool change cycle for tool L = 200 to 300 mm

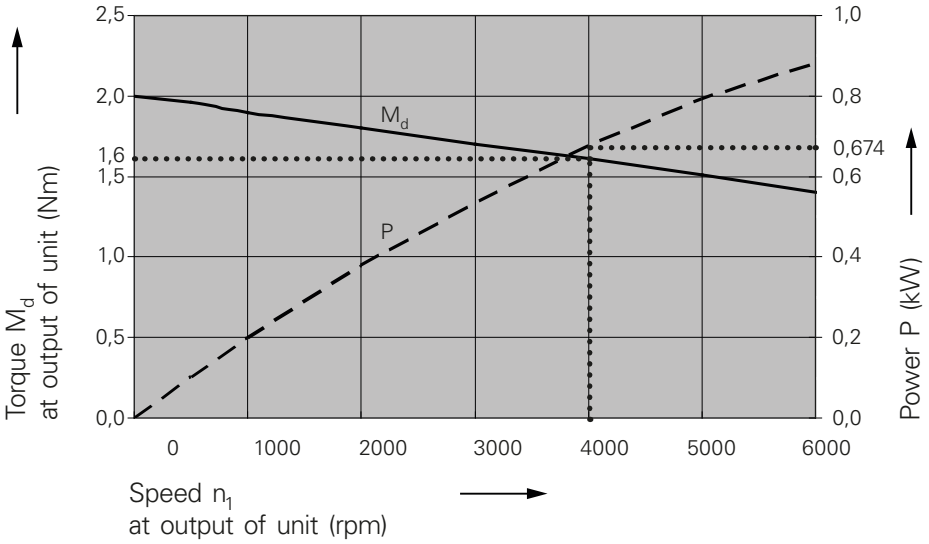
Notes on how to use the diagram when using tool holders

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):

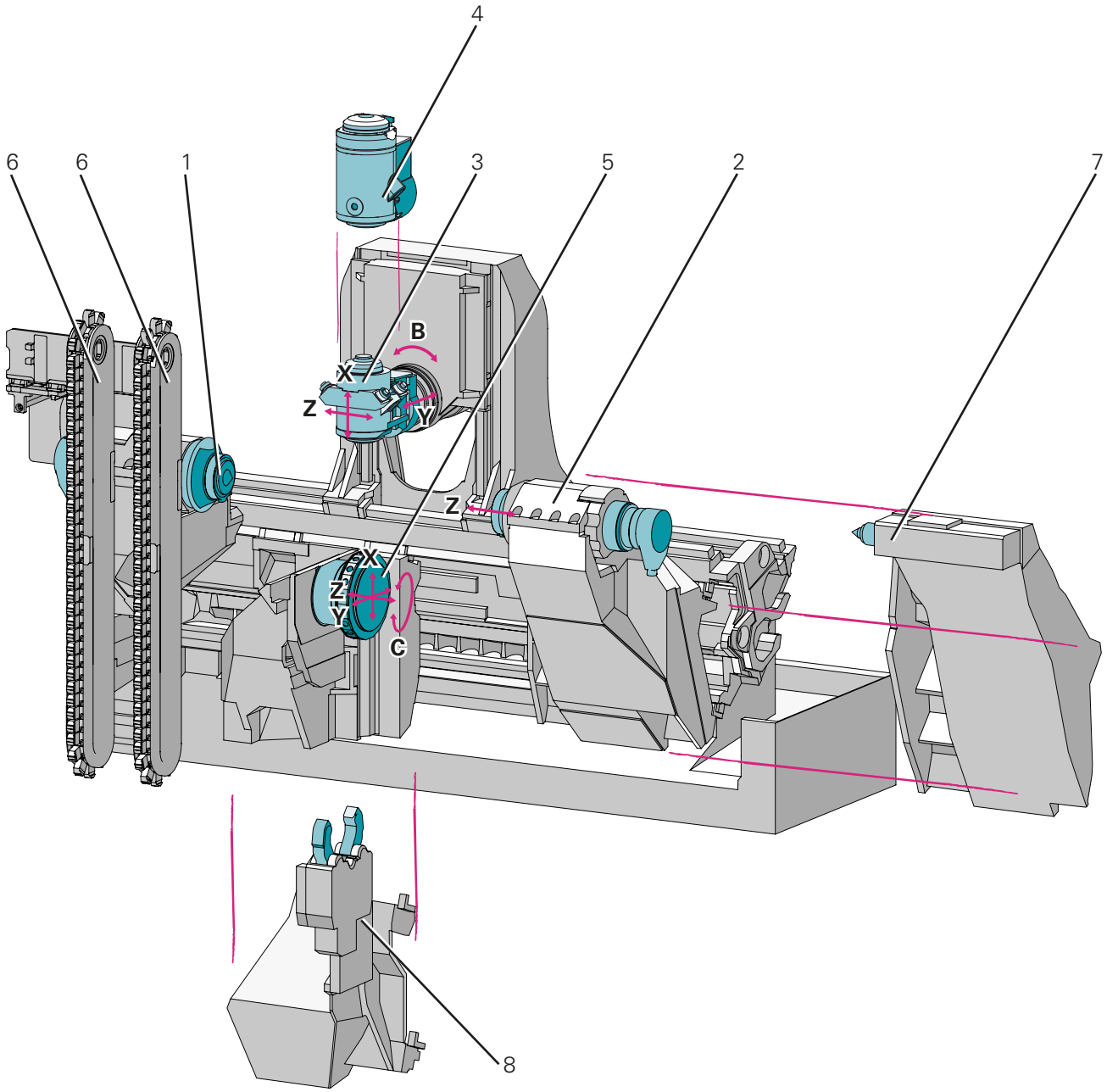
live tool unit, tool speed n_{Tool} = 1000 rpm	
Internal speed ratio i of the tool holder	i = 4
Programmed speed n_{prog} for the drive of the unit	$n_{prog} = n_{Tool} * i = 1000 \text{ rpm} * 4 = 4000 \text{ rpm}$
Torque M_{Tool} at the output of the tool holder	Read-out M_d at speed n_{prog} = 4000 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

