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Ref. No.:
324-06121454

Overview and Technical Data:

STARRAG HECKERT - CWK 400 D with palett changer + aluminium option

STARRAG HECKERT

Starrag Group

Year of Build:
May 1999

Description:

Used STARRAG HECKERT FCWK 400D Dynamic 6-station pallet pool, 240 Tower magazine with aluminum finish

- New spindle at 16 116 hours
- About. 33 568 operating hours

- CNC control Siemens 840 D
- Travel:
  - Column longitudinal travel X-axis 650 mm
  - Support vertical travel 650 mm Y-axis
  - Table traverse Z-axis 650 mm
  - B-axis 360 degrees x 0.001 indexing
  - Rapid traverse 40 m / min.
- Pallet size 400 x 400 mm
- Max Belstung 400 kp
- Drilling / tool spindle speed of 50 to max.15.000 r / min
- Drive power 31 KW
- Tool holder HSK 63
- Dynamic range change in 8 to 9 s by hydraulic rotary changer
- Coolant system
- Dimensions approximately 5.4 x 2.87 x 4.23 m

The motor spindles and speeds of 15 000 rev / min are creating the ideal conditions for the light metal processing, without compromising the high static and dynamic stiffness of the cast iron and steel processing.

The CWK 400 D Dynamic reach peak values??: Eilgangwerte to 100 m / min and accelerations up to 15 m/s2.

Innovative ideas also stuck in tool handling with the proven tower magazines with 240 tools. Attending dynamics is called for: in 1.5 s is provided the next tool, to 3.5 s to 4 s, the chip-to-chip time is reduced.

Compact in design, space-saving features of the circular memory 6 presets and 1 clamping space. It is powered by an AC servo motor.

For more details see PDFs

Technical Data:

Technical Data:

Control:
SINUMERIK 840D
Machine Hours:
33.568 hrs.
Spindle Hours:
16.116 hrs.
Spindle Speed:
15.000 rpm
Tool Capacity:
240 x

Travels:

X-Axis:
650 mm
Y-Axis:
650mm
Z-Axis:
650 mm

Dimensions and Weight:

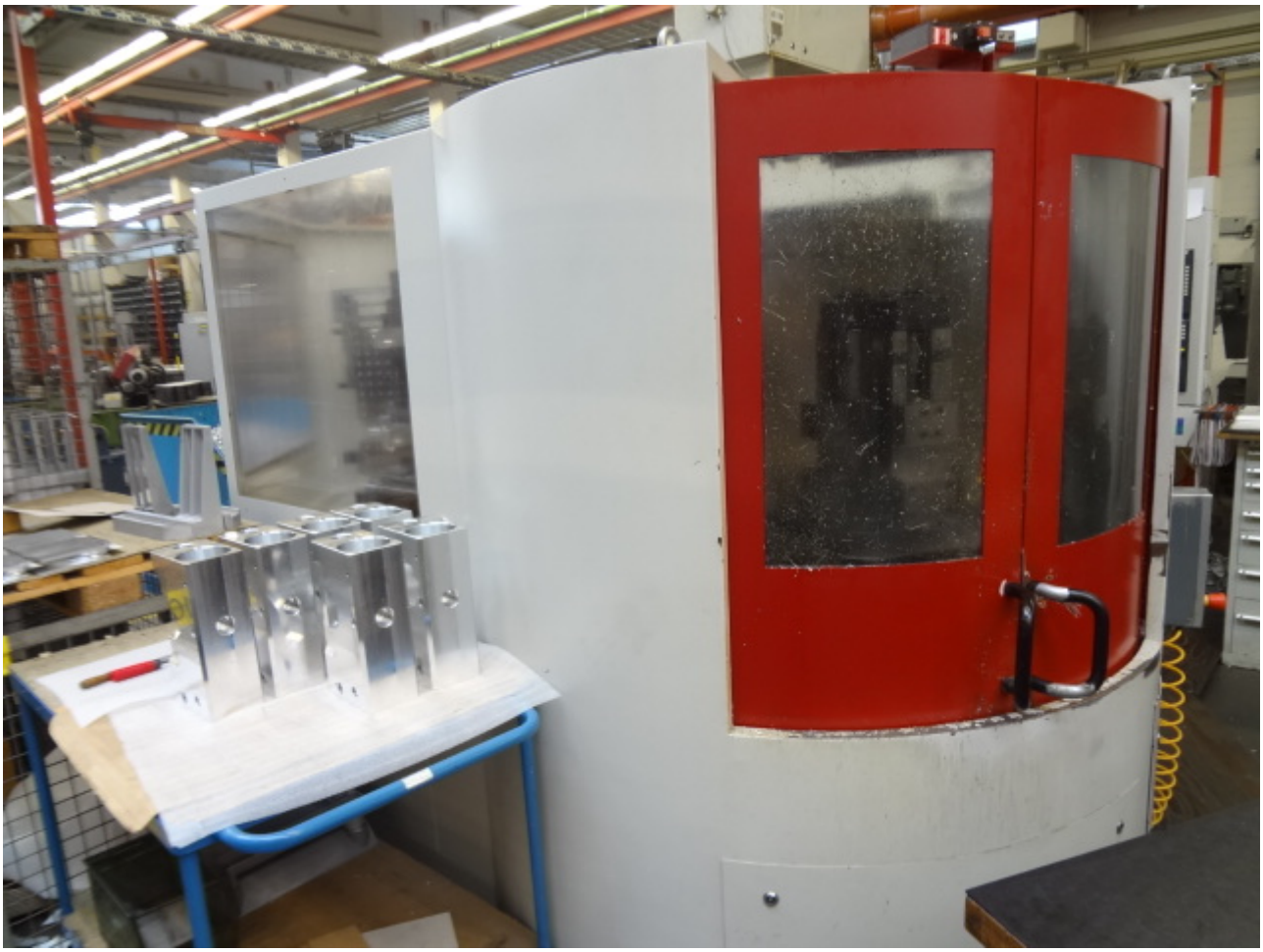
Height:
2.870 mm
Width:
4.230 mm
Length:
5.400 mm
Weight:
12.800 kg

Buyer Information:

Condition:
Very good condition
Availability:
Sold
Sold as:
EXW (Ex Works - Incoterm)
VAT:
19 %
Location:
Germany

1

2



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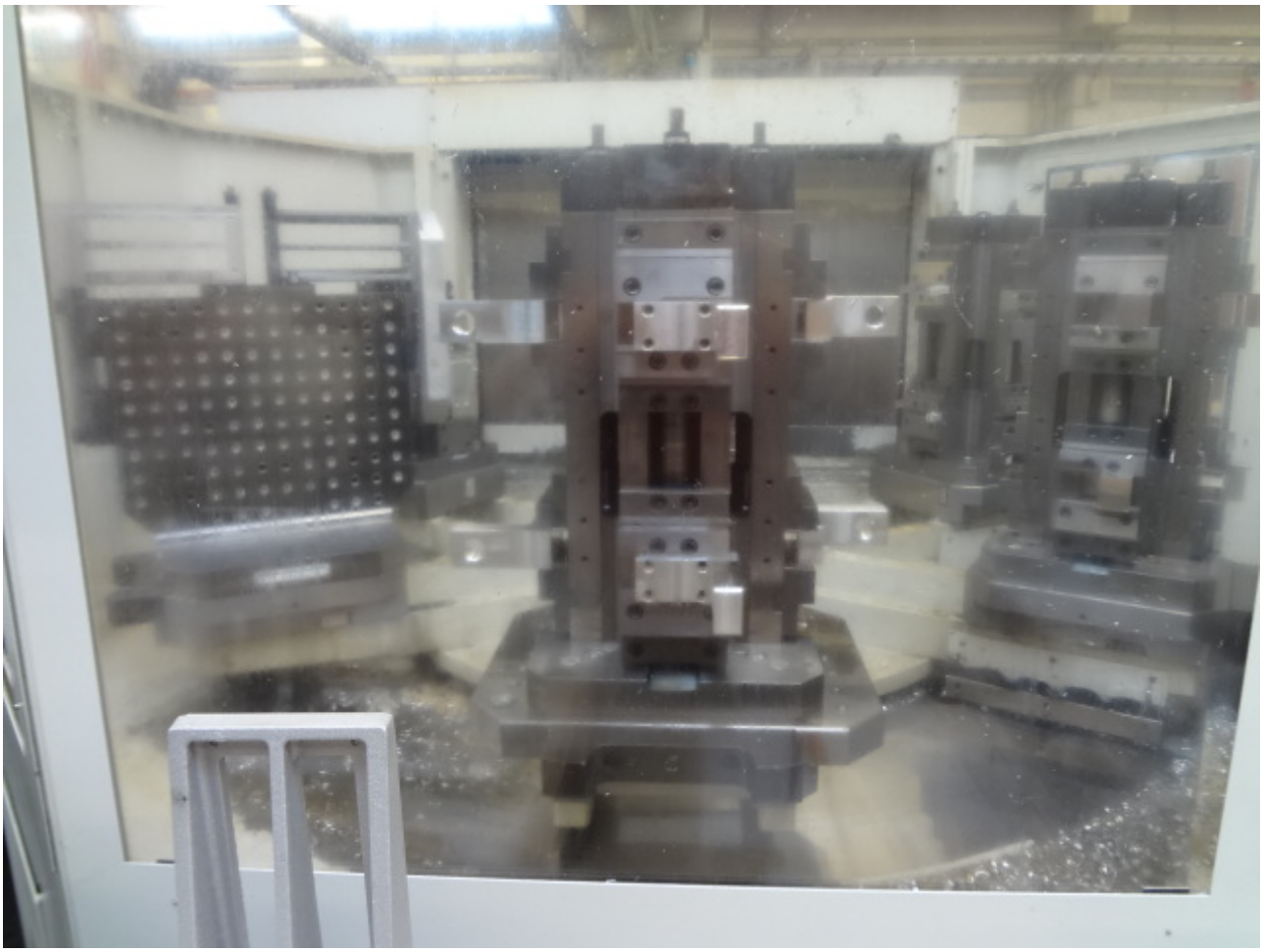

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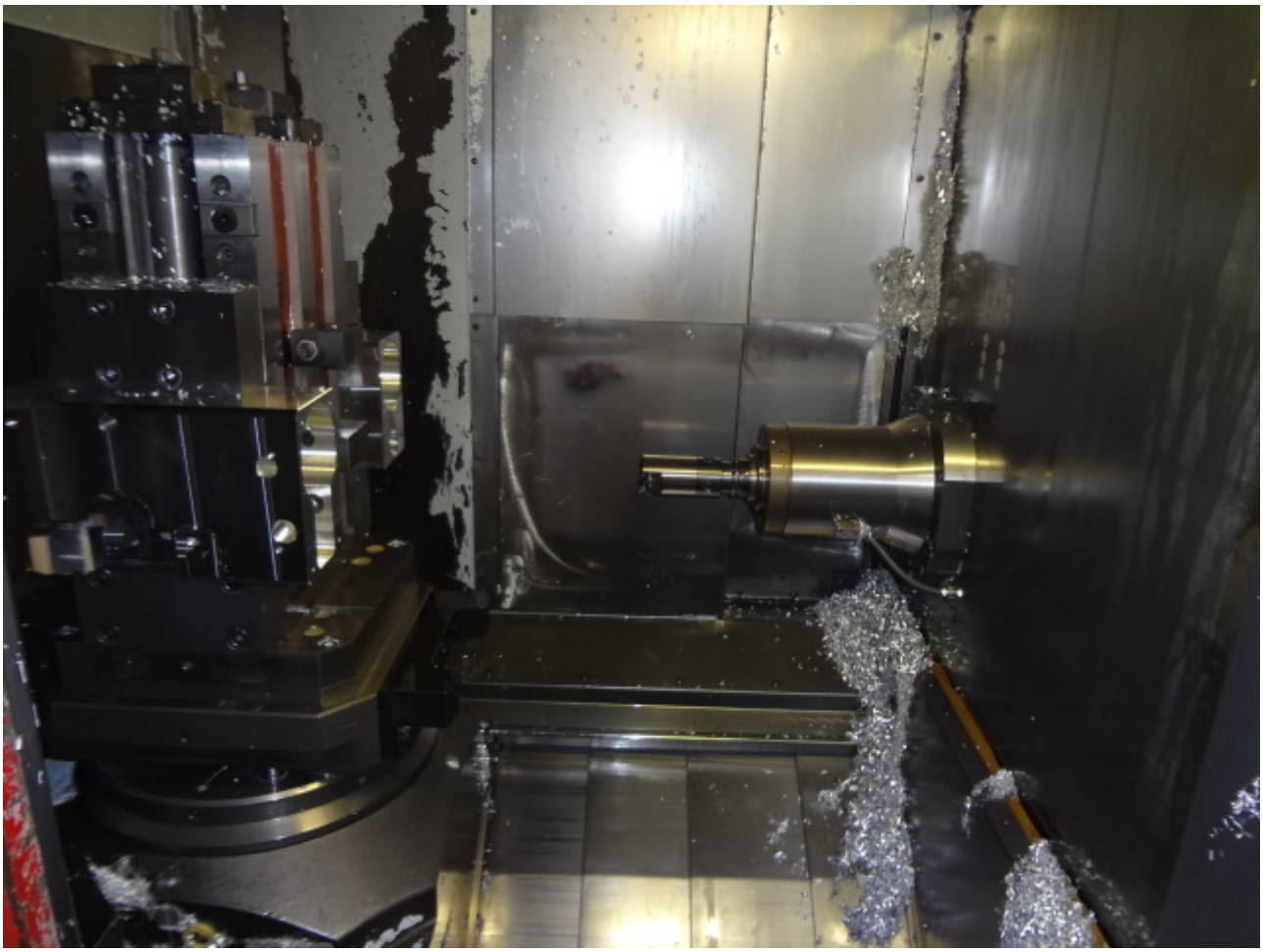

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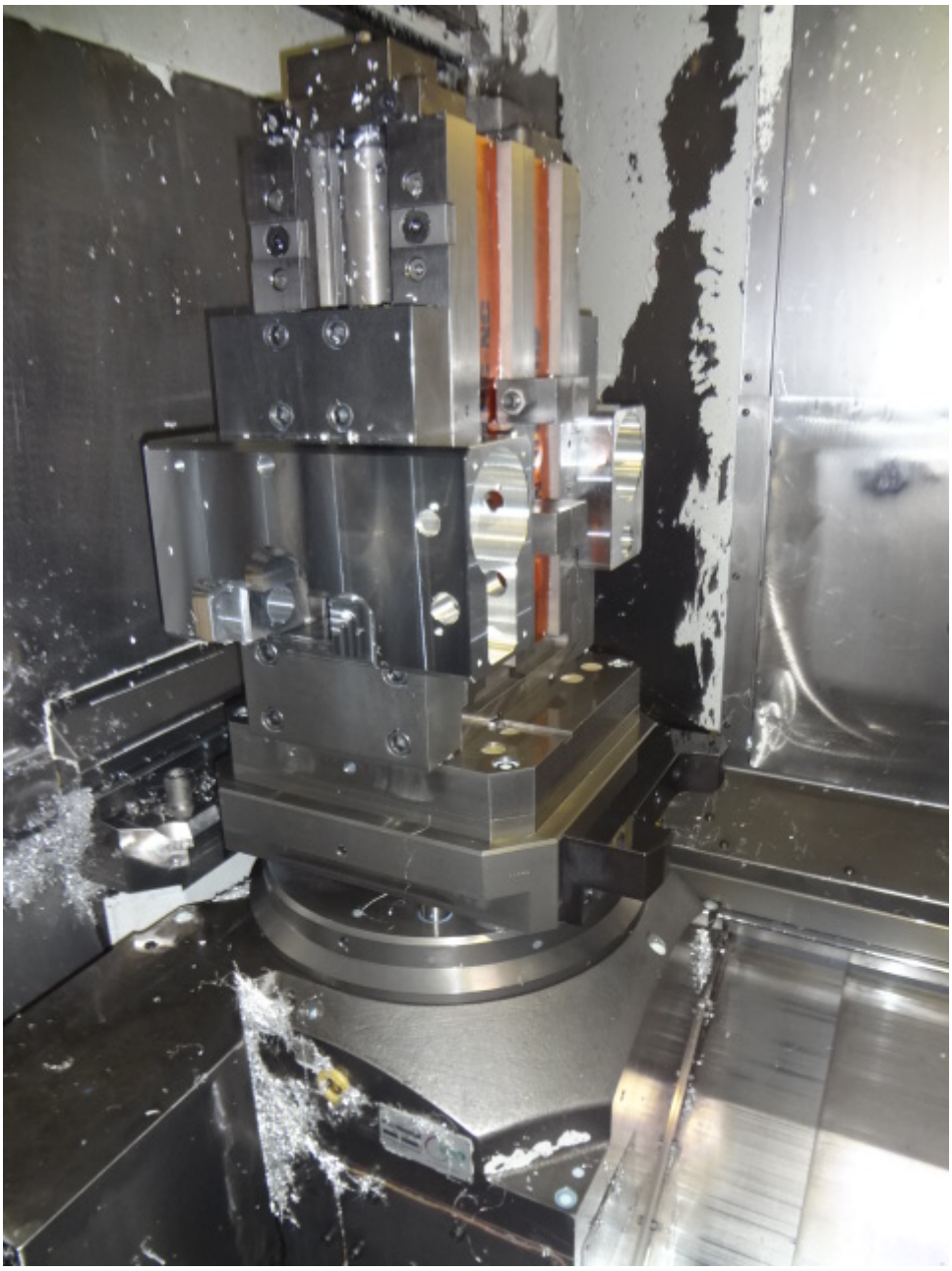

