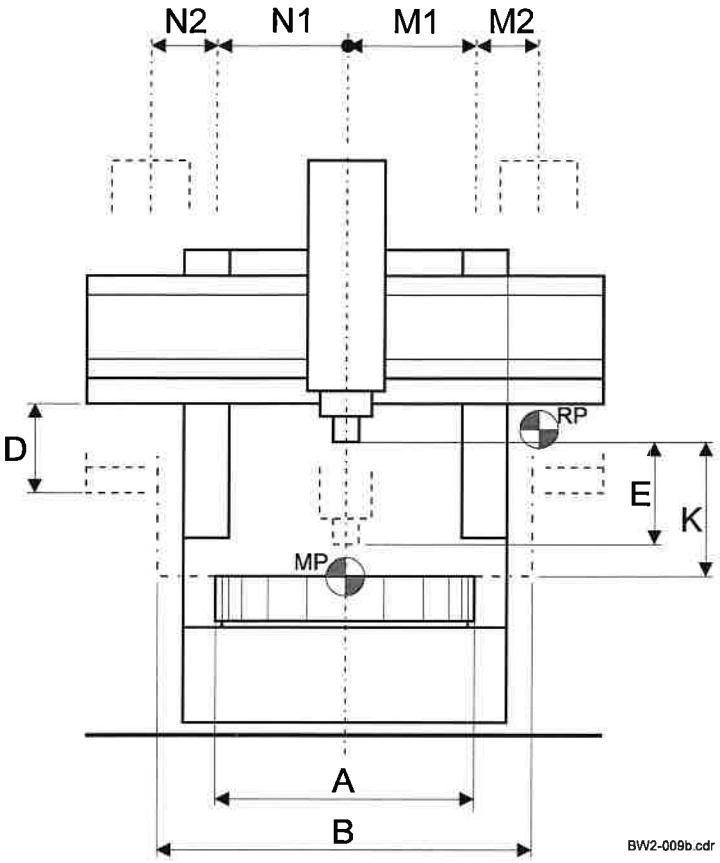
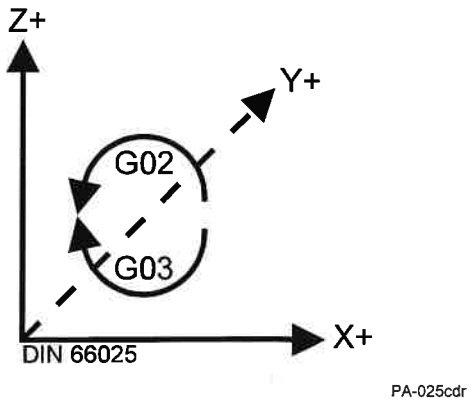
Dimensions and travels





Legend

MP center
RP reference point

A	Table diameter (of vertical turning mill)	2 000 mm
B	Maximum diameter turned and maximum swing	2 520 mm
K_{max}	Working under standard tool holder (250.2- 0401)	1 990 mm
D	Crossrail travel	900 mm
	by steps of	100 mm
	Railhead cross section	250 x 250 mm
	minimum immersion diameter	340 mm
E	vertical travel	1 500 mm
	Crossrail head, horizontal travels	
M1	from turning diameter to the right	1 350 mm
M2	+ change travel	520 mm
N1	from turning diameter to the left	1 350 mm
N2	+ change travel	520 mm

Speeds, feedrates, travers speeds, cutting forces

Table drive

Required power for the main drive (see Chapter 2.3)	60 kW
Number of gear steps	2 steps
Progressive ratio of speed	3,76
Speed range of the 1st gear step	1,25 - 18 - 67 min^{-1}
Speed range of the 2nd gear step	4,5 - 67 - 250 min^{-1}
Rotary feed of C axis Positioning accuracy	0 - 3,15 min^{-1} ±3 sec
Max. workpiece weight (see Chapter 2.4)	15 000 kg

Feed drives

Crossrail head, vertical and horizontal	0,1 - 3 000 mm/min
Crossrail head, rapid motion	18 000 mm/min
Crossrail traverse speed	425 mm/min