INDEX

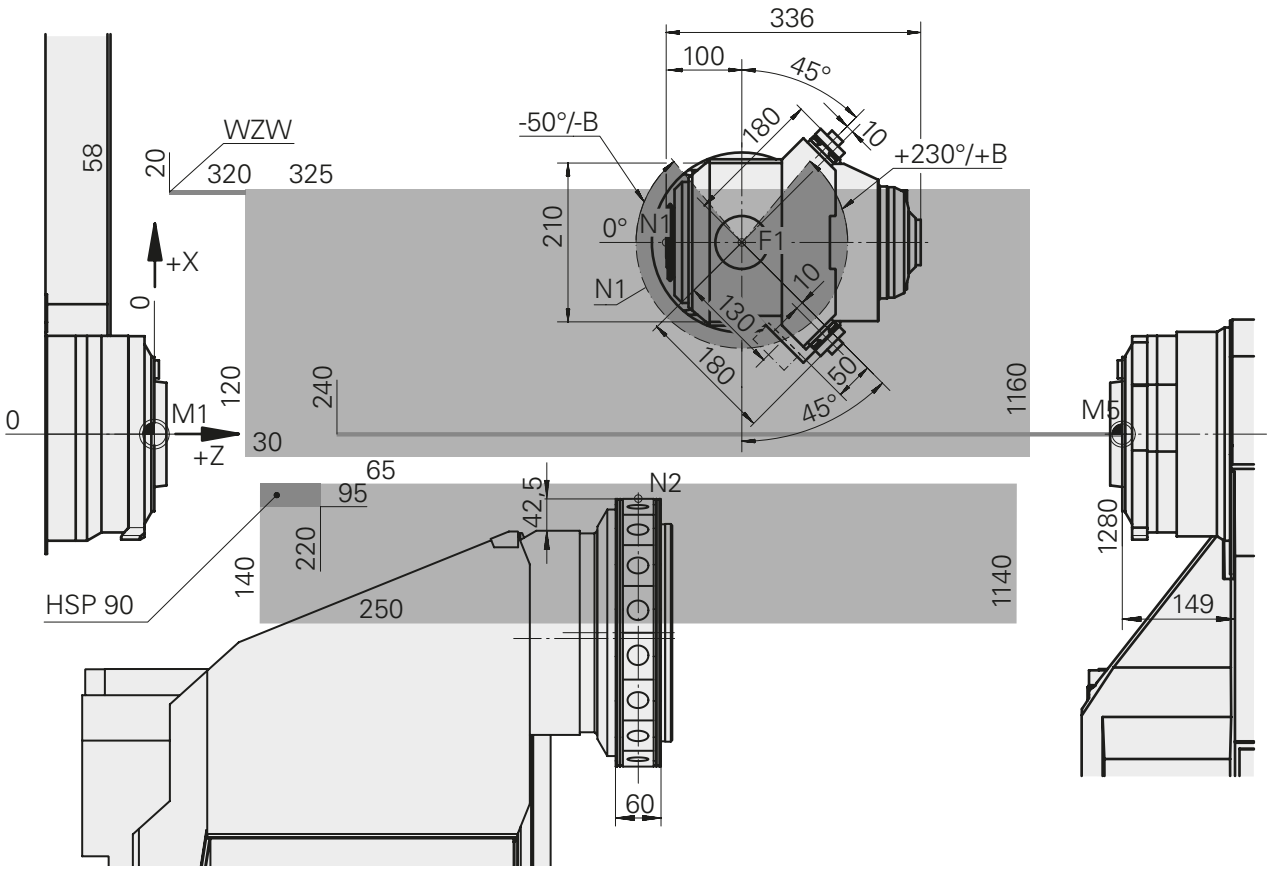
Modular system of INDEX G220



1 Main spindle
2 Counter spindle
3 Upper tool carrier
with motorized milling spindle HSK40 - XZYB
4 Upper tool carrier
with motorized milling spindle HSK63 - XZYB
5 Lower tool carrier
VDI25 / VDI30 - XZY
6 Tool magazine
7 Tailstock
8 Steady rest