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heckert
starrag-heckert group
Heckert Werkzeugma
D-09117 Chemnitz Otto-Schmer
Typ
CWK 400 D
Maschinen - Nr.
18272
Baujahr
1999
Temperaturbereich
+5...35 °C
Gesamtmasse
12,5 t
CE
Made in Germany

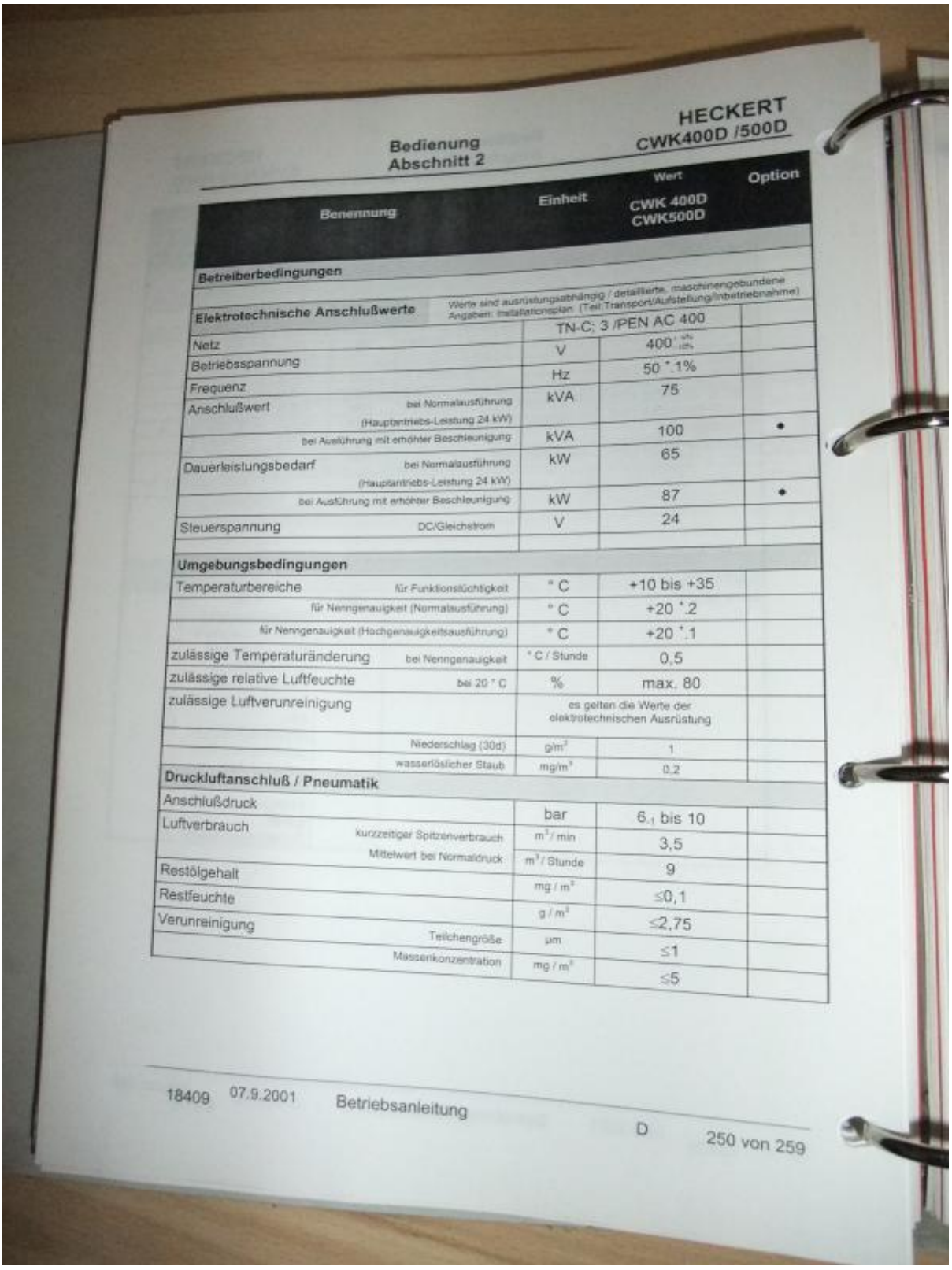
18

19


SIEMENS
AUTO
ROV
Kanal aktiv
Programm läuft
510220 Einlesesperre bei Werkzeugwechsel
Speicherabbild
AUTOMAT
Palettenfolge
2
3
4
2
8
4
5
1
3
MA
6
5
1
6
7
SP
Platz ist leer
roh
in Bearb.
fertig
nicht i. O.
kein Auftrag
Aktiv:
Palette3
Folgebearbeitung: = 0
Meldungen
Auftraege
Paletten-
verwaltung
Einstellung

21

Benennung			Einheit	Wert CWK 400D CWK500D	Option
Positionsgenauigkeiten in den Achsen X, Y, Z nach VDI / DGQ 3441					
Normalausführung	Positionierunsicherheit	$P(T_p)$	µm	9	
	Positionsabweichung	P_a	µm	8	
	Positionsstreubreite	P_{amax}	µm	7	
	max. Umkehrspanne	U_{max}	µm	6	
Hochgenauigkeits-ausführung	Positionierunsicherheit	$P(T_p)$	µm	6	•
	Positionsabweichung	P_a	µm	5	•
	Positionsstreubreite	P_{amax}	µm	4	•
	max. Umkehrspanne	U_{max}	µm	3	•

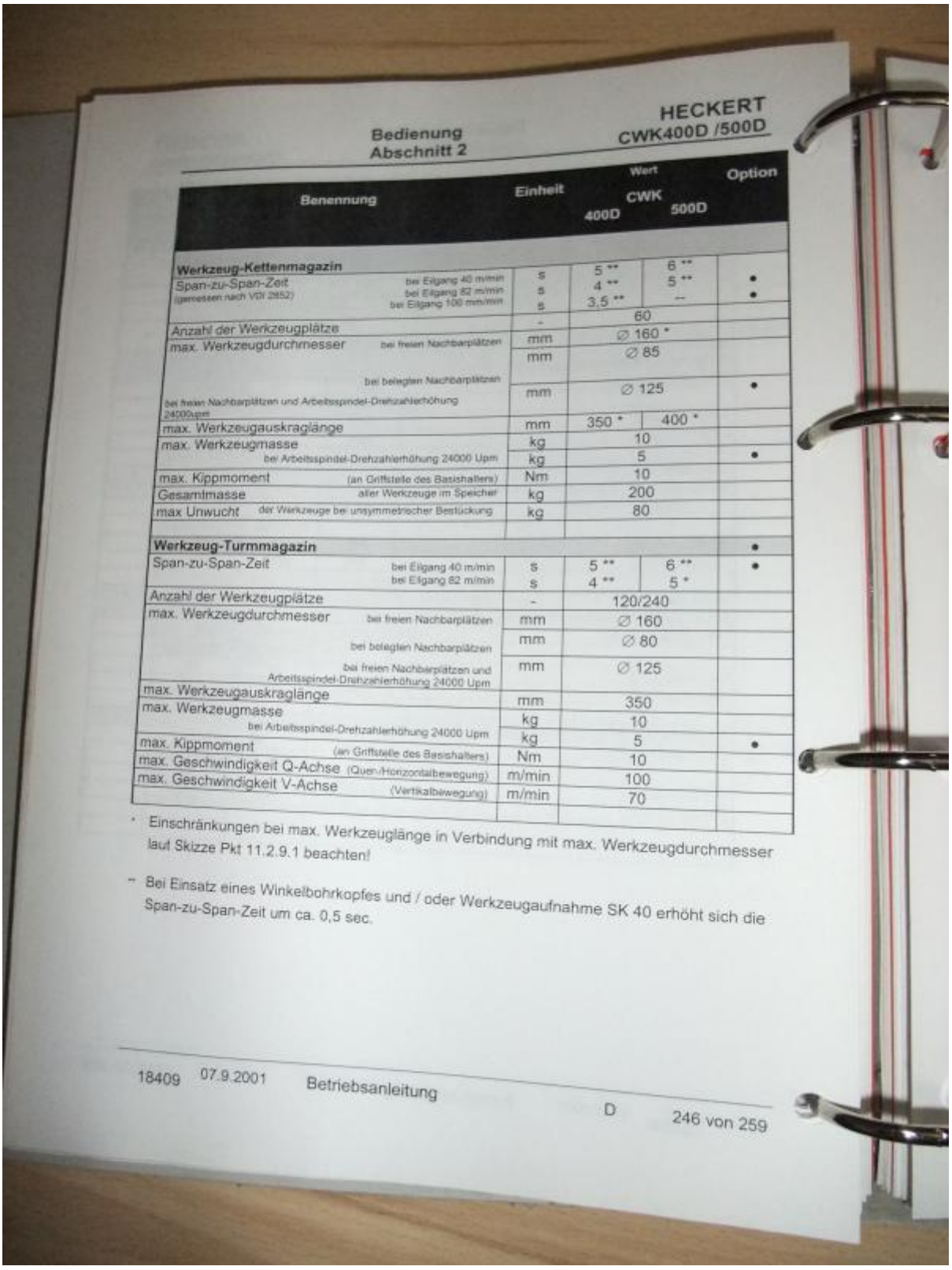


Benennung		Einheit	Wert CWK 400D CWK500D	Option
Betreiberbedingungen				
Elektrotechnische Anschlußwerte	Werte sind ausrüstungsabhängig / detaillierte, maschinengebundene Angaben: Installationsplan (Teil:Transport/Aufstellung/Inbetriebnahme)			
Netz			TN-C; 3 /PEN AC 400	
Betriebsspannung		V	400 +6% -10%	
Frequenz		Hz	50 ±1%	
Anschlußwert	bei Normalausführung (Hauptantriebs-Leistung 24 kW)	kVA	75	
	bei Ausführung mit erhöhter Beschleunigung	kVA	100	•
Dauerleistungsbedarf	bei Normalausführung (Hauptantriebs-Leistung 24 kW)	kW	65	
	bei Ausführung mit erhöhter Beschleunigung	kW	87	•
Steuerspannung	DC/Gleichstrom	V	24	
Umgebungsbedingungen				
Temperaturbereiche	für Funktionstüchtigkeit	°C	+10 bis +35	
	für Nenngenauigkeit (Normalausführung)	°C	+20 ±2	
	für Nenngenauigkeit (Hochgenauigkeitsausführung)	°C	+20 ±1	
zulässige Temperaturänderung	bei Nenngenauigkeit	°C / Stunde	0,5	
zulässige relative Luftfeuchte	bei 20 °C	%	max. 80	
zulässige Luftverunreinigung		es gelten die Werte der elektrotechnischen Ausrüstung		
	Niederschlag (30d)	g/m²	1	
	wasserlöslicher Staub	mg/m³	0,2	
Druckluftanschluß / Pneumatik				
Anschlußdruck		bar	6,1 bis 10	
Luftverbrauch	kurzzeitiger Spitzenverbrauch	m³/ min	3,5	
	Mittelwert bei Normaldruck	m³/ Stunde	9	
Restölgehalt		mg / m³	≤0,1	
Restfeuchte		g / m³	≤2,75	
Verunreinigung	Teilchengröße	µm	≤1	
	Massenkonzentration	mg / m³	≤5	

Benennung		Einheit	Wert CWK400D	Wert CWK500D	Option
Steuerung			Sinumerik 840 D		
Masse / Raumbedarf					
Anhängemasse	Maschine	kg	ca. 12.800	ca. 15.000	
Länge	Normalausführung ca.	mm	4.600	4.850	
Breite	Normalausführung ca.	mm	3.920	4.000	
Maschinenhöhe (bei Kettenmagazin)	über Unterkante Bett	mm	2.900	2.950	
Maschinenhöhe (bei Turmmagazin)	über Unterkante Bett	mm	2.700	2.950	•
Montagehöhe	über Unterkante Bett	mm	3150	3300	
Höhe Unterkante Bett über Fußboden	Normalausführung ca.	mm	125		
Lärmemission					
Lärmpegel		dBA	< 76 Prüfbedingungen: 1,6 m; Hauptgetriebe n_{max} links und rechts; mittlerer Vorschub in allen Achsen nacheinander; Arbeitsraumschutz geschlossen, Messung vor dem Spannplatz und am Einlegeplatz; Meßgerät: Schallpegelmesser		

Benennung		Einheit	Wert CWK 400D CWK500D	Option
Hydraulik				
Pumpe	Druck	bar	85 bis 90	
	Förderstrom	l/min	22,5	
Ölbehälter	Ölmenge	l	40	
Antriebsmotor	Leistung	kW	4	
	Anzahl der Kreisläufe	-	1	
Späneförderer				
Nutzbreite		mm	450	
Abwurfhöhe	Standardausführung	mm	1050	
Kühlaggregat				
Kältemittel		-	R 134 A	
Wasserbehälter	Inhalt	l	ca. 30	
Zusatz gegen Korrosion		-	10% Anticorit	

Benennung		Einheit	Wert CWK 400D CWK500D	Option
Prozessschmierung		-	2	
Anzahl der Kreisläufe				
durch Spindelmitte				
manuell schaltbar	Fördermenge der Pumpe	l/min	30/27/24	•
	Druck am Begrenzungsventil	bar	30/40/50	•
schaltbar mit M-Befehl	Fördermenge der Pumpe	l/min	30/27/24	•
	Druck am Begrenzungsventil	bar	30/40/50	•
über Düsen	Fördermenge der Pumpe	l/min	50	
	Pumpendruck	bar	2	
Schwalldusche	Fördermenge der Pumpe	l/min	ca. 70	•
	Anzahl der Düsen am Dach	-	4	•
Spülpistole	am Spannplatz			•
Filterart mit Behälterinhalt	Rückspülfilter	l	900	
	Vliesfilter	l	1350	•
	Vakuumrotationsfilter	l	1250	•



Benennung		Einheit	Wert CWK 400D	Wert CWK 500D	Option
Werkzeug-Kettenmagazin					
Span-zu-Span-Zeit (gemessen nach VDI 2852)	bei Eilgang 40 m/min	s	5 **	6 **	•
	bei Eilgang 82 m/min	s	4 **	5 **	•
	bei Eilgang 100 mm/min	s	3,5 **	--	
Anzahl der Werkzeugplätze		-	60		
max. Werkzeugdurchmesser	bei freien Nachbarplätzen	mm	∅ 160 *		
	bei belegten Nachbarplätzen	mm	∅ 85		
	bei freien Nachbarplätzen und Arbeitsspindel-Drehzahlerhöhung 24000Upm	mm	∅ 125		•
max. Werkzeugauskraglänge		mm	350 *	400 *	
max. Werkzeugmasse		kg	10		
	bei Arbeitsspindel-Drehzahlerhöhung 24000 Upm	kg	5		•
max. Kippmoment	(an Griffstelle des Basishalters)	Nm	10		
Gesamtmasse	aller Werkzeuge im Speicher	kg	200		
max Unwucht	der Werkzeuge bei unsymmetrischer Bestückung	kg	80		
Werkzeug-Turmmagazin					•
Span-zu-Span-Zeit	bei Eilgang 40 m/min	s	5 **	6 **	•
	bei Eilgang 82 m/min	s	4 **	5 *	
Anzahl der Werkzeugplätze		-	120/240		
max. Werkzeugdurchmesser	bei freien Nachbarplätzen	mm	∅ 160		
	bei belegten Nachbarplätzen	mm	∅ 80		
	bei freien Nachbarplätzen und Arbeitsspindel-Drehzahlerhöhung 24000 Upm	mm	∅ 125		
max. Werkzeugauskraglänge		mm	350		
max. Werkzeugmasse		kg	10		
	bei Arbeitsspindel-Drehzahlerhöhung 24000 Upm	kg	5		•
max. Kippmoment	(an Griffstelle des Basishalters)	Nm	10		
max. Geschwindigkeit Q-Achse	(Quer-/Horizontalbewegung)	m/min	100		
max. Geschwindigkeit V-Achse	(Vertikalbewegung)	m/min	70		

* Einschränkungen bei max. Werkzeuglänge in Verbindung mit max. Werkzeugdurchmesser lauf Skizze Pkt 11.2.9.1 beachten!