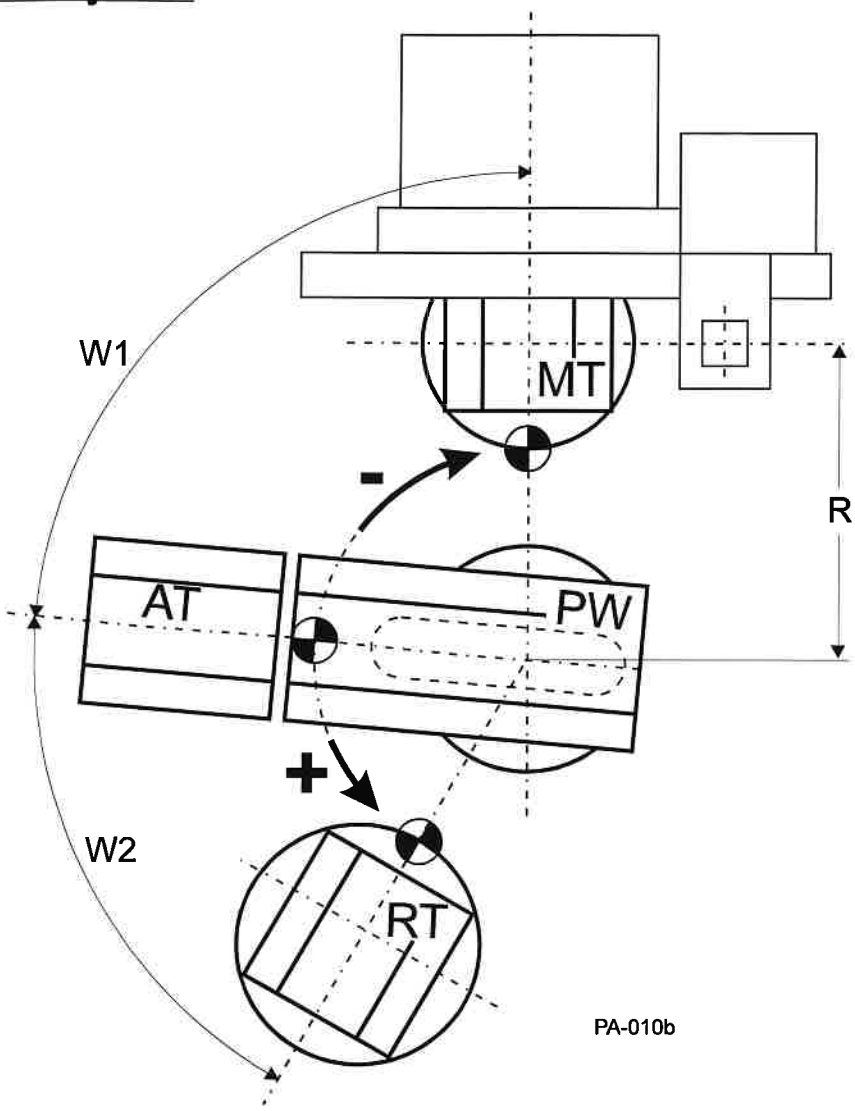
Milling drive

Required power for milling (see Chapter 2.6)	30 kW
Number of gear steps	2 steps
Progressive ratio of speed	3,17
Speed range of the 1st gear step	10 - 224 - 9550 min^{-1}
Speed range of the 2nd gear step	32 - 710 - 3000 min^{-1}

Tool system, Cutting force

Tool system Milling spindle holding fixture as per 69871-A	250.2 SK 50
Cutting force at turning tool (see Chapter 2.5)	50 kN

Pallet system



Legend

MT	machine table
PW	pallet changer
RT	setting table
AT	table of deposit

R	Distance between machine table and pallet changer	3 000 mm
W1 W2	Angle machine table - table of deposit table of deposit - setting table	85° mm 65°

Setting table

Speed range	0- 9 min^{-1}

Electrical connected load

Operating voltage	400 V	+6% -15%
Control voltage	230 V AC 24 V DC	
Frequency	50 Hz	± 2%
Connected current	250 A	
Total connected load	175 kVA	