Work area of INDEX G220

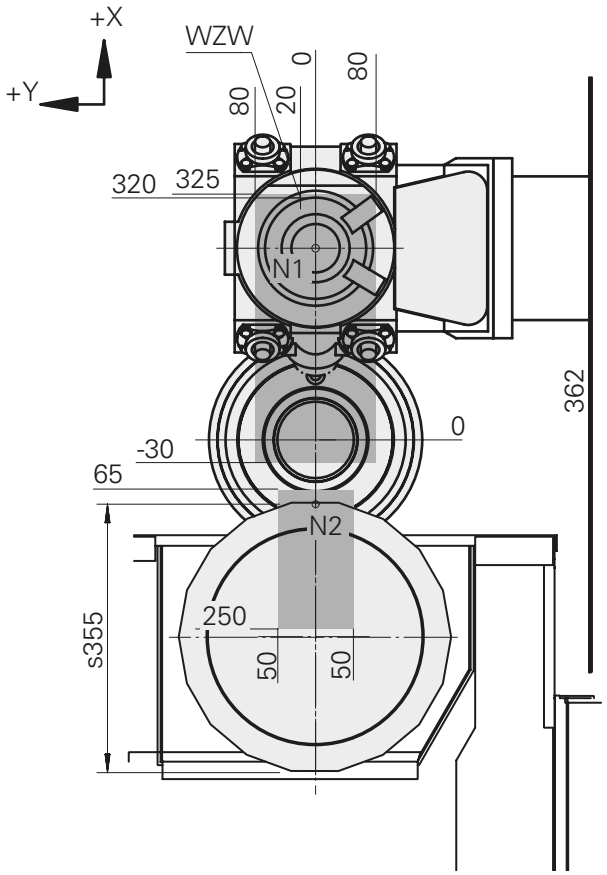
Upper tool carrier with motorized milling spindle HSK40
Lower tool carrier VDI25, 18 stations



WZW = tool change
HSP90 = restriction on main spindle 90

Work area of INDEX G220

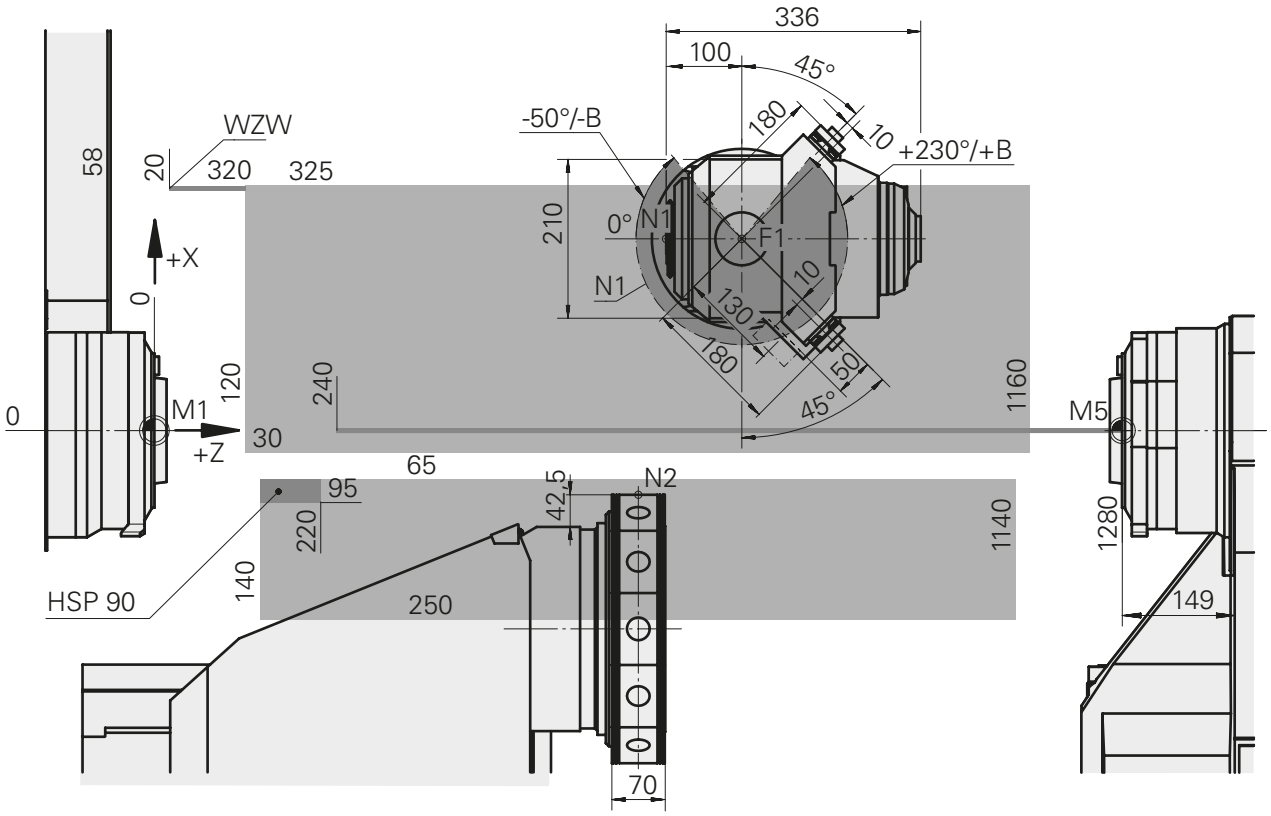
Upper tool carrier with motorized milling spindle HSK40
Lower tool carrier VDI25, 18 stations