** Bei Einsatz eines Winkelbohrkopfes und / oder Werkzeugaufnahme SK 40 erhöht sich die Span-zu-Span-Zeit um ca. 0,5 sec.

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Arbeitsspindel / Hauptmotor				
Durchmesser im vorderen Lager	mm	∅75		
Werkzeugaufnahme		HSK-A63 DIN 69893		
		SK 40-AD DIN 69871 Anzugsbolzen DIN 69872-19		•
Variante Motorspindel Starrag und HSK - A63				
Drehzahlbereich	min^{-1}	50 ...15 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Motorspindel Starrag und SK 40				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Motorspindel Starrag und HSK - A63				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Hohlwellenmotor und SK 40				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	37	24	
Drehmoment	Nm	350	230	

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Verstellwege				
X - Achse (Ständerverstellung)	mm	650	750	
Y - Achse (Support-Senkrechtverstellung)	mm	650	750	
Z - Achse (Tisch-Querverstellung)	mm	650	700	
Verfahrbereich				
min. Abstand Spindelvorderkante - Mitte Werkstückträger	mm	50	100	
min. Abstand Spindelmitte - Oberkante Werkstückträger	mm	30	80	
lineare Vorschubachsen X / Y / Z				
Vorschub	mm/min	0 ... 40 000 0 ... 82 000 0 ... 100 000		 • •
Eilgang	m/min m/min m/min	40 82 100		 • •
technologisch verwertbare Vorschubkraft 60% ED	kN	12*		
100% ED	kN	10*		
Meßsysteme linear, optisch-inkremental, abstandscodiert				
Genauigkeitsklasse	µm	±5		
Teilungsperiode der Strichgitterteilung	µm	20		
Eingabe- und Anzeigefeinheit	µm	1		
Beschleunigung X/Y/Z bei Eilgang 40m/min	m/s^2	7		
Eilgang 82m/min bei Hohlwellenantrieb	m/s^2	9,3 / 9,6 / 10		•
bei Motorspindel	m/s^2	4 / 5,5 / 4,5		•
Eilgang 100m/min	m/s^2	15/15/12		•

* Beachten Sie die Einschränkung der Vorschubkraft
(siehe Bild 1: Diagramm Zulässige Vorschubkraft im oberen Y-Bereich

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
NC-Drehtisch / Drehachse B				
max. Drehzahl	min^{-1}	25		
Eingabe- und Anzeigefeinheit	Grad	0,001		
zul. Tangentialmoment (Tisch geklemmt)	Nm	3000		
zul. Tangentialmoment bei Dreharbeiten	Nm	530 bei 100% ED 1000 bei 60% ED		
max. Kippmoment ab Oberkante Palette	Nm	5000		
Positionierzeiten 45°	s	0,8		
90°	s	1,2		
180°	s	2,0		
Normalausführung Positionsunsicherheit P (T_p)		12''		
max. Positionsstreubreite P_{smax}		10''		
max. Umkehrspanne U_{max}		6''		
Hochgenauigkeitsausführung Positionierunsicherheit P (T_p)		6''		•
max. Positionsstreubreite P_{smax}		5''		•
max. Umkehrspanne U_{max}		3''		•

11.5 Technische Daten

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Palette (am Spannplatz drehbar)				
Aufspannfläche	mm x mm	400 x 400 400 x 500	- -	•
	mm x mm	- -	500 x 500 500 x 630	•
max. Belademasse pro Palette (mittig)	kg	400	500	
bei Eilgang 82 m/min	kg	300		•
bei Eilgang 100 m/min	kg	200		•
zul. Moment bei außermittiger Last	Nm	200		
Höhe der Werkstück-Aufspannfläche über Unterkante Bett (Spannplatz)	mm	1000		
Richtbohrung - Durchmesser	mm	∅ 20 H 6		
Abstand zur Tischmitte	mm	150 ∅ 0,013	200 ∅ 0,013	
Aufnahmebohrung ohne Spannhydraulik	mm	∅ 50 H 6		
in Verbindung mit Spannhydraulik	mm	∅ 20 H 6		
Befestigungsgewinde (Normalausführung)		43 x M12	23 x M12	
T-Nut (ähnlich DIN 650)	mm	14		•
Werkstück-Durchlaßhöhe	mm	750	900	
max. Störkreis	mm	∅ 700	∅ 800	
Spannhydraulik für Werkstückspannung	3 Anschlüsse			•
Automatischer Palettenwechsel				
Anzahl der wechselbaren Paletten	-	2		
max. Palettenwechselzeit bei Normalausführung	s	8	9	
bei Ausführung mit Spannhydraulik mindestens	s	10		

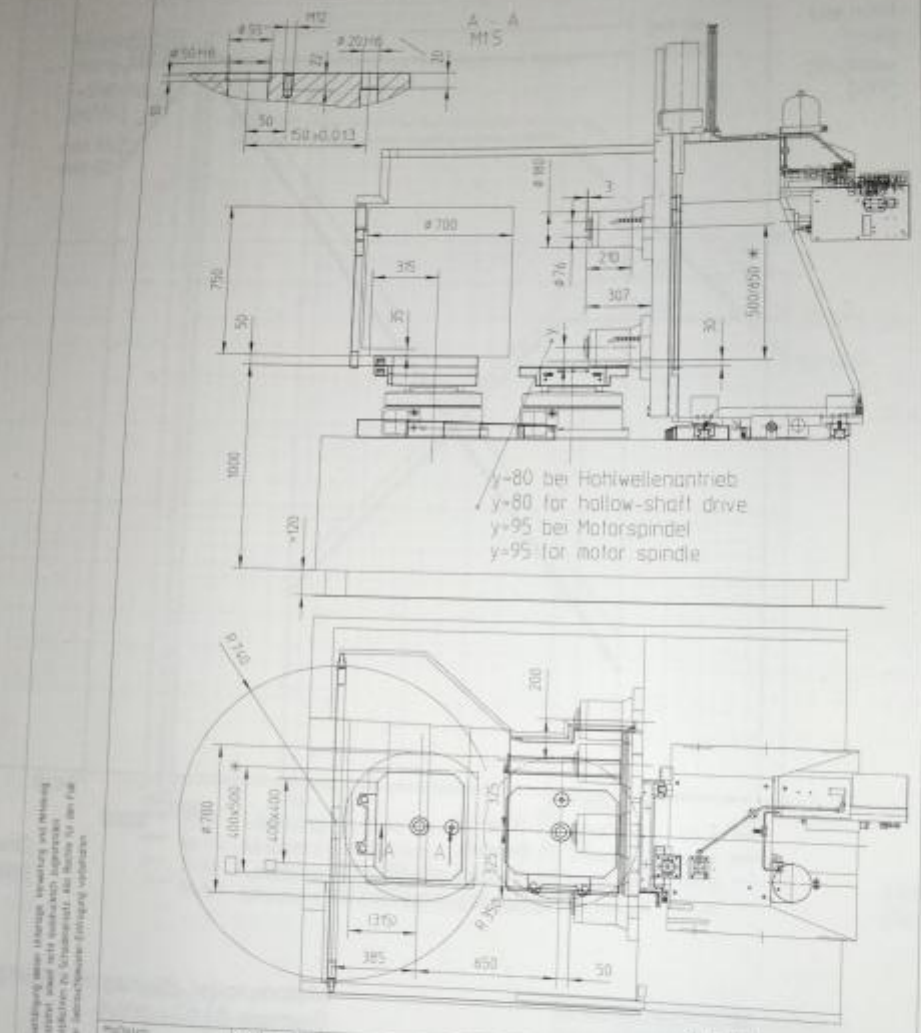
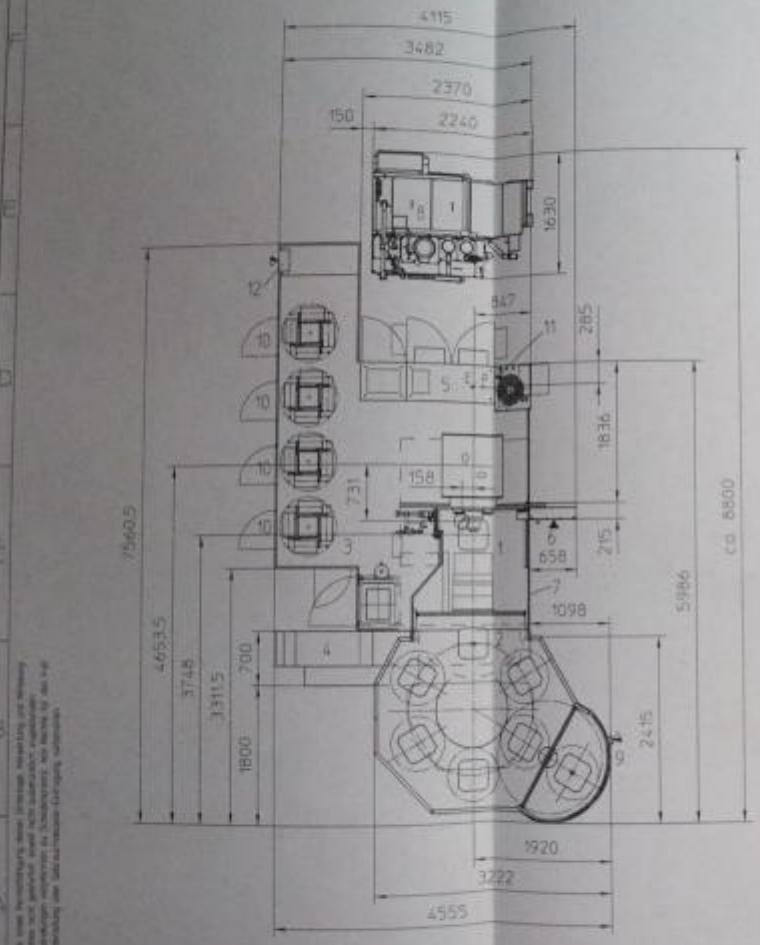


Bild 6: Arbeitsraumbild



1 Arbeitsraum
2 Werkstückwechsel
3 Werkzeugspeicher/Werkzeugwechsler mit Verkleidung
4 Spänef.örderer mit Schaurzbehälter
5 Elektroschrank
6 CNC-Steuerung mit Bedientafel
7 Arbeitsraumschutz
8 Kühlmittelbehälter
9 Sicherheitseinrichtung Spannplatz
10 Handeinlegeplatz für Werkzeuge
11 Hauptschalter
12 2. NC-Bedientafel

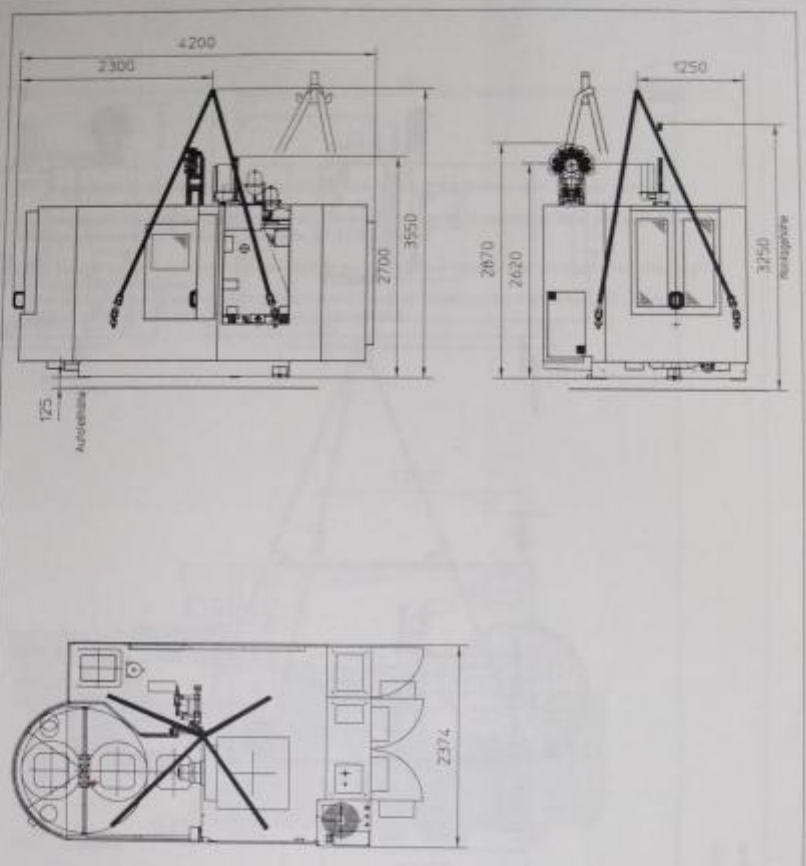
E Elektroanschluß (Netzanschluß)
P Luftanschluß
▸ Hauptbedienstelle
▸ Bedienstelle

1 Work area
2 Workpiece changer
3 Tool Magazin/tool change with paneling
4 Chip conveyor with oily coolant tank
5 Switch cabinets
6 CNC-control with operator control
7 Work area enclosure
8 Coolant tank
9 Safety device for clamping station
10 Manual loading station for tools
11 Main switch
12 2. NC-operator pane

E Power supply (mains connection)
P Compressed-air supply
▸ Main operator control
▸ Secondary operator's stand

Maßstab		Maschine
1:50		CWK400D

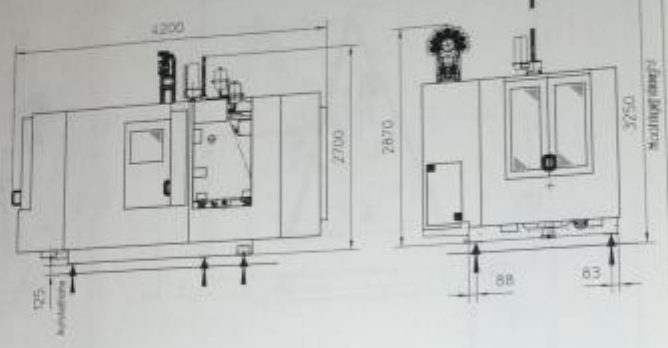
Benennung
RAUMBEDARFSPLAN

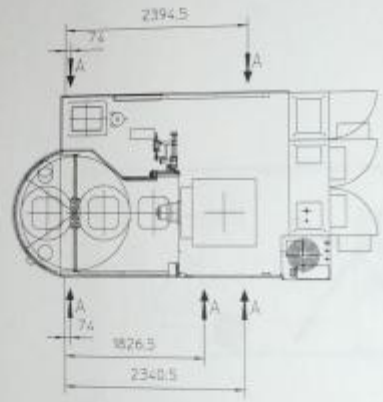


Anhängelasse = 11400kg
Anhängemittel
-2 Rundschlingen WLL6000kan 6m lang
-6 Schäkel A6 links je 1x, rechts je 2x
DIN 82101 (min St Tragfahigkeit)
-4 Anschlagwirbel M30 (min St Tragfahigkeit)

Maßstab: 1:50	ab Maschine: 38252	Maschinentyp: CWK400D	HECKERT Werkzeugmaschinen GmbH	Bearb.	Name
	bis Maschine:			Gepr.	
	Ers. für:			A4_D	Datum: Norm:
	Ers. durch:				
Benennung: Transportbild			Gek.Zeichnungs-Nr. T18000	Bl. 1	Var. 2

Bild 6: Transport Maschine Bl. 1





Anhebemasse = 11400kg
Anhebemittel
4 - 5 hydraulische Heber inkl. 3t Tragfähigkeit

Maßstab 1:50	Bl. Maschine	Blatt	Maschinentyp CWK400D	HECKERT Werkzeugmaschinen GmbH	Bearb.	Datum	Name
	Ers. für				Gepr.		
	Ers. durch				Ers. D	Datum	Norm
Benennung Transportbild				Dok.Zeichnungs-Nr. T18000	Bl. 2	Vers. 2	

Bild 7: Transport Maschine Bl. 2

2 Transport

Der Palettenpool ist eine kompakte Baugruppe die nach der Inbetriebnahme in dem Zustand verbleibt.