Speed / Performance Diagram of the main drive

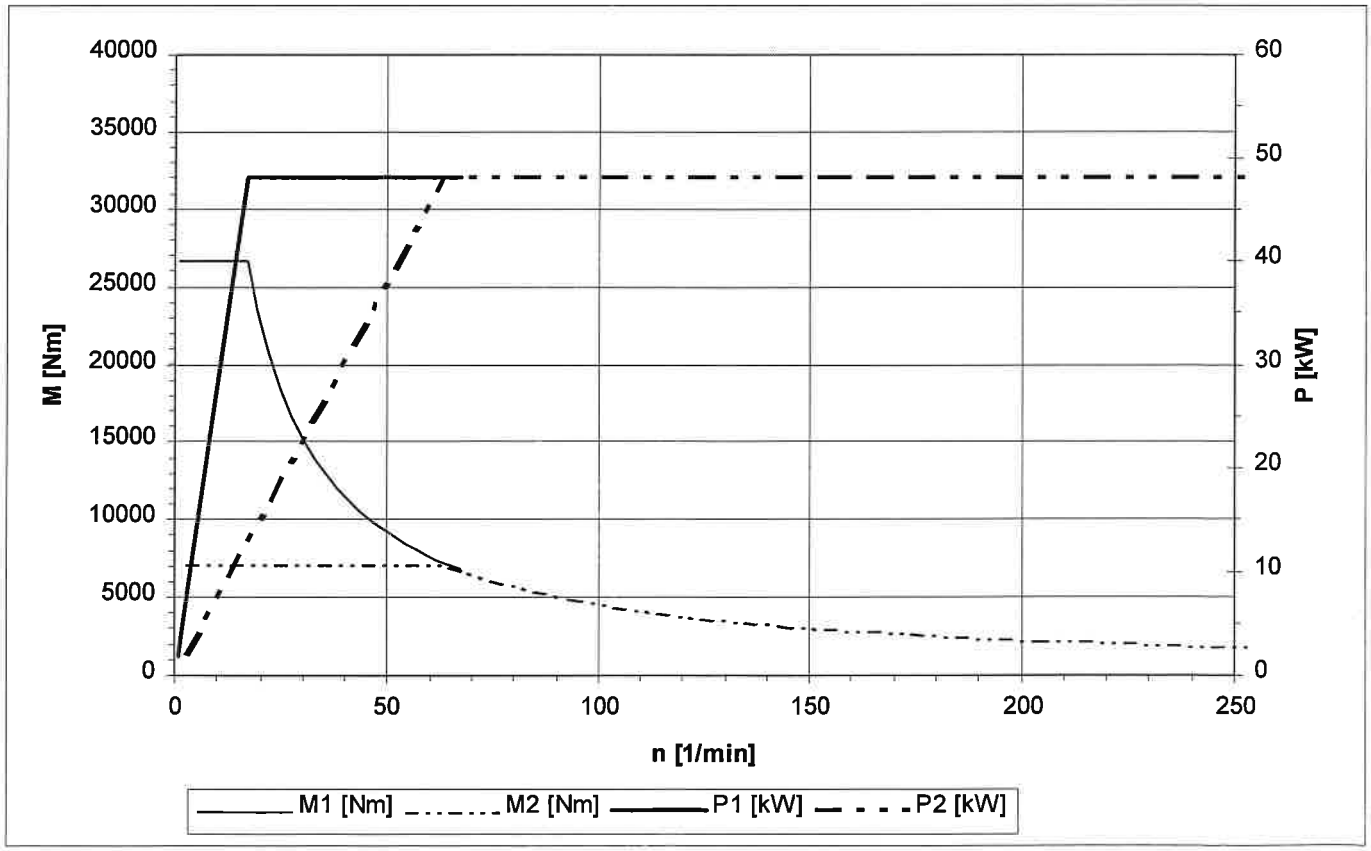
In the list below you can find the characteristic values for torque and performance at the table in dependance on speed, efficiency and gear steps.

Main drive data

AC-Motor	**SIEMENS**	**1PH7 186**		
Maximum speed		n_2 =	**5 000**	min^{-1}
Nominal output		P_N =	**60**	kW

Gear					**Speed range**
Ratio of transmission gear step 1		i_1 =	**72,7**		**1,25 - 18 - 67** min^{-1}
Ratio of transmission gear step 2		i_2 =	**19,3**		**4,5 - 67 - 250** min^{-1}
Progressive ratio of speed			**3,76**		
max. torque	1st Gaer step	Md_1 =	**26 650**	Nm	
max. torque	2nd Gear step	Md_2 =	**7 090**	Nm	

Torque and performance at the machine table



Working life of the table bearing

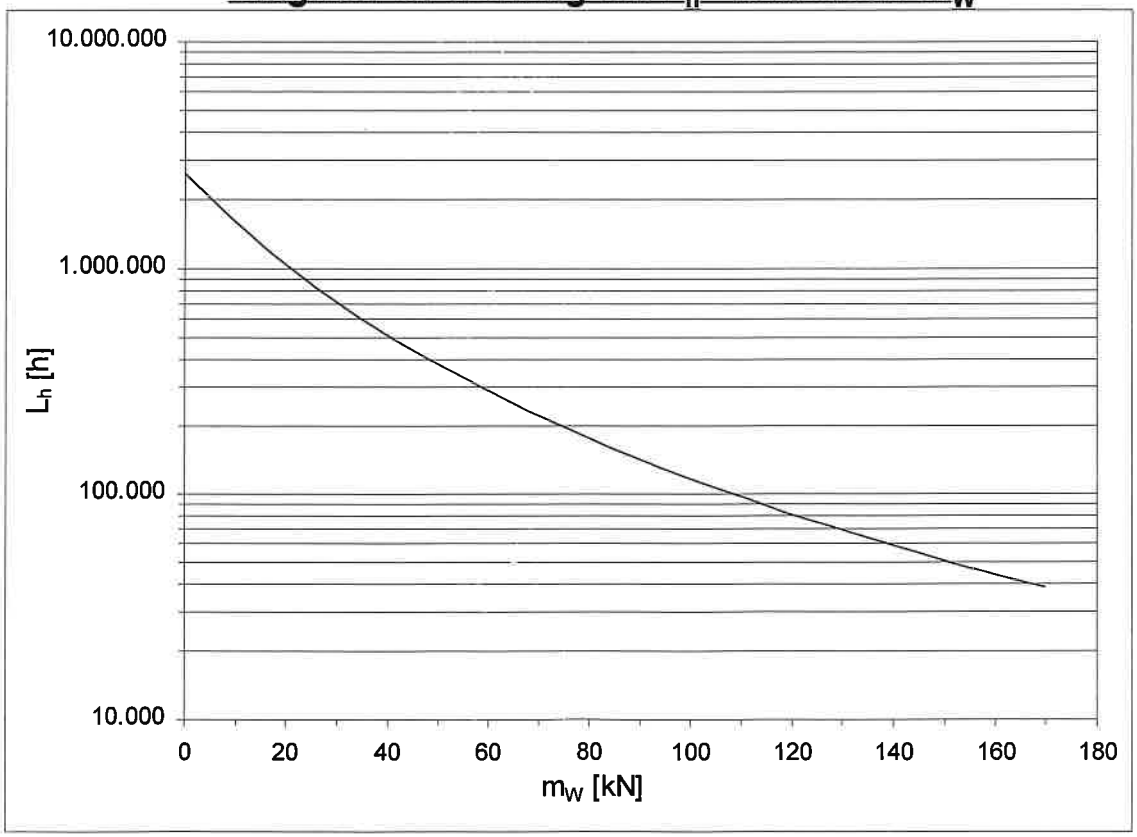
To calculate the working life a comparative speed n_v is used. This comparative speed is calculated from speeds with time data in per cent, see speed table below.