WZW = tool change

Work area of INDEX G220

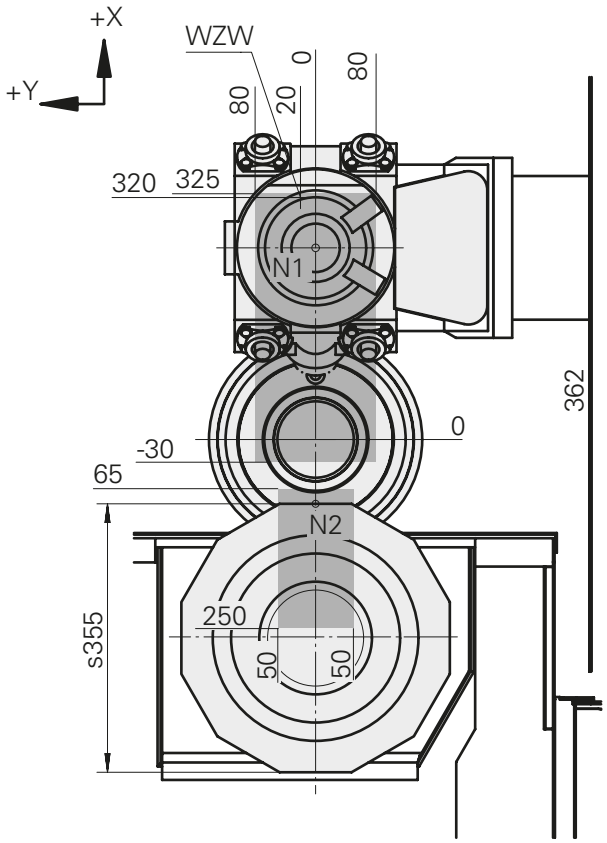
Upper tool carrier with motorized milling spindle HSK40
Lower tool carrier VDI30, 12 stations



WZW = tool change
HSP90 = restriction on main spindle 90

Work area of INDEX G220

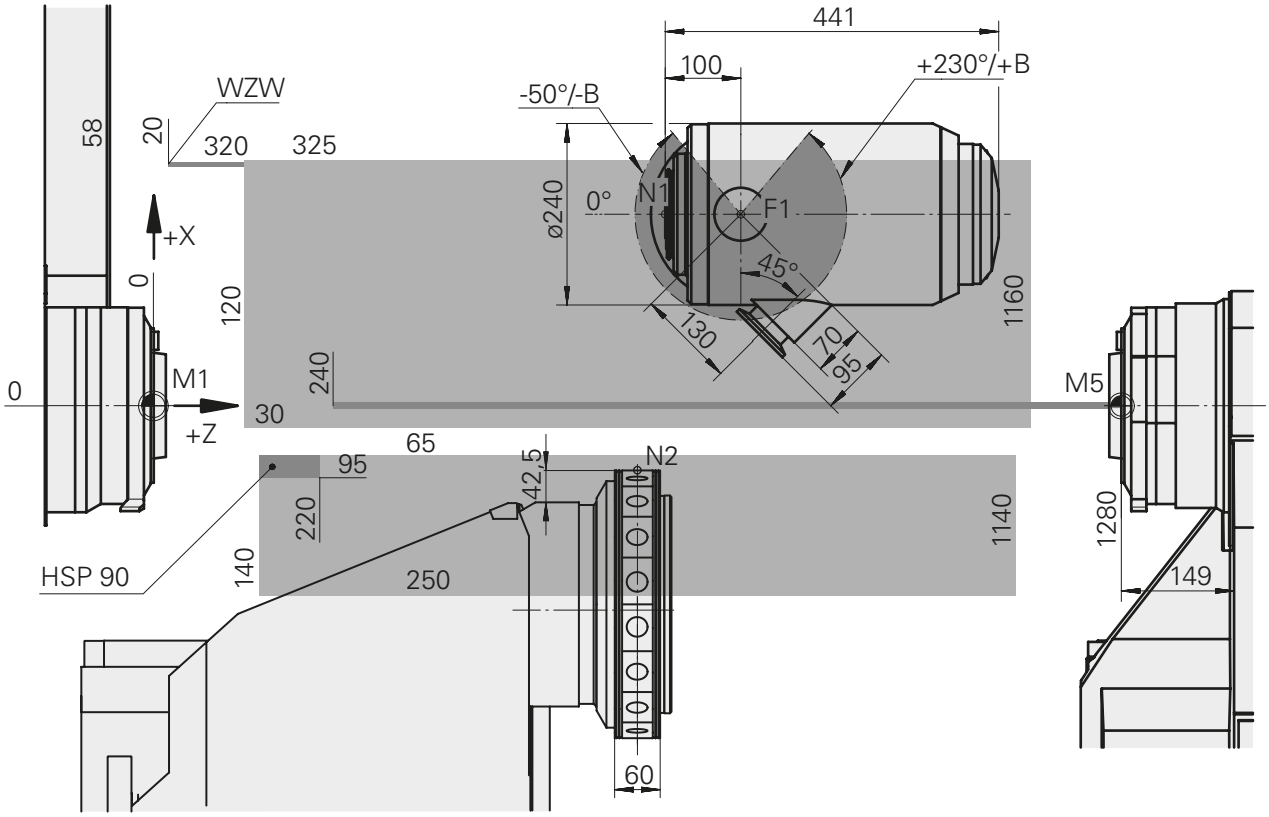
Upper tool carrier with motorized milling spindle HSK40
Lower tool carrier VDI30, 12 stations