Das Anhängen des Palettenpool darf nur an den mitgelieferten M20 Anschlagwirbel erfolgen. Das Einschrauben anderer Anhängeschrauben ist nicht zulässig!

Die 6 Spannschrauben zwischen Verschiebeplatte und Grundkörper müssen beim Transport fest angezogen sein (siehe Bild Grundgestell).
Halten Sie die einschlägigen Unfallverhütungsvorschriften beim Transport des Palettenpool ein, die unter anderem den Aufenthalt unter schwebenden Lasten verbietet.

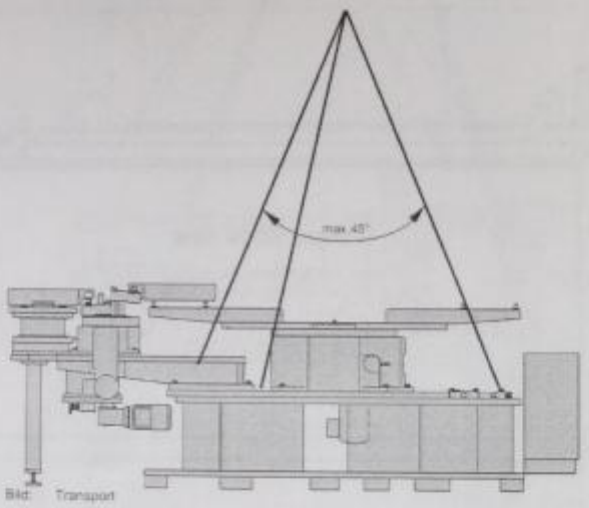
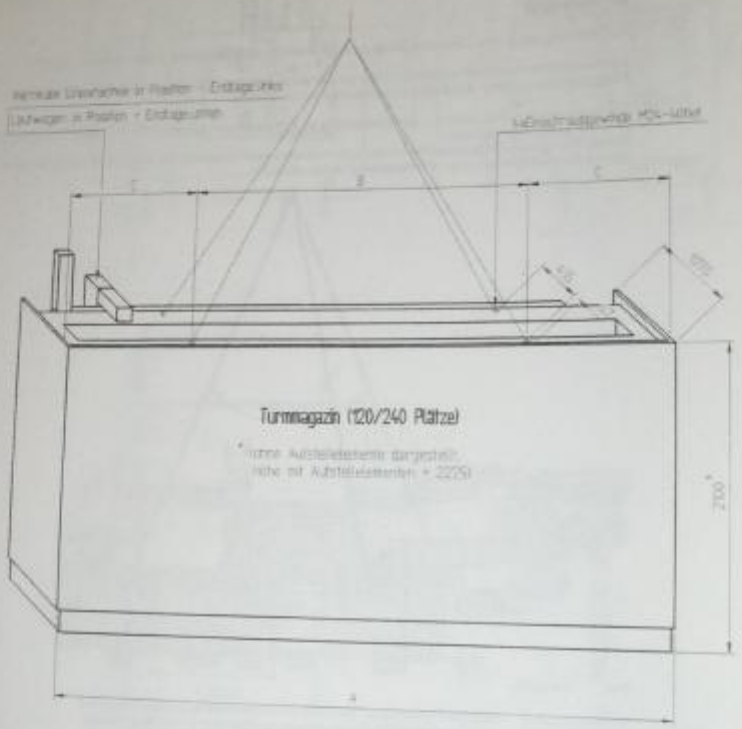


Bild: Transport

Anhängemasse: 3800 kg (Palettenpool komplett mit elektromechanischem Wechsler)
Anhängemittel: 3 Anschlagwirbel M 20 (pro Anschlagwirbel sind 2 Tonnen zulässig)

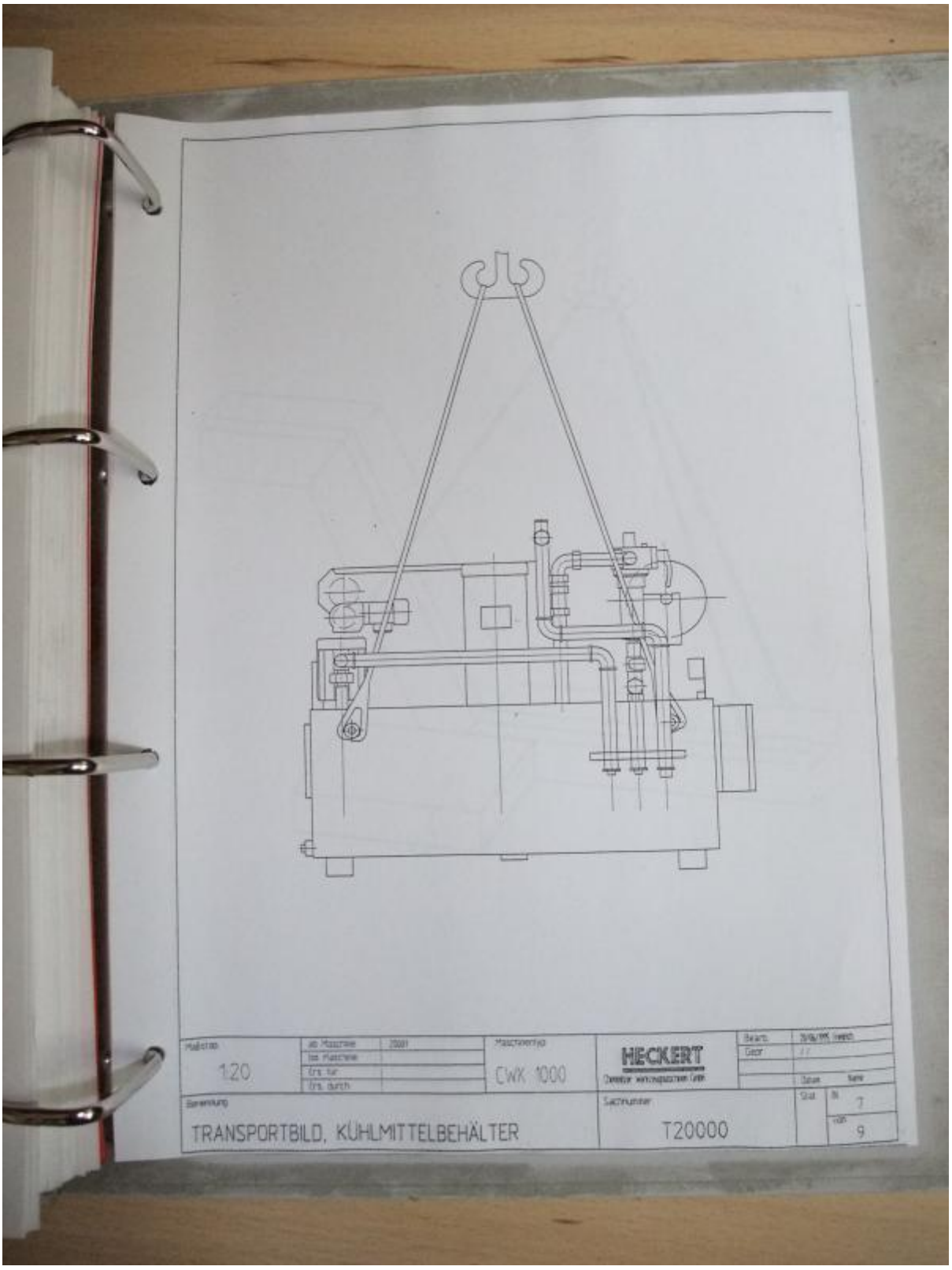
Bild 8: Transport Palettenpool

Anhängebild-Krantransport



Turmmag.-Typ	A (mm)	B (mm)	C (mm)	Masse (kg)
240 Plätze	4250	2965	672	1260
120 Plätze	2570	1965	302	710

Bild 9: Transport Turmmagazin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CWK 1000
HECKERT
TRANSPORTBILD, KÜHLMITTELBEHÄLTER
T20000
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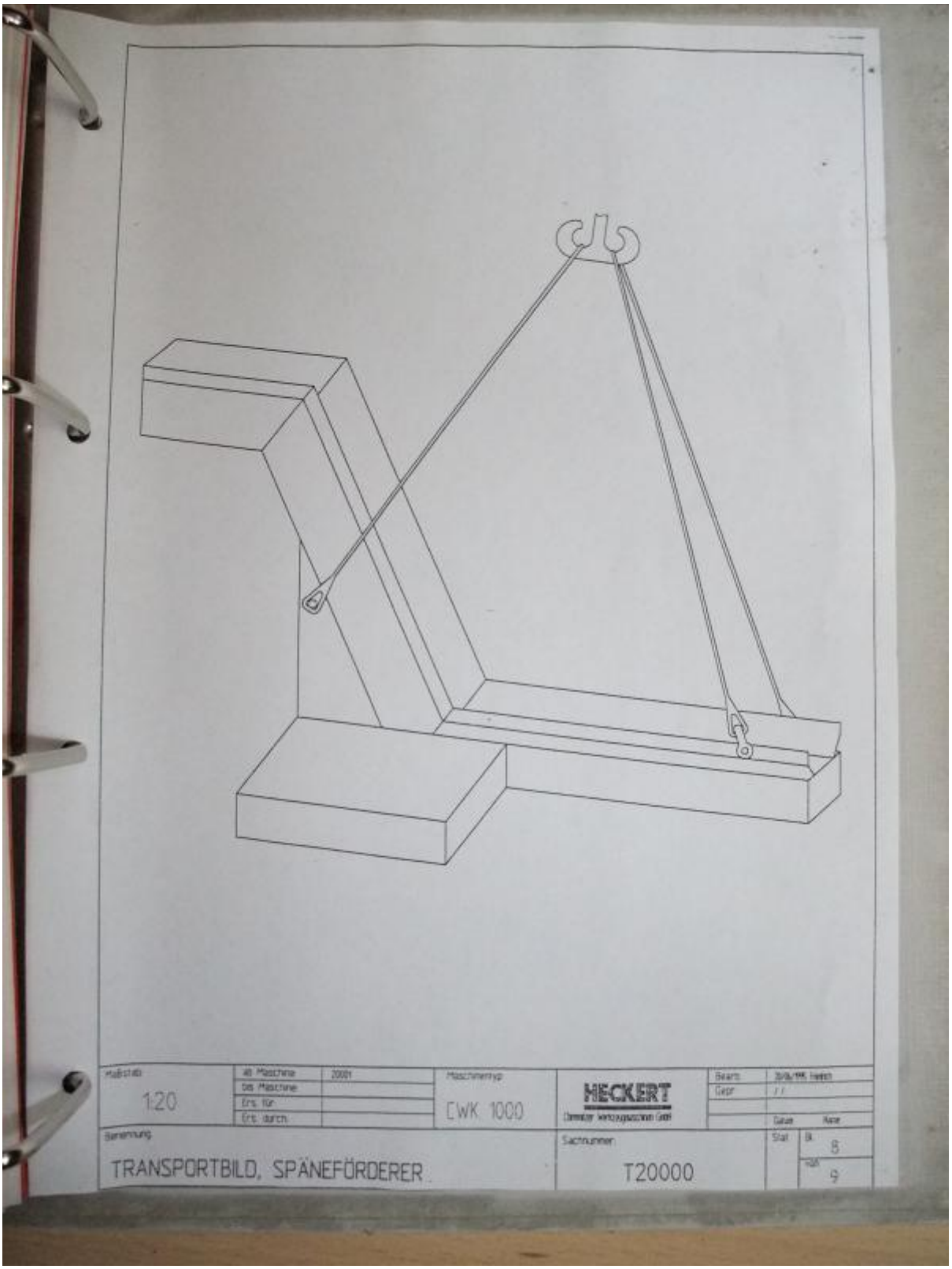

Maßstab
1:20
Maschinentyp
CWK 1000
HECKERT
Bezeichnung
TRANSPORTBILD, SPÄNEFÖRDERER
Sachnummer
T20000
Blatt
8
9

With Ever More
To The New Mill

The new HECK
CWK 500 D
Centres have b
the demands o
more reliable,
effective.
Using motor
speed ranges o
15,000 rpm o
conditions have
metal machinin
high static an
machining cap
the customers'
could be reduc
extent. The CW
highest dynam
achieving top
rates of up to 1
rates of up to
centres are n
values with 82
Innovative ide
mented in too
the well-prove
with max. 240
developed a r
with 60 pocket
between mag
This also sub
sequential too
1.5 sec. and
reduced to 3.5

All Around
A Direct Hit

1 Installation without any need for foundation
thanks to compact design with T-type bed and column with reduced mass

2 Safe and extremely fast swarf removal
from the working zone thanks to slant-bed design, swarf conveyor worm and swarf conveyor as preconditions for dry machining

3 Highest positioning accuracies
P ≤ 0.006 mm and Pumax ≤ 0.004 mm
in all linear axes by means of linear motion guideways

4 Highest rapid traverse rates and short controller acting times
thanks to digital AC servo drives with pre-loaded ball lead screws

5 Dynamic package 1 g (optional)
with rapid traverse rate of 82 m/min, acceleration rate of 10 m/s² and motor-driven spindle of 15,000 rpm

6 Dynamic package 1.5 g (optional for CWK 400 Q)
with rapid traverse rate of 100 m/min, acceleration rate of 15 m/s² and motor-driven spindle of 15,000 rpm

7 Main drive
in variants with motor-driven spindle
– driving power ratings of up to 21 kW, speed range of up to 10,000 rpm, steep-taper tool receptor AD 40 or hollow-shank taper HSK 63
– driving power ratings of up to 21 kW, speed range of up to 15,000 rpm, HSK 63 tool receptor
– driving power ratings of up to 60 kW, speed range of up to 24,000 rpm, HSK 63 tool receptor
or with hollow shaft-type motor
– driving power ratings of up to 35 kW, torque up to 335 Nm, speed range of up to 10,000 rpm, steep-taper tool receptor AD 40

8 Pallet changeover time 8 to 9 sec.
thanks to hydraulic rotary changer

9 Rotatable clamping station
with 4 × 90° indexing facility for operator-friendly workpiece setting work whilst the machining cycle is running

10 NC rotary table
for multisided and complete machining to satisfy highest accuracy demands (P ≤ 6", Pumax ≤ 5") with coupling unit for hydraulic workholding fixtures

11 High-performance in-process control and monitoring facilities
use of Siemens 840 D CNC continuous-path controller in 32-bit technology or, as an option, Fanuc 16i including comprehensive control and monitoring facilities