Table of several speeds

Time data [%]	Speed [min^{-1}]
20	0
45	62
30	125
5	250

Comparative speed	n_v	[min^{-1}]	78
Maximum speed	n_{max}	[min^{-1}]	250
Bearing type			FAG 509825
Dynamic bearing coefficient	C	[kN]	1270
Rolling body factor	f	ball=3, roller 3,33	3,00
Mass of table + rim gear	m_T	[kN]	55
Max. workpiece load	m_W	[kN]	170

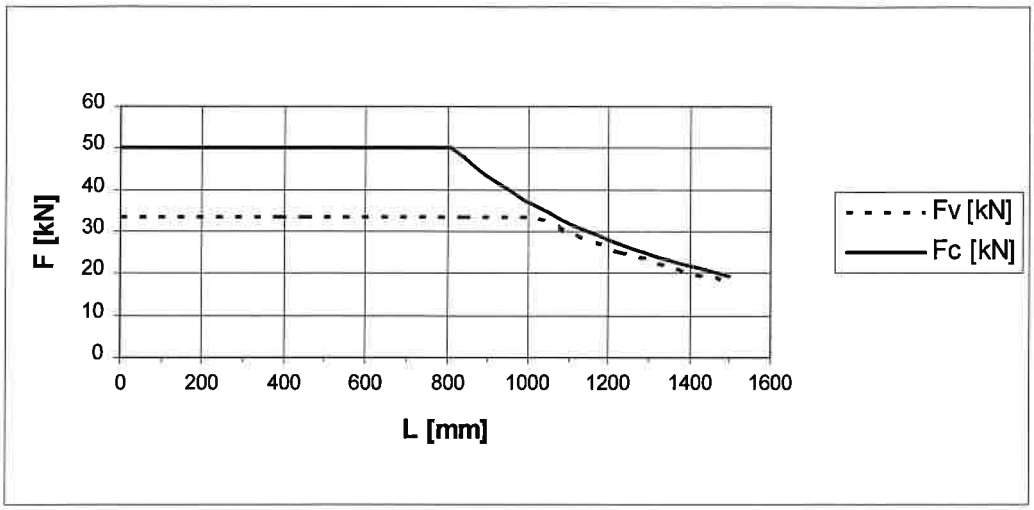
Diagram of working life L_h - table load m_W



Deflection of the railhead □250 x 1500

The calculation takes into account the ram rigidity and the bearing rigidity of the ram and the carriage. The rigidities of swivelling component, crossrail, column and base has not been considered. The maximum admissible tool lip dislocation is s = 1 mm. This limit is an experimental value at which in normal process conditions (cutting is not interrupted, etc.) machining without chattering is possible. The components within the power flux (in particular hydrostatic guiding arrangements and frictionally engaged threaded joints between carriage and swivelling component) are designed for this limiting value.

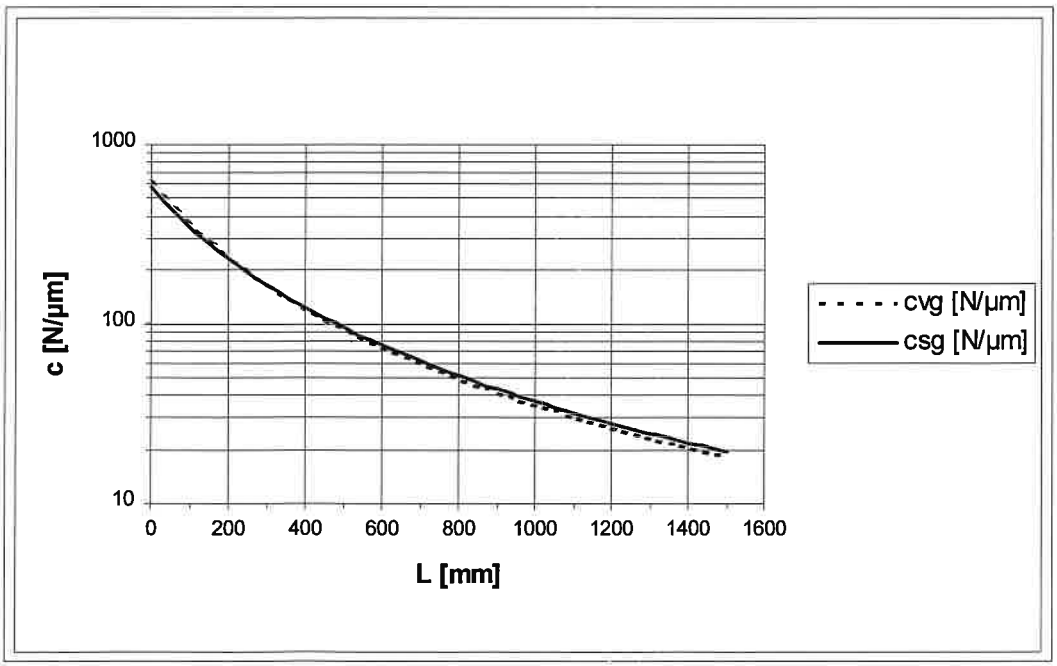
Admissible process forces in dependance on the protruding ram part