WZW = tool change

Work area of INDEX G220

Upper tool carrier with motorized milling spindle HSK63
Lower tool carrier VDI25, 18 stations



WZW = tool change
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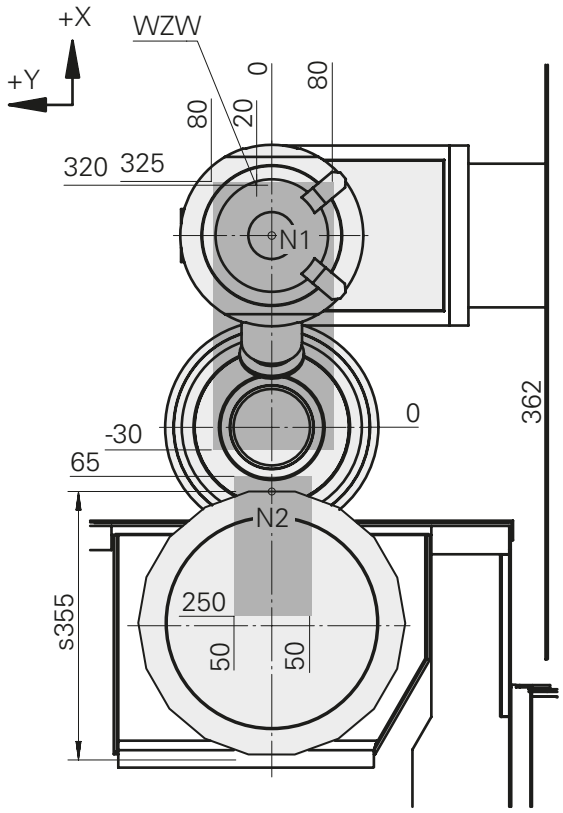
Work area of INDEX G220