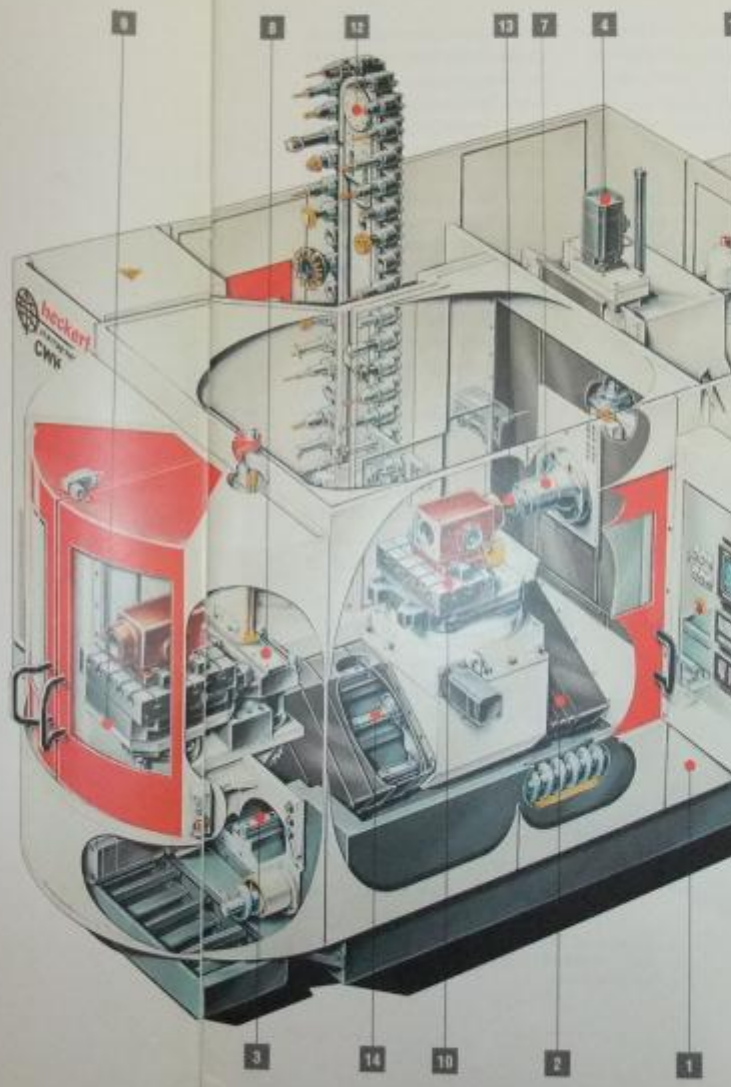
12 Tool handling with chain-type magazine, chip-to-chip times 3.5 to 4 sec., parallel tool location between magazine and main spindle, drive by means of AC servo motor to reduce the availability times for sequential tool and the chip-to-chip times

Tool handling with tool tower magazine
space-saving option with regard to chain-type magazine for increased tool demands of up to 240 pockets with smallest installation area and tool changeover in parallel to production time

13 Coolant system
wet machining with coolant supply through nozzles or through spindle centre with a delivery pressure rating of up to 50 bar or dry machining with minimum-quantity lubrication

14 Low-maintenance grease lubrication
for motor-driven spindle, ball lead screws and linear motion guideways

Conversion into manufacturing cells and flexible manufacturing systems
with circular and linear magazines for workpiece pallets



Economy And Ecology Form An Optimal Entity

■ The compact design of HECKERT CWK 400 D and CWK 500 D centres with a T-type bed, carrying all major machine elements is the condition for transporting the machine as a single complete entity, for installation without any need for foundations and instant readiness for use. This saves foundation, transportation, and assembly costs and makes sure that full production can be started even earlier.

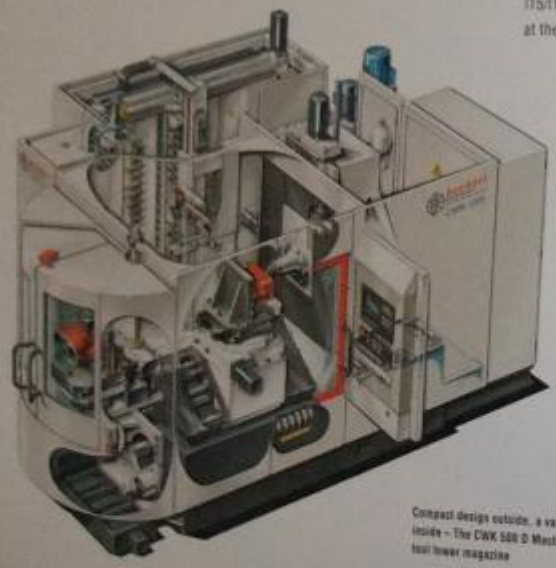
■ All major machine elements feature excellent shock absorbing qualities and a very limited heat expansion to ensure vibration-free machining with high performance.

■ To ensure fast and safe swarf removal from the working zone, the machine bed has been configured in slant-bed design. The consequential prevention of heat accumulation will create ideal conditions for dry machining.

■ Extremely high running, positioning and permanent accuracies are ensured by optimally dimensioned linear motion guideways in all linear axes.

■ Incremental, direct linear encoder systems with distance coding have been encapsulated in aluminium casings and are pressurized with compressed air. So, the encoder systems are protected from swarf, coolant and contaminations. An incremental encapsulated angular position encoder system is used for the NC rotary axis.

■ Manufacturing tolerance deviations and temperature fluctuations can be compensated for in conjunction with the CNC controller. In the stage of extension featuring enhanced machining accuracy, a positioning deviation of $P \leq 0.006$ mm and a positioning variation of $Psmax \leq 0.004$ mm in all linear axes and $Psmax \leq 5''$ in the rotary axis can be achieved. So, accuracies in the IT5/IT6 tolerance class can be obtained at the workpiece.



Compact design outside, a variety of innovations inside – The CWK 500 D Machining Centre with tool tower magazine

■ The technical concept of the HECKERT CWK 400 D and CWK 500 D consistently applies all necessary considerations for strict adherence to ecological requirements. Total-loss oil lubrication has become a thing of the past. Thanks to grease lubrication for main spindle, ball lead screws and linear motion guideways, maintenance requirements have been reduced quite considerably.

■ With the machine being sealed off the shop floor, any ingress of coolant and hydraulic oil is avoided. This has been achieved by a machine bed which carries all functional machine elements and is hermetically sealed.

■ Fleeceless coolant purification with vacuum edge strainer and return flow filter for the high-pressure circuit does away with cost-intensive special refuse disposal requirements.

■ In accordance with environment and operator-friendliness, a splash shower in the working zone with a coolant volume rate of 70 l/min, an air-blast gun at the clamping station for cleaning of workpiece and fixture and an emission extraction can be incorporated in the machining centres.

■ A clear view of the working zone is always ensured by a pneumatically operated, rotating inspection window in the working-zone safety door.

Construction princ
with slant bed

How A Reduction In Idle Times Can Be All Important

HECKERT CWK 400 D and CWK 500 D Machining Centres after best conditions for light-metal machining of engine components

Optimal cutting conditions with coolant supply through spindle centre and through external nozzles

■ Main drive

A characteristic of the new HECKERT CWK 400 D and CWK 500 D Machining Centres is the highly dynamic behaviour of the main drive. With a mass-reduced and grease-lubricated motor-driven spindle, speeds of up to 10,000 rpm, 15,000 rpm and 24,000 rpm at power ratings of 31 kW can be reached optionally.

Even for heavy-duty cutting work, HECKERT offers another solution. A hollow shaft-type motor ensures power ratings of 35 kW at torques of 335 Nm.

Optimal conditions are obtained for wet machining. Coolant supply is optionally possible through external, adjustable ball nozzles or through spindle and tool centre. Absolute swarf removal is guaranteed during core drilling with a delivery pressure rate of up to 50 bar.

Ideal machining results are achieved in dry machining thanks to the minimum-quantity lubrication.

Clamping and unclamping of tools with steep-taper receptor 40 or hollow-shaft taper HSK 63 function quickly and safely by means of Belleville spring pack and hydraulic cylinder. Blasting of spindle taper and internal coolant supply of tools with compressed air during the automatic tool changeover cycle avoids contaminations and prevents negative influences on the machining quality.

■ Feed drive

Digital AC servo motors in combination with preloaded ball lead screws ensure short positioning times, minimized controller acting times, maximum rapid traverse rates, and a high stability over the whole range of feed rates. They feature the cost-saving option to the linear drives and reduce idle times above average with rapid traverse rates optionally from 40 m/min up to 100 m/min and acceleration rates of up to 15 m/s². Such problems of linear drives as mastering of magnetic forces, expensive cooling and mass-dependent power capacity are excluded when using the rotary HECKERT drives.

Ever more dynamics can be achieved by the optionals:

Dynamic package 1 g
(CWK 400 D and CWK 500 D)
- rapid traverse rate 82 m/min
- acceleration rate 10 m/s² in all linear axes
- motor-driven spindle with max. 15,000 rpm
- hollow-shank taper HSK-A63
- chip-to-chip time 4 sec.

Dynamic package 1.5 g (CWK 400 D)
- rapid traverse rate 100 m/min
- acceleration rate of up to 15 m/s²
- motor-driven spindle with max. 15,000 rpm
- hollow-shank taper HSK-A63
- chip-to-chip time 3.5 sec.

■ Pallet changeover

Pallet changeover too is safe, comfortable and ultra-fast. A hydraulically operated rotary pallet changer ensures exchange

of pallets within a tim
Workpieces are clamp
unclamped at the clamp
machining takes plac
standard design of
with its 4 × 90° indexing
operator comfort cons
An NC rotary table is of
machining operations,
fitted with a high-pre
ensure a positioning d
and a position variatio
satisfy highest quality
The NC rotary table i
dable with a coupling
pressure stages to su
holding fixtures.

Highest Innovation During Tool Changeover

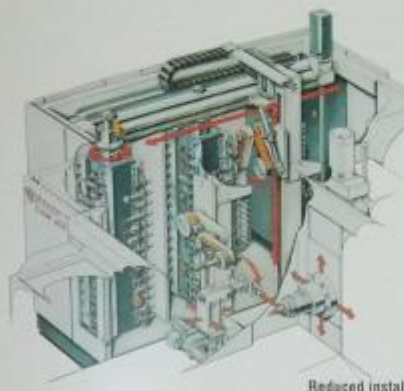
The tool handling is optimally matched with the machining job. Whether equipped with chain-type magazine for 80 tools or with tool tower magazine for 120 or 240 tools, the chip-to-chip time with dynamic package is only 3.5 to 4 sec. for tools of 10 kg in weight, 160 mm in diameter and up to 400 mm in length. The twin gripper is located outside the machining area and therefore not subject to coolant and swarf ingress.

The enhanced peripheral speed of chain-type magazine will reduce the availability time of sequential tool to 1.5 sec. This is of particular importance for light-metal machining.

The tool tower magazine featuring highest tool density at minimum space requirements reduces setup times, optimizes sequences of operation and enhances operator comfort.

Arrangement of tools in chain-type magazine in parallel to the main spindle ensures a chip-to-chip time of 3.5 sec.

Advantages of to as against chain



Dynamic tool changeover between main spindle and tool tower magazine

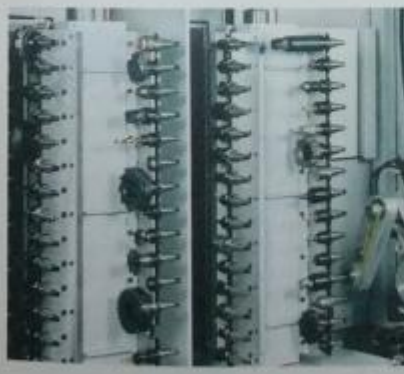
Reduced instal

– Highest tool d
0.25 m² installat
– Full occupatio
without vacant

Reduced setup

– Manual tool
magazine durin
within the auto
– Each tool ca
location
– Full occupati
without adjace

Tool tower magazine for max. 120 or 240 tools with highest tool density at minimum space requirements



Flexible Manufacture Can Be Extended

■ Linear magazine

A track-bound workpiece pallet transporter, clamping station for setup work, storage locations in linear arrangement for intermediate storage of workpiece pallets and a cell controller are included in the linear magazine.

The transporter featuring a traverse speed of 60 m/min as well as short acceleration and deceleration times guarantees short setup times.

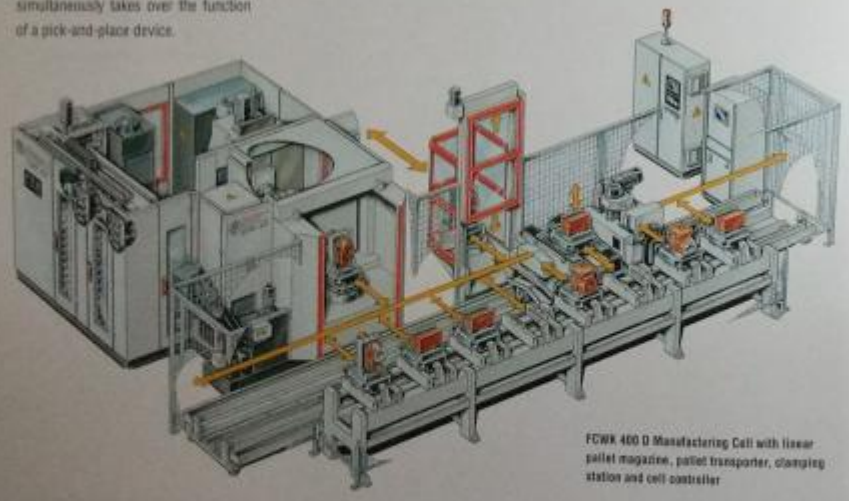
The independent NC controller of transporter increases operator comfort and reduces setup expenditure. The transverse conveyor at the transporter ensures double-sided loading and unloading of workpiece pallets and thus a high flexibility in cell structure.

When the storage locations are arranged in 2 or 3 tiers, the transporter simultaneously takes over the function of a pick-and-place device.

Setup work at the clamping station is carried out quickly, safely and under good ergonomic conditions. For clamping, positioning and unclamping of workpieces, for resetting the fixtures and for simple measuring operations, the clamping station can be rotated and indexed 4 × 90°.

A protection device designed as lifting cage with electric drive and locking functions will increase labour safety and ease of operation.

The storage locations guarantee limited operator attendance for intermediate and buffer storage and can be arranged in one tier or in 2 or 3 tiers to save space.



FCWK 400 D Manufactering Cell with linear pallet magazine, pallet transporter, clamping station and cell controller

■ Circular magazine

The circular magazine in compact and, thus, space saving design has got 6 storage locations and 1 clamping location and is driven by means of an AC servo motor.

To ease operation, the incorporated clamping station can be rotated and indexed for workpiece setup work.

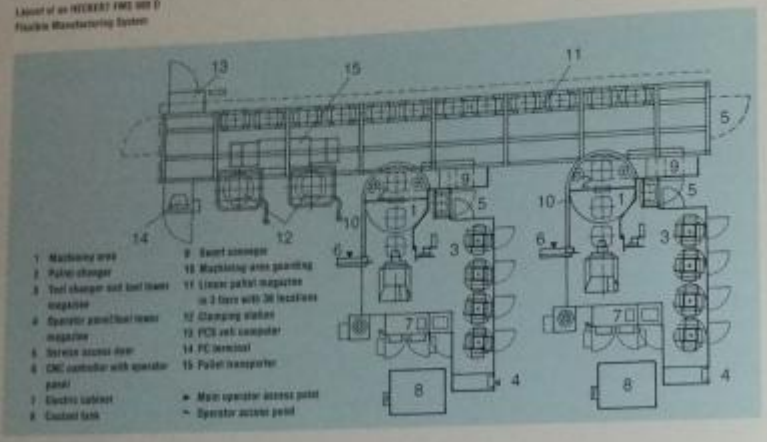
The workpiece pallets are quickly and safely transported from the clamping station to the circular magazine according to the rotary changer principle.