Legend

F Force
Fv Force in feed direction
Fc Force in cutting force direction
L Railhead travel

Rigidities in dependance on the protruding ram part



Legend

c Rigidity
cvg Rigidity in cutting force direction
csg Rigidity in feed direction
L Railhead travel

Speed / Performance Diagram of the milling drive

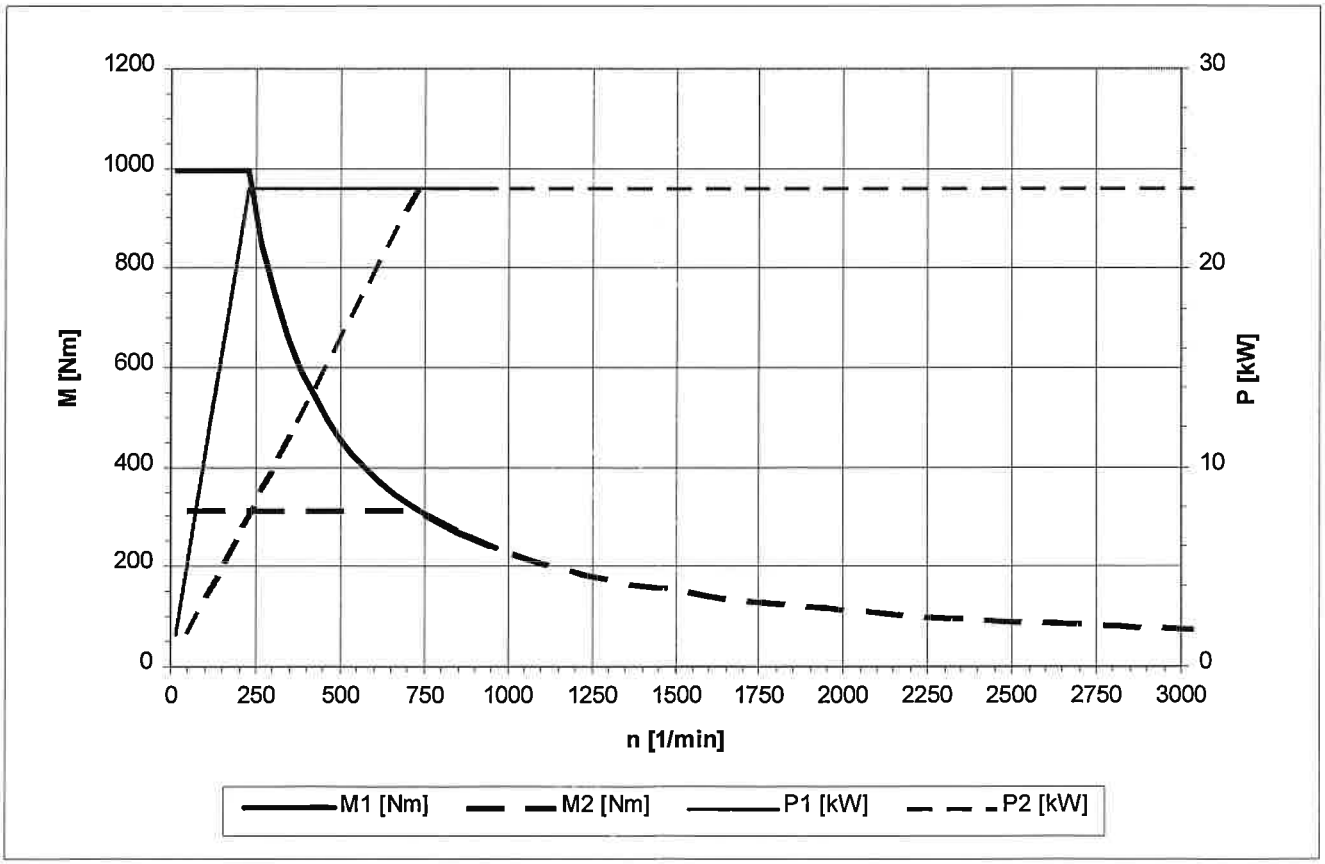
In the list below you can find the characteristic values for torque and performance at the milling drive in dependance on speed, efficiency and gear steps.