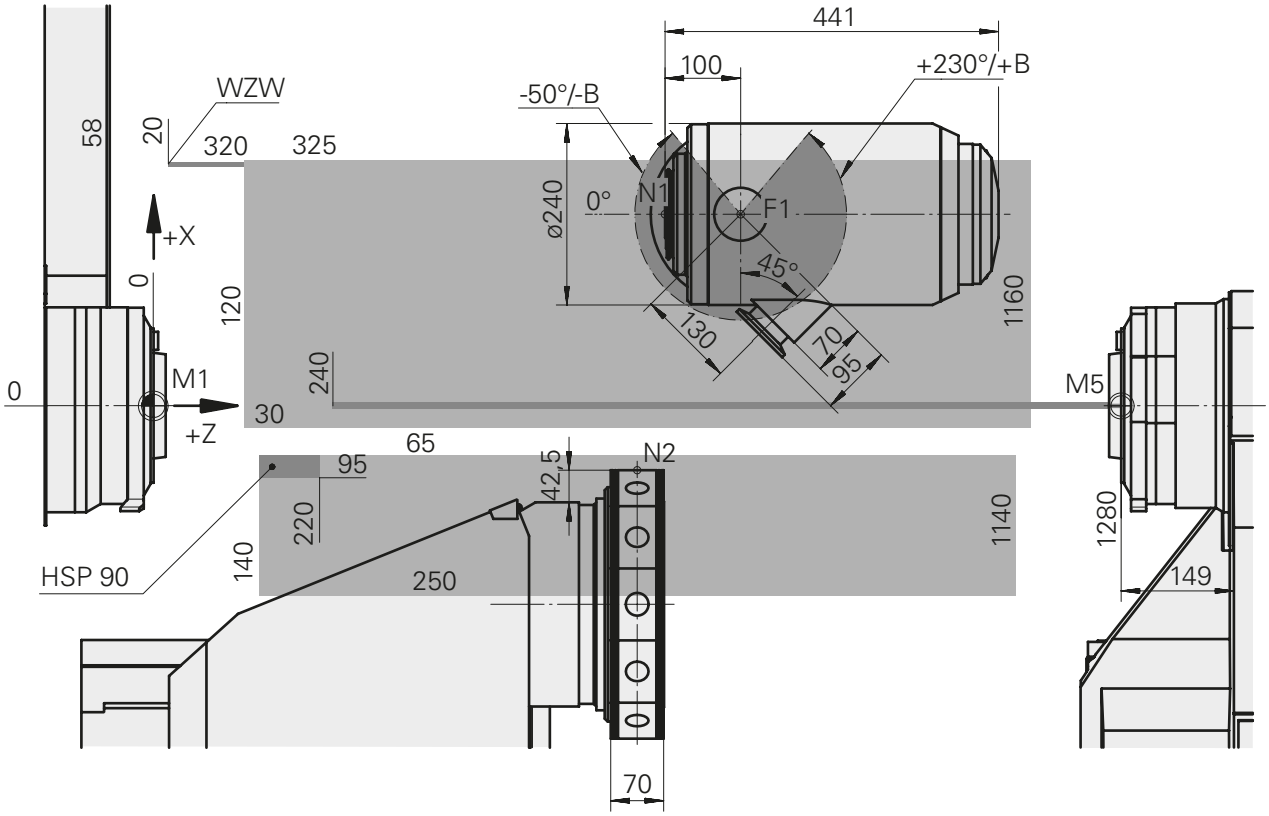
Upper tool carrier with motorized milling spindle HSK63
Lower tool carrier VDI25, 18 stations



WZW = tool change

Work area of INDEX G220

Upper tool carrier with motorized milling spindle HSK63
Lower tool carrier VDI30, 12 stations



WZW = tool change
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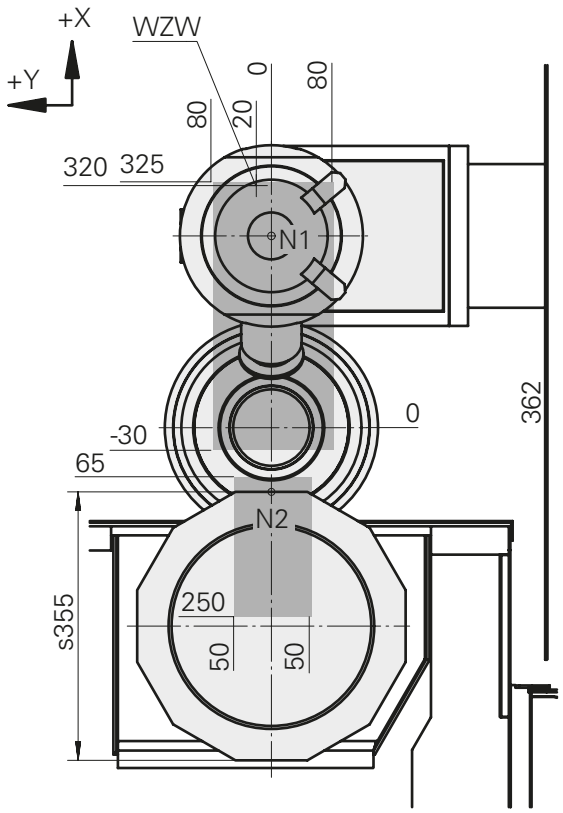
Work area of INDEX G220

Upper tool carrier with motorized milling spindle HSK63
Lower tool carrier VDI30, 12 stations