Following the same principle, the pallets

are introduce
zine into the
CWK 400 D
Centres. The
controls th
takes over p

Machining Area

Layout of an HECKERT FMS 600 D
Flexible Manufacturing System



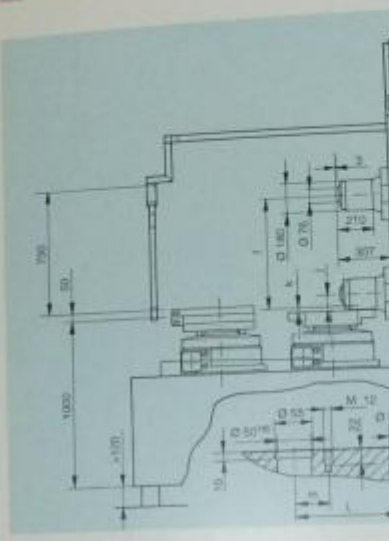
1 Machining area
2 Pallet changer
3 Tool changer and tool liners magazine
4 Operator panel/tool liners magazine
5 Service access door
6 CNC controller with operator panel
7 Electric cabinet
8 Coolant tank
9 Swarf conveyor
10 Machining area guarding
11 Linear pallet magazine in 3 tiers with 30 locations
12 Clamping station
13 PCS cell computer
14 PC terminal
15 Pallet transporter
► Main operator access point
~ Operator access point

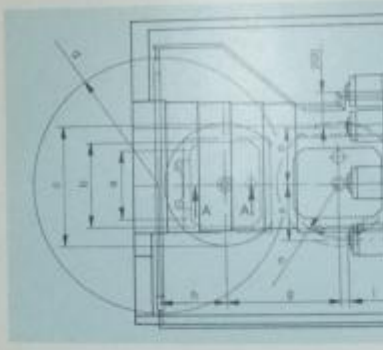
■ Control and monitoring facilities

Comprehensive control and monitoring facilities are at choice for the HECKERT CWK 400 D and CWK 500 D Machining Centres as a precondition for semi-unattended manufacture and for reducing manual inspection work.
The target value and remaining life expectancy per tool are indicated on the CNC monitor screen for monitoring of tool lifetime and consequential steps are automatically initiated upon any excess thereof. The main drive power rating is monitored for wear detection at the cutting edges of tool.
The speed given in the tool list for each tool is permanently monitored to avoid any overspeeding.
Direct tool break monitoring is ensured by means of break detector with pneumatic cylinder.

A 3 D measuring probe monitors machining quality and allows for safe and fast zeroing of workpieces, allowance measurements and cut segmentation.

Direct tool break monitoring
at break detector





		CWK 400 D
a	mm	400 × 400
b (optional)	mm	(500 × 400)
c	mm	700
d	mm	R 740
e/ longitudinal travel	mm	± 325
f/ vertical travel	mm	500 (550)
g/ transverse travel	mm	650
h	mm	385
i	mm	50
j	mm	95 for motor-driven spindle
	mm	(80 for hollow-shaft motor)
k	mm	30
l	mm	150 ± 0.013
m	mm	50
e	mm	R 310

Values in brackets = special execution

Technical Data

		CMX 400 D	CMX 400 D with dynamic package 1 g	CMX 400 D with dynamic package 1.5 g	CMX 500 D	CMX 500 D with dynamic package 1 g
NC rotary table						
Clamping surface/grid pattern (also DIN 55201	mm	400 × 400 (500 × 400)	400 × 400 (500 × 400)	400 × 400 (500 × 400)	500 × 500 (630 × 500)	500 × 500 (630 × 500)
Input and display resolution	degrees	0.001	0.001	0.001	0.001	0.001
Max. load	kgf	400	300	200	500	300
Max. speed	rpm	25	25	25	25	25
Workpiece swing diameter	mm	700	700	700	800	800
Automatic pallet changer						
Number of changeable pallets		2	2	2	2	2
Max. pallet changeover time	sec.	8	8	8	8	8
Traverse ranges						
Column, linear/X-axis	mm	650	650	650	750	750
Spindle head, vertical/Y-axis	mm	500 (650)	650	650	650 (750)	650 (750)
Table, transverse/Z-axis	mm	650	650	650	700	700
Main spindle/Motor-driven spindle						
Power rating at 100 % duty cycle	kW	19	19	19	19	19
Power rating at 40 % duty cycle	kW	31	31	31	31	31
Torque at 100 % duty cycle	Nm	165	165	165	165	165
Torque at 40 % duty cycle	Nm	200	200	200	200	200
Tool receptor		SK 40 DIN 69871 form A (HSK 63)	HSK 63	HSK 63	SK 40 DIN 69871 form A (HSK 63)	HSK 63
Speed range	rpm	50...10 000 (15 000)	50...15 000	50...15 000	50...10 000 (15 000)	50...15 000
Diameter of front bearing	mm	70	70	70	70	70
Increased power rating/hollow-shaft motor (optional)						
Power rating at 100 % duty cycle	kW	24	24		24	24
Power rating at 40 % duty cycle	kW	35	35		35	35
Torque at 100 % duty cycle	Nm	230	230		230	230
Torque at 40 % duty cycle	Nm	335	335		335	335
High-speed package (optional)						
Max. speed/motor-driven spindle	rpm		24 000			24 000
Automatic tool changer						
Chain-type magazine						
Magazine pockets		60	60	60	60	60
Max. tool diameter	mm	160	160	160	160	160
Max. tool length	mm	350	350	350	400	400
Max. tool weight	kg	10	10	10	10	10
Max. tilt torque	Nm	10	10	10	10	10
Max. chip-to-chip time	sec.	5	4	3.5	6	4
Tool tower magazine (optional)						
Magazine pockets		120/240	120/240		120/240	120/240
Other data same as chain-type magazine						
Traverse rates						
Feed rate range, infinitely variable	m/min	0...40	0...82	0...100	0...40	0...82
Rapid traverse rate	m/min	40	82	100	40	82
Acceleration rate	m/s²	7	10	15/12 for Z-axis	7	10
Coolant system						
Supply through spindle centre						
Volume	l/min	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)
Pressure	bar	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)
Supply via nozzles						
Volume	l/min	50	50	50	50	50
Pressure	bar	2	2	2	2	2
Coolant tank capacity	l	550 (900)	550 (900)	550 (900)	550 (900)	550 (900)
Machine accuracy according to VDI/DGQ 3441						
Linear axes X, Y and Z						
Positioning deviation P	mm	≤ 0.01 (0.005)	≤ 0.01 (0.006)	≤ 0.01 (0.006)	≤ 0.01 (0.006)	≤ 0.01 (0.006)
Positioning variation Pvmax	mm	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)
NC rotary table						
Positioning deviation P	sec.	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)
Positioning variation Pvmax	sec.	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)
Net weight	kg	12 800	12 800	12 800	15 000	15 000
CNC controller type		Sinumerik 840 D (Fanuc 16 i)	Sinumerik 840 D	Sinumerik 840 D	Sinumerik 840 D (Fanuc 16 i)	Sinumerik 840 D
Circular magazine (optional)						
Number of storage locations		6	6	6	6	6
Design of clamping station				rotatable and indexable 4 × 90°		
Number of pallets in total system, max.		8	8	8	8	8
Linear magazine (optional)						
NC transporter				track-bound, with transverse conveyor and lifting device		
Traverse speed, approx.	m/min	80	80	80	80	80
Clamping station				rotatable and indexable 4 × 90°		
Storage locations, optional design		1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers
Number, optional		12/24/36	12/24/36	12/24/36	12/24/36	12/24/36
Number of pallets in total system, max.		14/26/38	14/26/38	14/26/38	14/26/38	14/26/38

Values in brackets = special execution

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Ref. No.:
324-06121454

Overview and Technical Data:

STARRAG HECKERT - CWK 400 D with palett changer + aluminium option

STARRAG HECKERT

Year of Build:
May 1999

Description:

Used STARRAG HECKERT FCWK 400D Dynamic 6-station pallet pool, 240 Tower magazine with aluminum finish

- New spindle at 16 116 hours
- About. 33 568 operating hours

- CNC control Siemens 840 D
- Travel:
  - Column longitudinal travel X-axis 650 mm
  - Support vertical travel 650 mm Y-axis
  - Table traverse Z-axis 650 mm
  - B-axis 360 degrees x 0.001 indexing
  - Rapid traverse 40 m / min.
- Pallet size 400 x 400 mm
- Max Belstung 400 kp
- Drilling / tool spindle speed of 50 to max.15.000 r / min
- Drive power 31 KW
- Tool holder HSK 63
- Dynamic range change in 8 to 9 s by hydraulic rotary changer
- Coolant system
- Dimensions approximately 5.4 x 2.87 x 4.23 m

The motor spindles and speeds of 15 000 rev / min are creating the ideal conditions for the light metal processing, without compromising the high static and dynamic stiffness of the cast iron and steel processing.

The CWK 400 D Dynamic reach peak values??: Eilgangwerte to 100 m / min and accelerations up to 15 m/s2.

Innovative ideas also stuck in tool handling with the proven tower magazines with 240 tools. Attending dynamics is called for: in 1.5 s is provided the next tool, to 3.5 s to 4 s, the chip-to-chip time is reduced.

Compact in design, space-saving features of the circular memory 6 presets and 1 clamping space. It is powered by an AC servo motor.

For more details see PDFs

Technical Data:

Technical Data:

Control:
SINUMERIK 840D
Machine Hours:
33.568 hrs.

Spindle Hours:
16.116 hrs.
Spindle Speed:
15.000 rpm
Tool Capacity:
240 x

Travels:

X-Axis:
650 mm
Y-Axis:
650mm
Z-Axis:
650 mm

Dimensions and Weight:

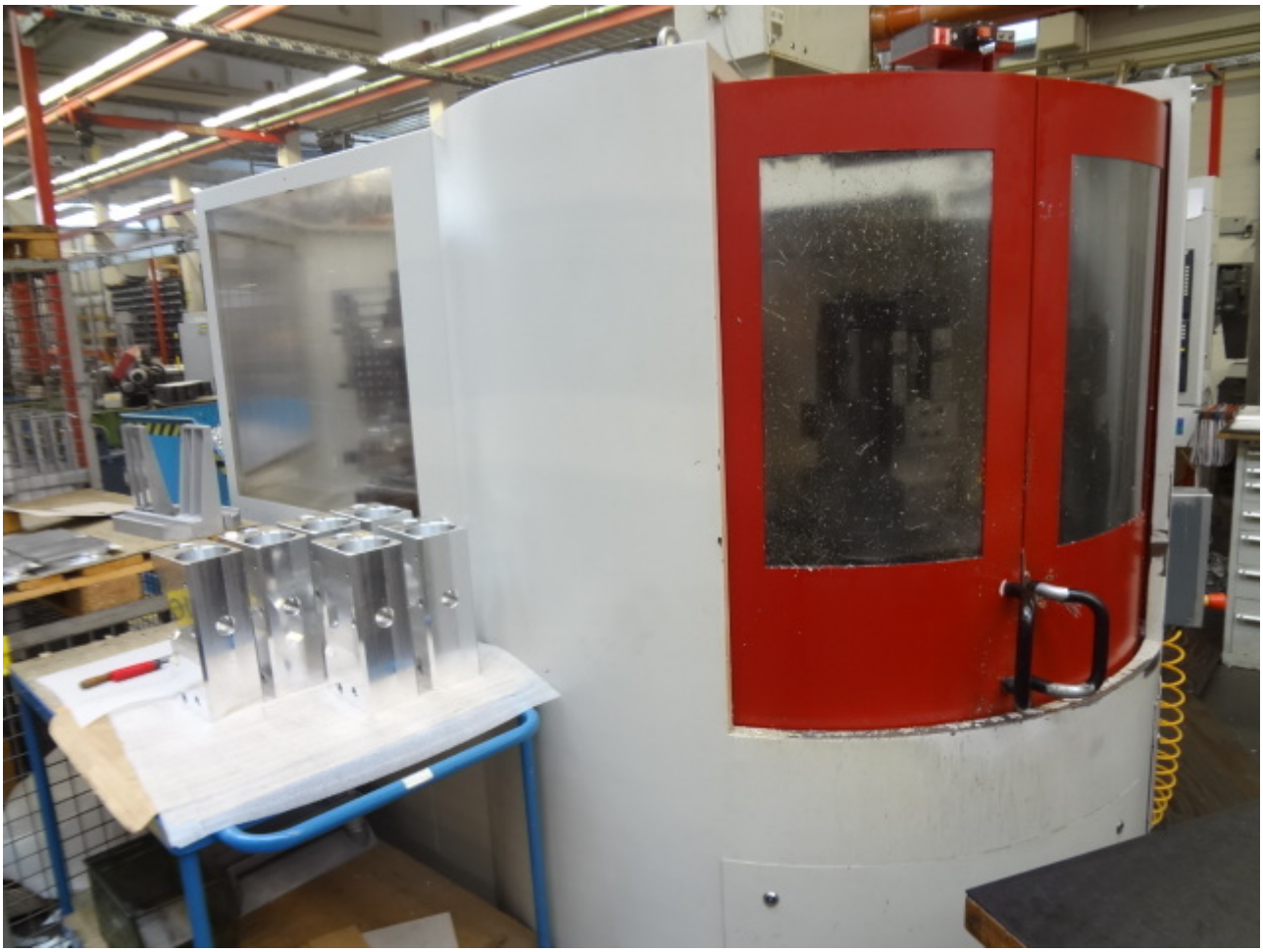
Height:
2.870 mm
Width:
4.230 mm
Length:
5.400 mm
Weight:
12.800 kg

Buyer Information:

Condition:
Very good condition
Availability:
Sold
Sold as:
EXW (Ex Works - Incoterm)
VAT:
19 %
Location:
Germany

1

2



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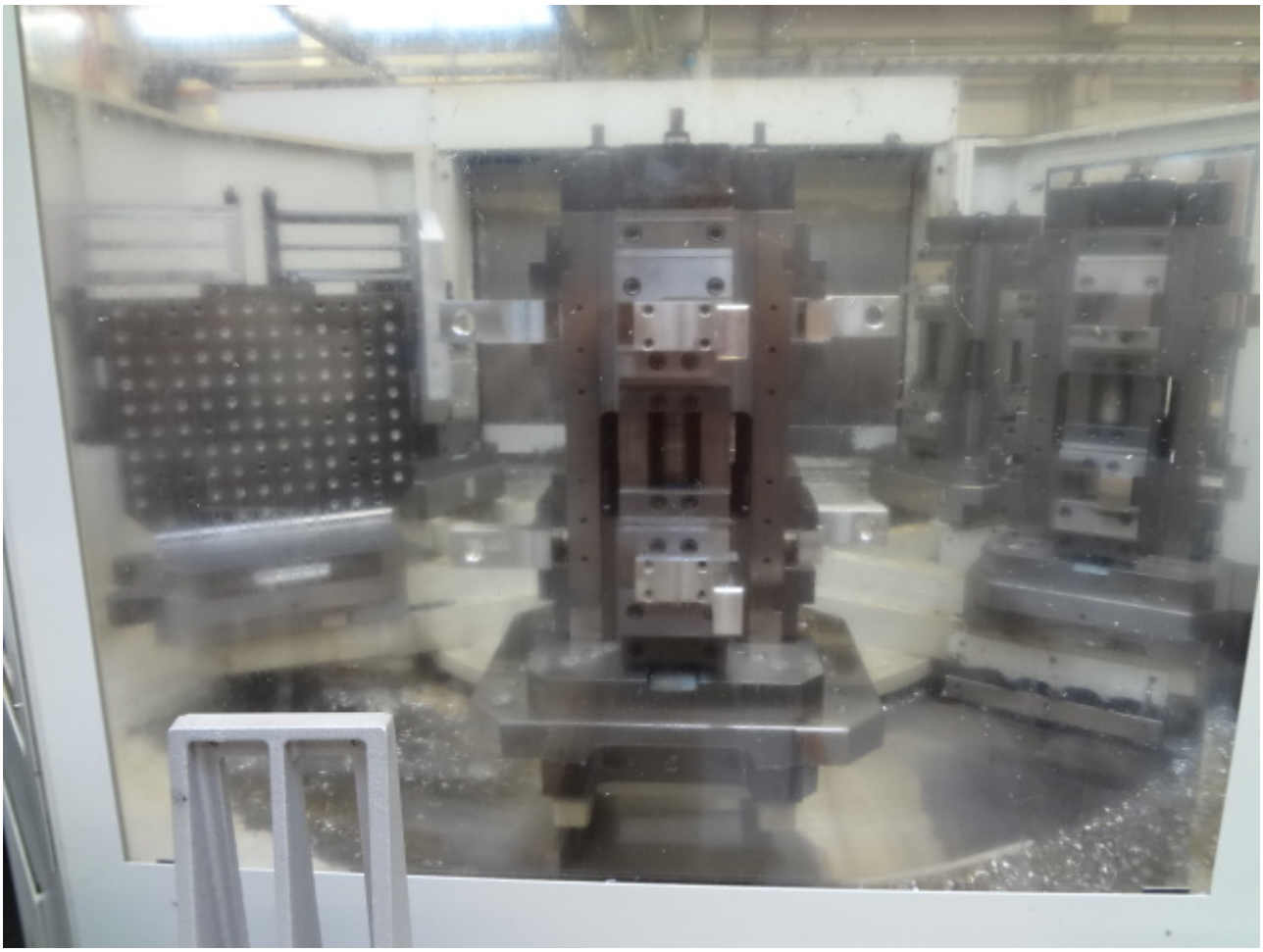