Milling drive data

AC-Motor	**SIEMENS**	**1PH6 163**		
Maximum speed		n_2 =	**6 300**	min^{-1}
Nominal output		P_N =	**30**	kW

Gear				**Speed range**
Ratio of transmission gear step 1		i_1 =	**6,25**	**10 - 224 - 950** min^{-1}
Ratio of transmission gear step 2		i_2 =	**2,06**	**32 - 710 - 3000** min^{-1}
Progressive ratio of speed			**3,03**	
max. torque	1st Gaer step	Md_1 =	**900**	Nm
max. torque	2nd Gear step	Md_2 =	**300**	Nm

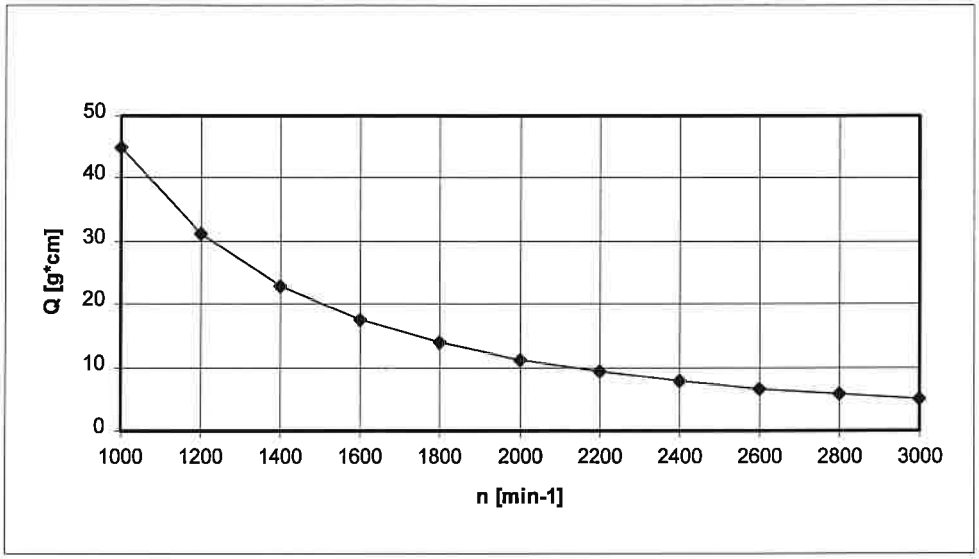
Torque and performance at the Milling drive



To ensure an optimal machining process, you should balance boring and milling tools taking into account the operating speed.

The admissible tool unbalance referred to the operating speed is represented in the following diagram.

Max. admissible tool unbalance
(oscillation amplitude max. 1 µm)