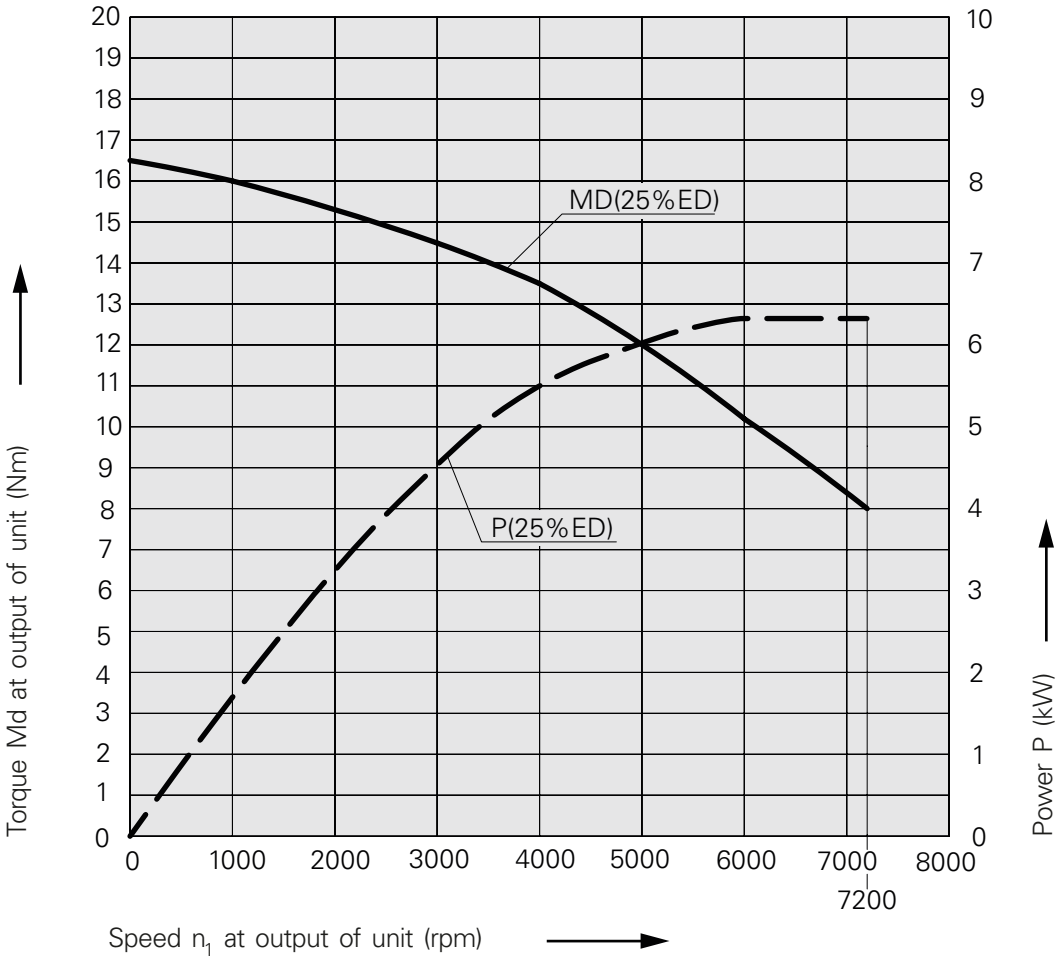
WZW = tool change

Performance diagram

Live tools with tooling system VDI25/VDI30
Lower tool turret

Speed range 0-7200 rpm

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

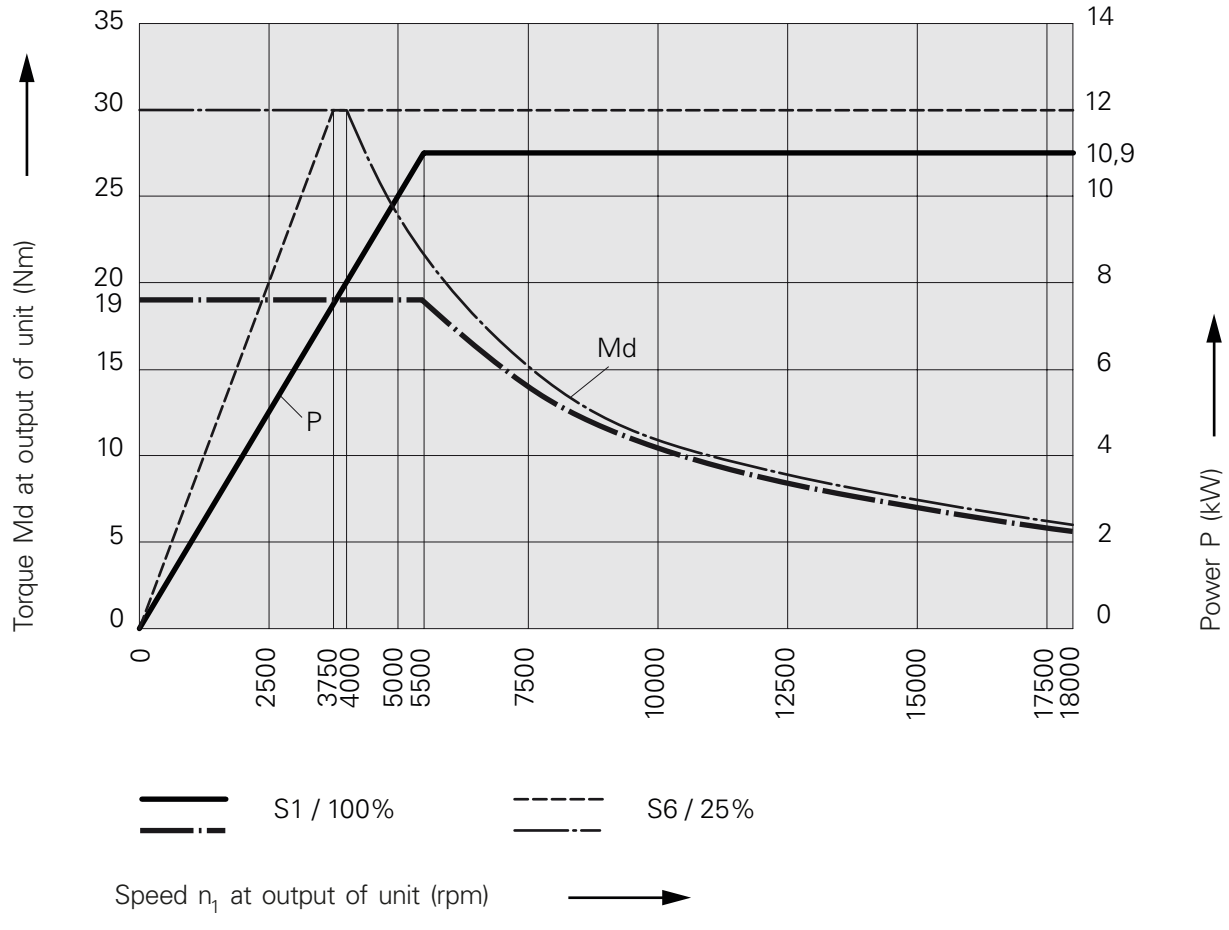


Performance diagram

Live tools with tooling system HSK40
Motorized milling spindle