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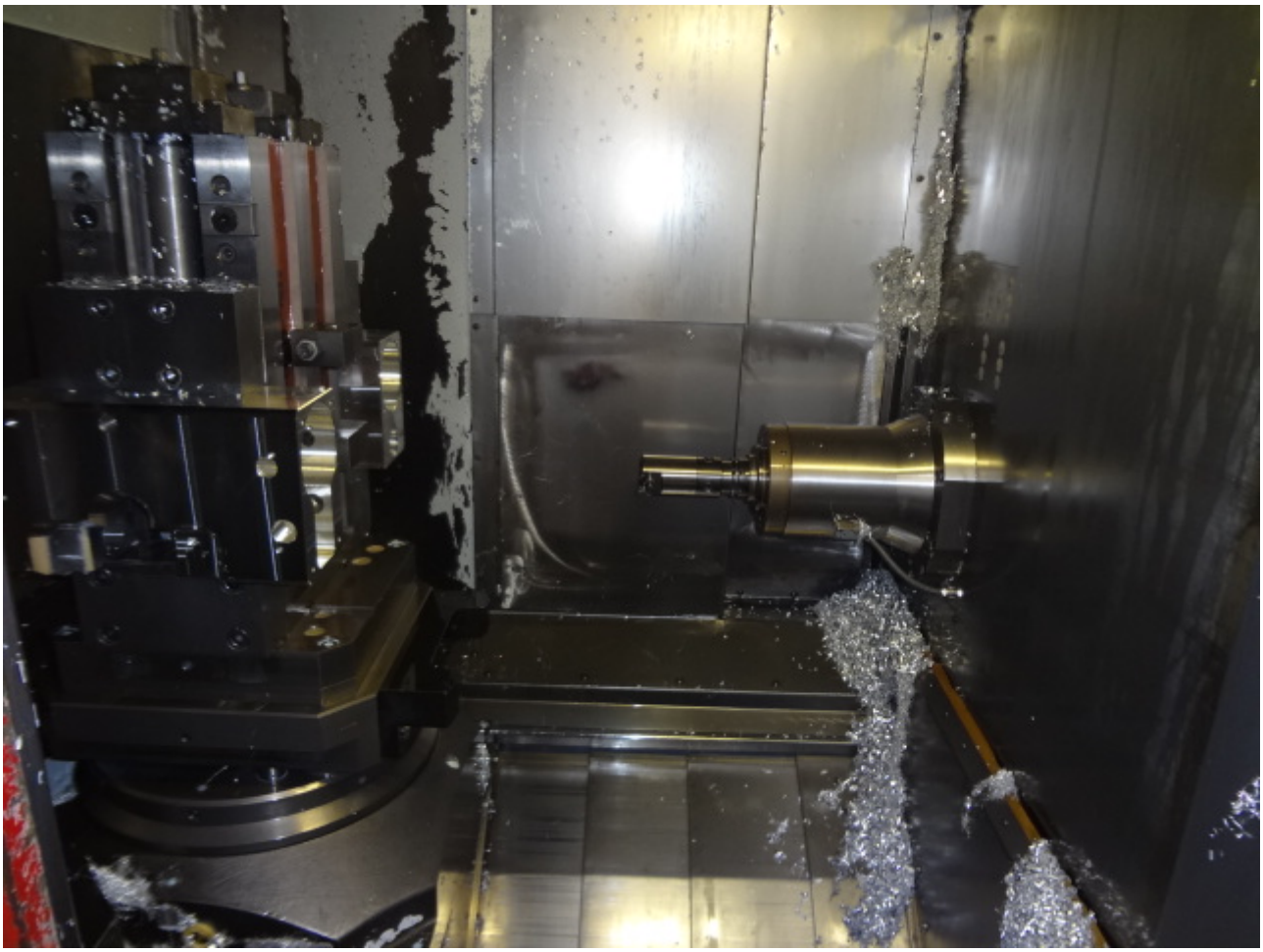

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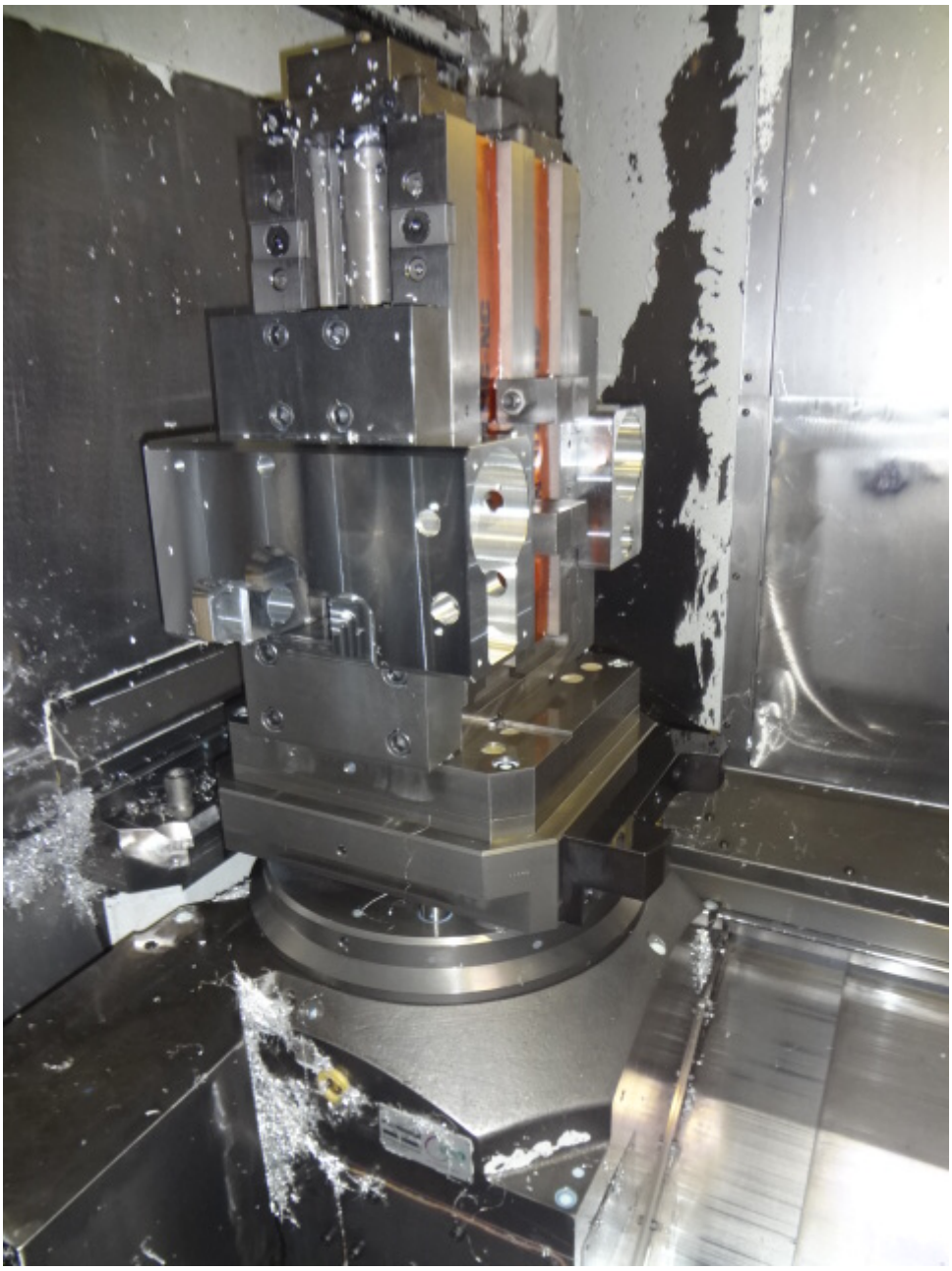

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heckert
starrag-heckert group
Heckert Werkzeugma
D-09117 Chemnitz Otto-Schmer
Typ
CWK 400 D
Maschinen - Nr.
18272
Baujahr
1999
Temperaturbereich
+5...35 °C
Gesamtmasse
12,5 t
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SIEMENS
AUTO
ROV
Kanal aktiv
Programm läuft
510220 Einlesesperre bei Werkzeugwechsel
Speicherabbild
AUTOMAT
Palettenfolge
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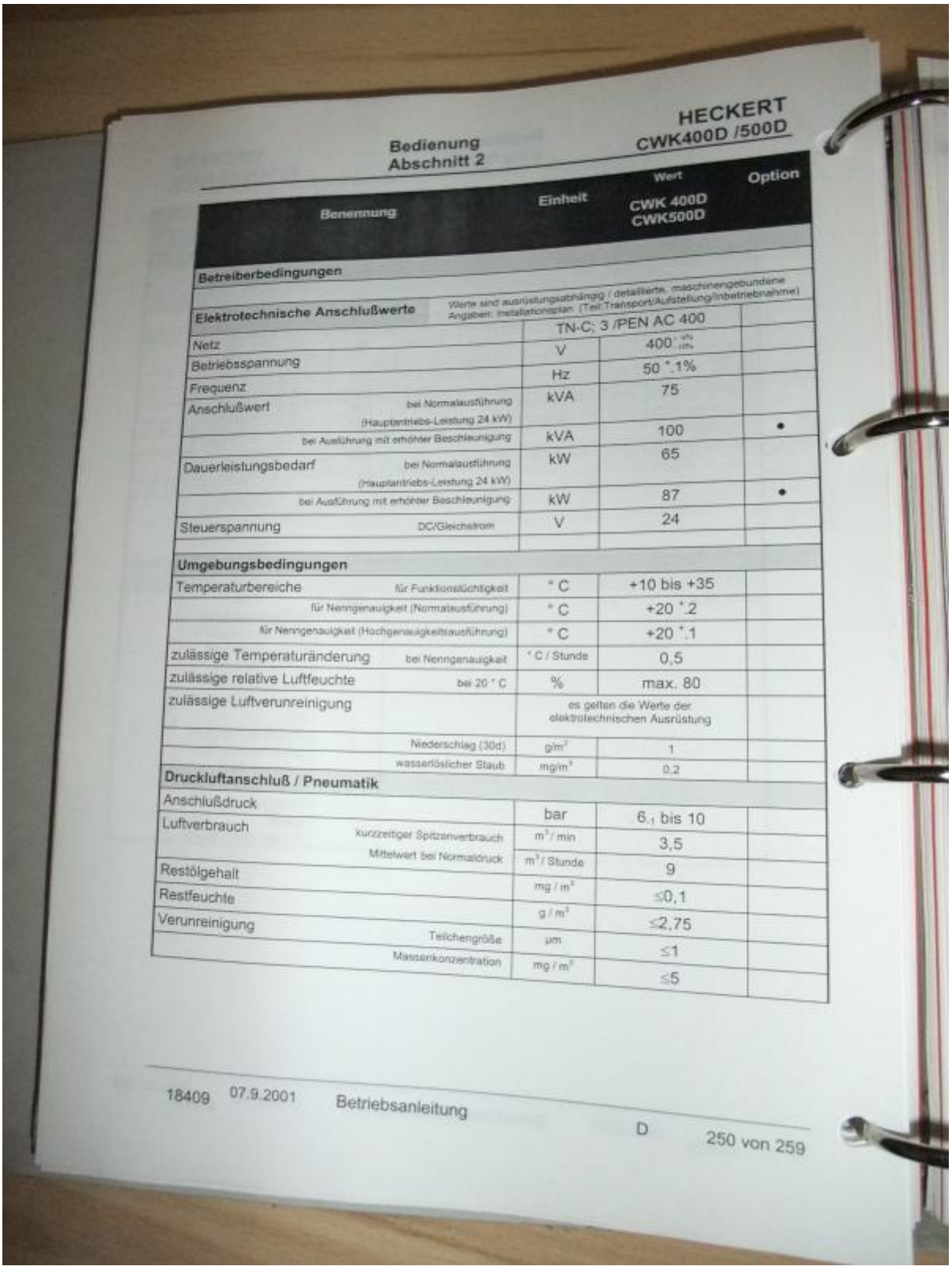
5
1
3
MA
6
5
1
6
7
SP
Platz ist leer
roh
in Bearb.
fertig
nicht i. O.
kein Auftrag
Aktiv:
Palette3
Folgebearbeitung: = 0
Meldungen
Auftraege
Paletten-
verwaltung
Einstellung

21

Benennung			Einheit	Wert CWK 400D CWK500D	Option
Positionsgenauigkeiten in den Achsen X, Y, Z nach VDI / DGQ 3441					
Normalausführung	Positionierunsicherheit	$P(T_p)$	µm	9	
	Positionsabweichung	P_a	µm	8	
	Positionsstreubreite	P_{amax}	µm	7	
	max. Umkehrspanne	U_{max}	µm	6	
Hochgenauigkeits-ausführung	Positionierunsicherheit	$P(T_p)$	µm	6	•
	Positionsabweichung	P_a	µm	5	•
	Positionsstreubreite	P_{amax}	µm	4	•
	max. Umkehrspanne	U_{max}	µm	3	•