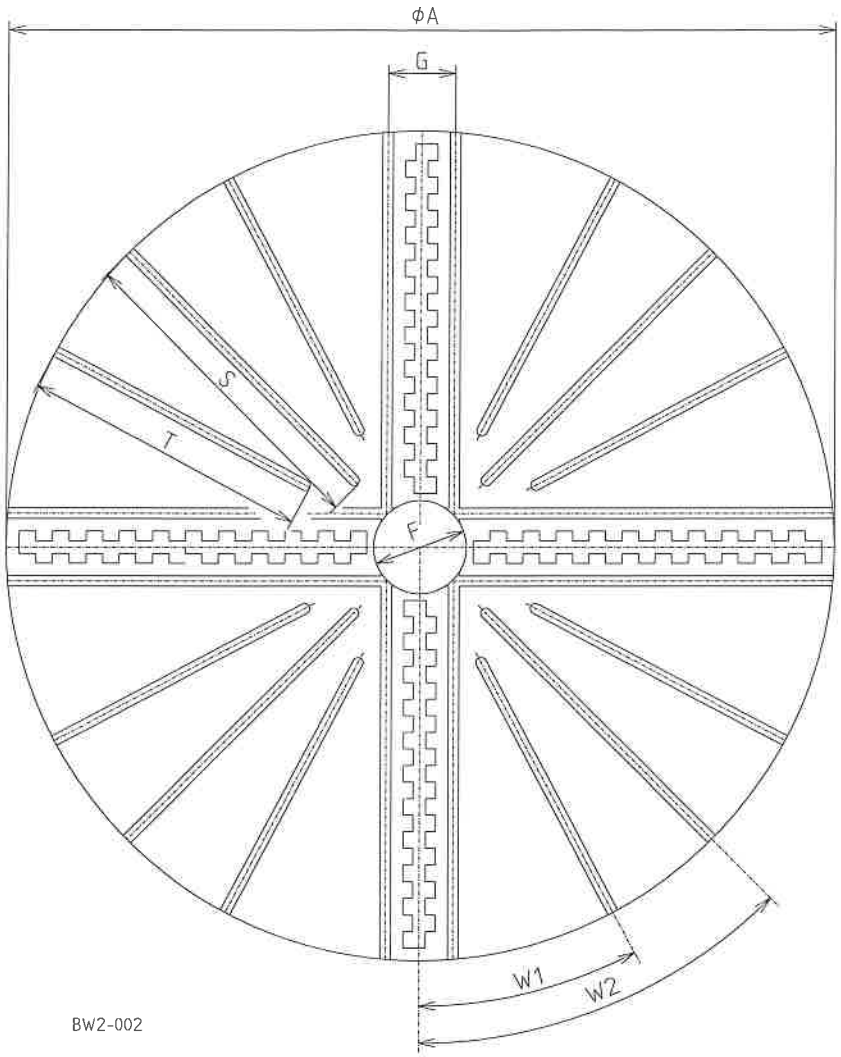


Legend

Q	max. admissible unbalance	m*r	[g*cm]
n	operating speed	n	[min^{-1}]