Speed range 0-18000 rpm

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

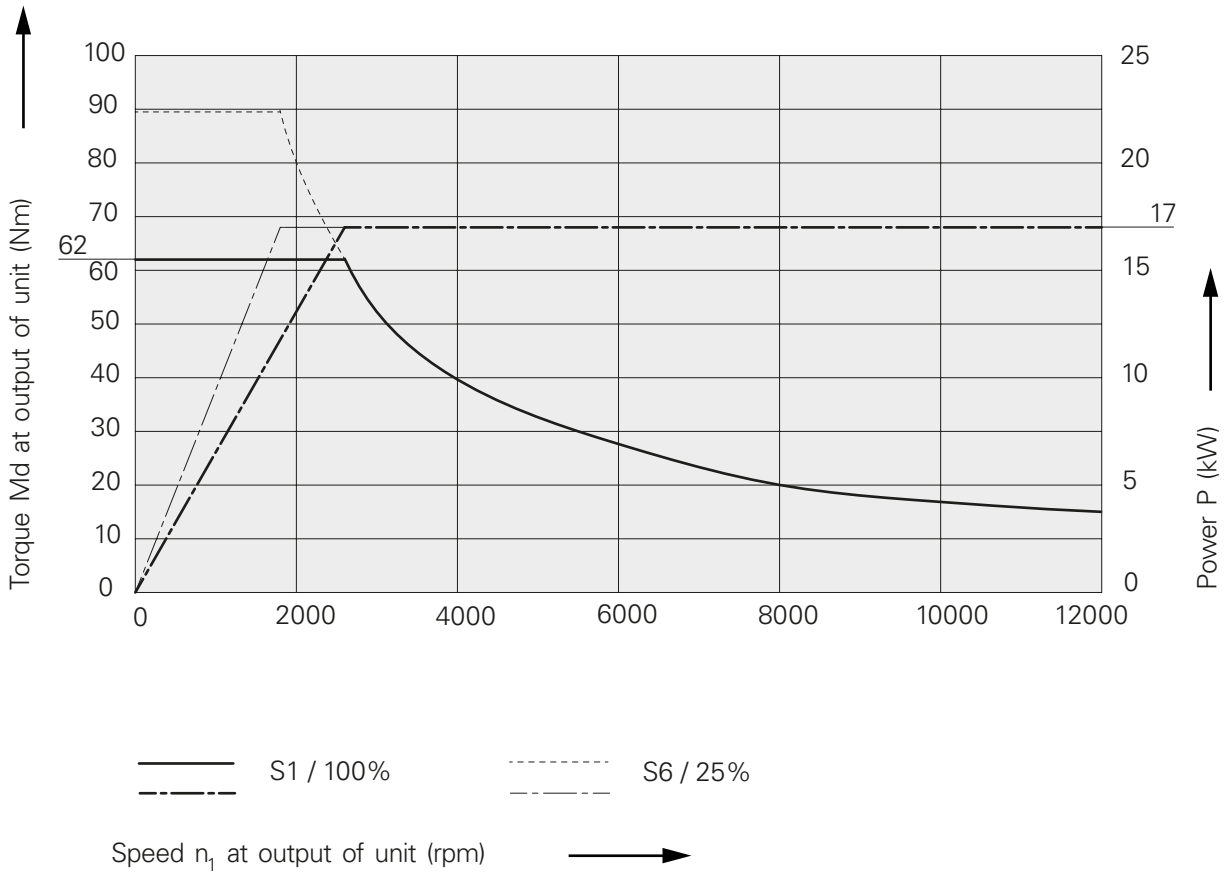


Performance diagram

Live tools with tooling system HSK63
Motorized milling spindle

Speed range 0-12000 rpm

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



INDEX

INDEX

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