Palette Ø 2500 with attached jaw boxes

02-01-825930/00-0



Workholding slots

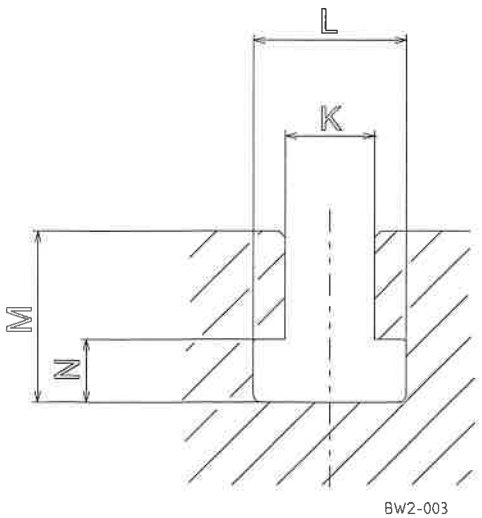


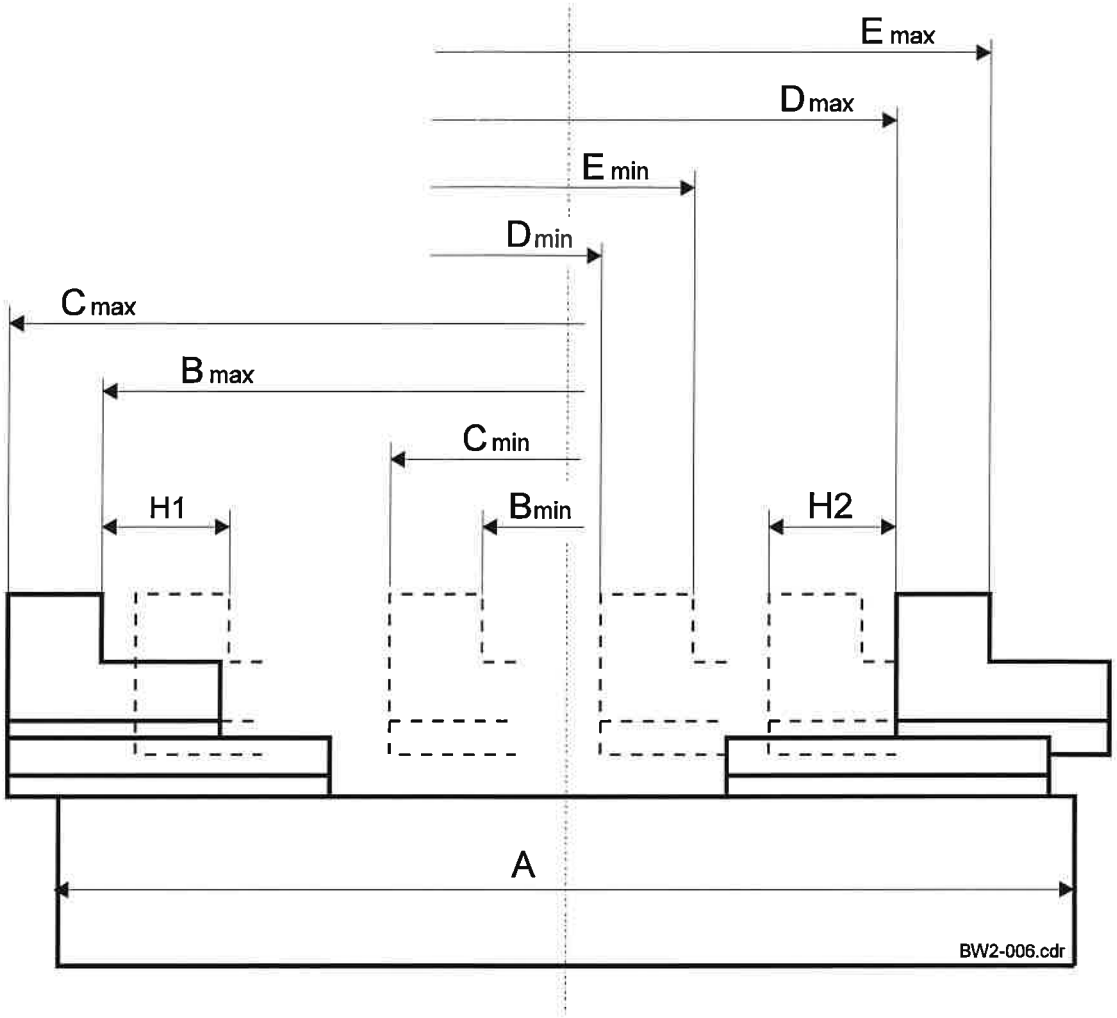
Table dimensions

A = Ø 2000
B = Ø 250 H7
C = 180
R = 765
S = 665
W1 = 28°
W2 = 45°

Dimensions of the workholding slots

K = 28^{H12}
L = 48^{+1}
M = 54^{+2}
N = 20^{+2}

Clamping areas with jaw boxes

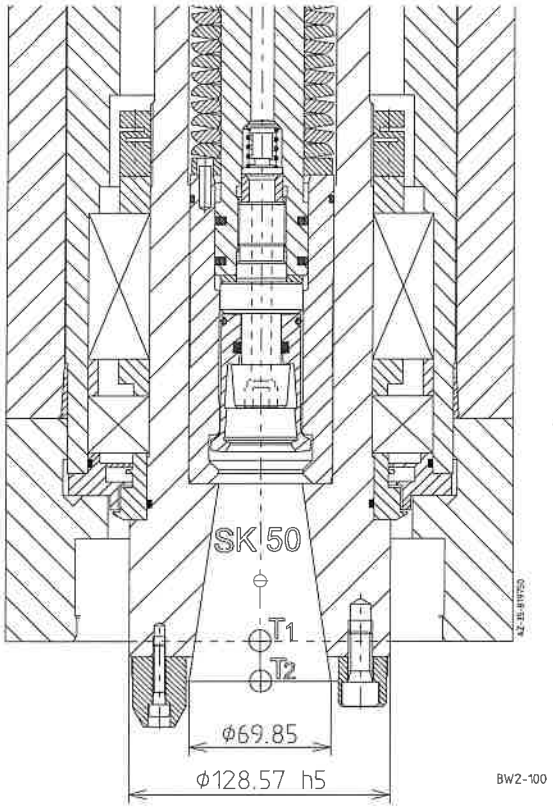


A	B_{max}	B_{min}	C_{max}	C_{min}	D_{max}	D_{min}	E_{max}	E_{min}	H1 stroke	H2 stroke
2000	1840	370	2000	530	1750	240	1850	400	120	120

The machine is provided with a tool holding fixture **System 250.2 / SK50 DIN2079A**.

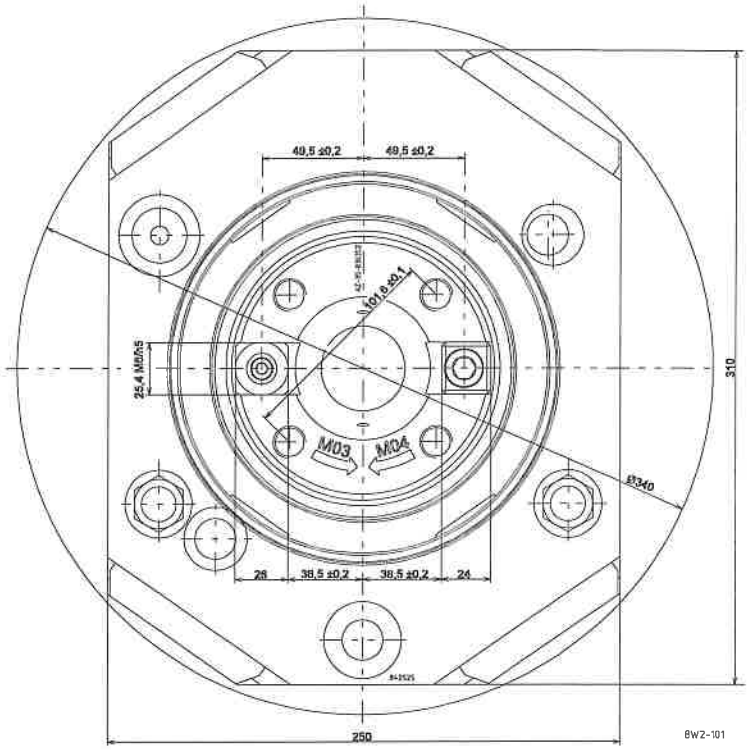
For description of the tool holding fixture see Operating and Maintenance Manual, Chapter 4.9.

Tool holding fixture in railhead



View of the tool holding fixture from below

Face of the railhead



Back of the railhead

T_1 ≡ home position of the tool holder in **turning mode,** identical with the reference point, is activated by **L651**

T_2 ≡ home position of the tool holder in **milling mode** for tool holding fixture SK50, is taken into account in **L651**