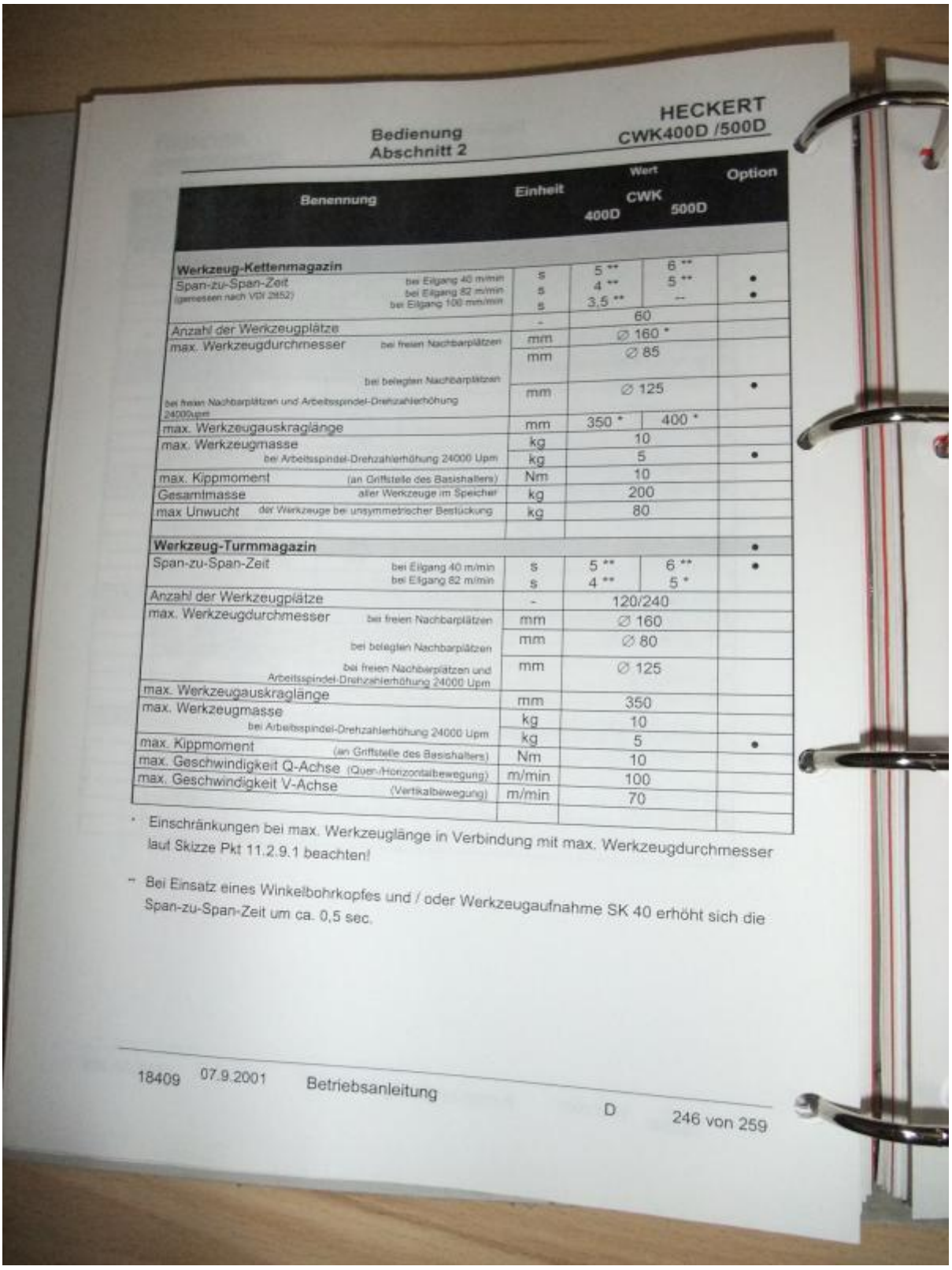


Benennung		Einheit	Wert CWK 400D CWK500D	Option
Betreiberbedingungen				
Elektrotechnische Anschlußwerte	Werte sind ausrüstungsabhängig / detaillierte, maschinengebundene Angaben: Installationsplan (Teil:Transport/Aufstellung/Inbetriebnahme)			
Netz			TN-C; 3 /PEN AC 400	
Betriebsspannung		V	400 +6% -10%	
Frequenz		Hz	50 ±1%	
Anschlußwert	bei Normalausführung (Hauptantriebs-Leistung 24 kW)	kVA	75	
	bei Ausführung mit erhöhter Beschleunigung	kVA	100	•
Dauerleistungsbedarf	bei Normalausführung (Hauptantriebs-Leistung 24 kW)	kW	65	
	bei Ausführung mit erhöhter Beschleunigung	kW	87	•
Steuerspannung	DC/Gleichstrom	V	24	
Umgebungsbedingungen				
Temperaturbereiche	für Funktionstüchtigkeit	°C	+10 bis +35	
	für Nenngenauigkeit (Normalausführung)	°C	+20 ±2	
	für Nenngenauigkeit (Hochgenauigkeitsausführung)	°C	+20 ±1	
zulässige Temperaturänderung	bei Nenngenauigkeit	°C / Stunde	0,5	
zulässige relative Luftfeuchte	bei 20 °C	%	max. 80	
zulässige Luftverunreinigung		es gelten die Werte der elektrotechnischen Ausrüstung		
	Niederschlag (30d)	g/m²	1	
	wasserlöslicher Staub	mg/m³	0,2	
Druckluftanschluß / Pneumatik				
Anschlußdruck		bar	6,1 bis 10	
Luftverbrauch	kurzzeitiger Spitzenverbrauch	m³/ min	3,5	
	Mittelwert bei Normaldruck	m³/ Stunde	9	
Restölgehalt		mg / m³	≤0,1	
Restfeuchte		g / m³	≤2,75	
Verunreinigung	Teilchengröße	µm	≤1	
	Massenkonzentration	mg / m³	≤5	

Benennung		Einheit	Wert CWK400D	Wert CWK500D	Option
Steuerung			Sinumerik 840 D		
Masse / Raumbedarf					
Anhängemasse	Maschine	kg	ca. 12.800	ca. 15.000	
Länge	Normalausführung ca.	mm	4.600	4.850	
Breite	Normalausführung ca.	mm	3.920	4.000	
Maschinenhöhe (bei Kettenmagazin)	über Unterkante Bett	mm	2.900	2.950	
Maschinenhöhe (bei Turmmagazin)	über Unterkante Bett	mm	2.700	2.950	•
Montagehöhe	über Unterkante Bett	mm	3150	3300	
Höhe Unterkante Bett über Fußboden	Normalausführung ca.	mm	125		
Lärmemission					
Lärmpegel		dBA	< 76 Prüfbedingungen: 1,6 m; Hauptgetriebe n_{max} links und rechts; mittlerer Vorschub in allen Achsen nacheinander; Arbeitsraumschutz geschlossen, Messung vor dem Spannplatz und am Einlegeplatz; Meßgerät: Schallpegelmesser		

Benennung		Einheit	Wert CWK 400D CWK500D	Option
Hydraulik				
Pumpe	Druck	bar	85 bis 90	
	Förderstrom	l/min	22,5	
Ölbehälter	Ölmenge	l	40	
Antriebsmotor	Leistung	kW	4	
	Anzahl der Kreisläufe	-	1	
Späneförderer				
Nutzbreite		mm	450	
Abwurfhöhe	Standardausführung	mm	1050	
Kühlaggregat				
Kältemittel		-	R 134 A	
Wasserbehälter	Inhalt	l	ca. 30	
Zusatz gegen Korrosion		-	10% Anticorit	

Benennung		Einheit	Wert CWK 400D CWK500D	Option
Prozessschmierung		-	2	
Anzahl der Kreisläufe				
durch Spindelmitte				
manuell schaltbar	Fördermenge der Pumpe	l/min	30/27/24	•
	Druck am Begrenzungsventil	bar	30/40/50	•
schaltbar mit M-Befehl	Fördermenge der Pumpe	l/min	30/27/24	•
	Druck am Begrenzungsventil	bar	30/40/50	•
über Düsen	Fördermenge der Pumpe	l/min	50	
	Pumpendruck	bar	2	
Schwalldusche	Fördermenge der Pumpe	l/min	ca. 70	•
	Anzahl der Düsen am Dach	-	4	•
Spülpistole	am Spannplatz			•
Filterart mit Behälterinhalt	Rückspülfilter	l	900	
	Vliesfilter	l	1350	•
	Vakuumrotationsfilter	l	1250	•



Benennung		Einheit	Wert CWK 400D	Wert CWK 500D	Option
Werkzeug-Kettenmagazin					
Span-zu-Span-Zeit (gemessen nach VDI 2852)	bei Eilgang 40 m/min	s	5 **	6 **	•
	bei Eilgang 82 m/min	s	4 **	5 **	•
	bei Eilgang 100 mm/min	s	3,5 **	--	
Anzahl der Werkzeugplätze		-	60		
max. Werkzeugdurchmesser	bei freien Nachbarplätzen	mm	∅ 160 *		
	bei belegten Nachbarplätzen	mm	∅ 85		
	bei freien Nachbarplätzen und Arbeitsspindel-Drehzahlerhöhung 24000Upm	mm	∅ 125		•
max. Werkzeugauskraglänge		mm	350 *	400 *	
max. Werkzeugmasse		kg	10		
	bei Arbeitsspindel-Drehzahlerhöhung 24000 Upm	kg	5		•
max. Kippmoment	(an Griffstelle des Basishalters)	Nm	10		
Gesamtmasse	aller Werkzeuge im Speicher	kg	200		
max Unwucht	der Werkzeuge bei unsymmetrischer Bestückung	kg	80		
Werkzeug-Turmmagazin					•
Span-zu-Span-Zeit	bei Eilgang 40 m/min	s	5 **	6 **	•
	bei Eilgang 82 m/min	s	4 **	5 *	
Anzahl der Werkzeugplätze		-	120/240		
max. Werkzeugdurchmesser	bei freien Nachbarplätzen	mm	∅ 160		
	bei belegten Nachbarplätzen	mm	∅ 80		
	bei freien Nachbarplätzen und Arbeitsspindel-Drehzahlerhöhung 24000 Upm	mm	∅ 125		
max. Werkzeugauskraglänge		mm	350		
max. Werkzeugmasse		kg	10		
	bei Arbeitsspindel-Drehzahlerhöhung 24000 Upm	kg	5		•
max. Kippmoment	(an Griffstelle des Basishalters)	Nm	10		
max. Geschwindigkeit Q-Achse	(Quer-/Horizontalbewegung)	m/min	100		
max. Geschwindigkeit V-Achse	(Vertikalbewegung)	m/min	70		

* Einschränkungen bei max. Werkzeuglänge in Verbindung mit max. Werkzeugdurchmesser lauf Skizze Pkt 11.2.9.1 beachten!

** Bei Einsatz eines Winkelbohrkopfes und / oder Werkzeugaufnahme SK 40 erhöht sich die Span-zu-Span-Zeit um ca. 0,5 sec.

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Arbeitsspindel / Hauptmotor				
Durchmesser im vorderen Lager	mm	∅75		
Werkzeugaufnahme		HSK-A63 DIN 69893		
		SK 40-AD DIN 69871 Anzugsbolzen DIN 69872-19		•
Variante Motorspindel Starrag und HSK - A63				
Drehzahlbereich	min^{-1}	50 ...15 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Motorspindel Starrag und SK 40				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Motorspindel Starrag und HSK - A63				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	31	19	
Drehmoment	Nm	200	165	
				•
Variante Hohlwellenmotor und SK 40				
Drehzahlbereich	min^{-1}	50 ...10 000		
		40% ED	**100% ED**	
Motorleistung	kW	37	24	
Drehmoment	Nm	350	230	

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Verstellwege				
X - Achse (Ständerverstellung)	mm	650	750	
Y - Achse (Support-Senkrechtverstellung)	mm	650	750	
Z - Achse (Tisch-Querverstellung)	mm	650	700	
Verfahrbereich				
min. Abstand Spindelvorderkante - Mitte Werkstückträger	mm	50	100	
min. Abstand Spindelmitte - Oberkante Werkstückträger	mm	30	80	
lineare Vorschubachsen X / Y / Z				
Vorschub	mm/min	0 ... 40 000 0 ... 82 000 0 ... 100 000		 • •
Eilgang	m/min m/min m/min	40 82 100		 • •
technologisch verwertbare Vorschubkraft 60% ED	kN	12*		
100% ED	kN	10*		
Meßsysteme linear, optisch-inkremental, abstandscodiert				
Genauigkeitsklasse	µm	±5		
Teilungsperiode der Strichgitterteilung	µm	20		
Eingabe- und Anzeigefeinheit	µm	1		
Beschleunigung X/Y/Z bei Eilgang 40m/min	m/s^2	7		
Eilgang 82m/min bei Hohlwellenantrieb	m/s^2	9,3 / 9,6 / 10		•
bei Motorspindel	m/s^2	4 / 5,5 / 4,5		•
Eilgang 100m/min	m/s^2	15/15/12		•

* Beachten Sie die Einschränkung der Vorschubkraft
(siehe Bild 1: Diagramm Zulässige Vorschubkraft im oberen Y-Bereich

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
NC-Drehtisch / Drehachse B				
max. Drehzahl	min^{-1}	25		
Eingabe- und Anzeigefeinheit	Grad	0,001		
zul. Tangentialmoment (Tisch geklemmt)	Nm	3000		
zul. Tangentialmoment bei Dreharbeiten	Nm	530 bei 100% ED 1000 bei 60% ED		
max. Kippmoment ab Oberkante Palette	Nm	5000		
Positionierzeiten 45°	s	0,8		
90°	s	1,2		
180°	s	2,0		
Normalausführung Positionsunsicherheit P (T_p)		12''		
max. Positionsstreubreite P_{smax}		10''		
max. Umkehrspanne U_{max}		6''		
Hochgenauigkeitsausführung Positionierunsicherheit P (T_p)		6''		•
max. Positionsstreubreite P_{smax}		5''		•
max. Umkehrspanne U_{max}		3''		•

11.5 Technische Daten

Benennung	Einheit	Wert CWK 400D	Wert CWK 500D	Option
Palette (am Spannplatz drehbar)				
Aufspannfläche	mm x mm	400 x 400 400 x 500	- -	•
	mm x mm	- -	500 x 500 500 x 630	•
max. Belademasse pro Palette (mittig)	kg	400	500	
bei Eilgang 82 m/min	kg	300		•
bei Eilgang 100 m/min	kg	200		•
zul. Moment bei außermittiger Last	Nm	200		
Höhe der Werkstück-Aufspannfläche über Unterkante Bett (Spannplatz)	mm	1000		
Richtbohrung - Durchmesser	mm	∅ 20 H 6		
Abstand zur Tischmitte	mm	150 ∅ 0,013	200 ∅ 0,013	
Aufnahmebohrung ohne Spannhydraulik	mm	∅ 50 H 6		
in Verbindung mit Spannhydraulik	mm	∅ 20 H 6		
Befestigungsgewinde (Normalausführung)		43 x M12	23 x M12	
T-Nut (ähnlich DIN 650)	mm	14		•
Werkstück-Durchlaßhöhe	mm	750	900	
max. Störkreis	mm	∅ 700	∅ 800	
Spannhydraulik für Werkstückspannung	3 Anschlüsse			•
Automatischer Palettenwechsel				
Anzahl der wechselbaren Paletten	-	2		
max. Palettenwechselzeit bei Normalausführung	s	8	9	
bei Ausführung mit Spannhydraulik mindestens	s	10		

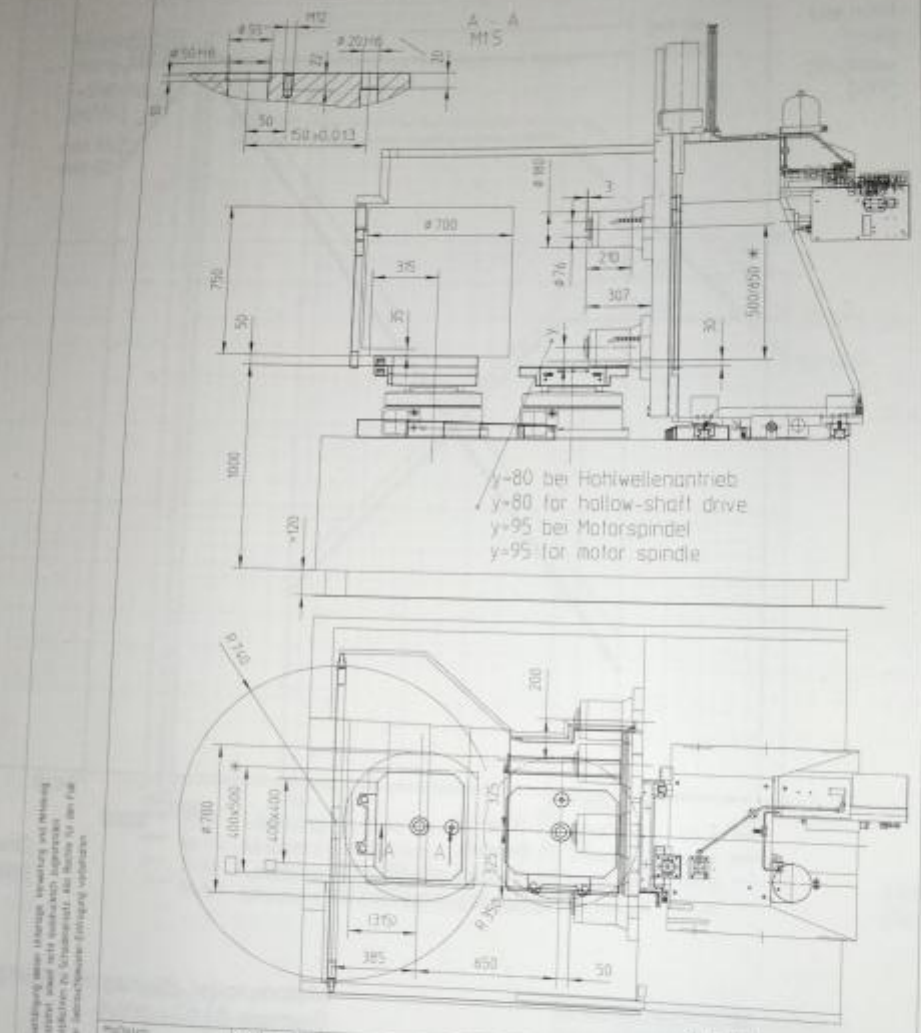
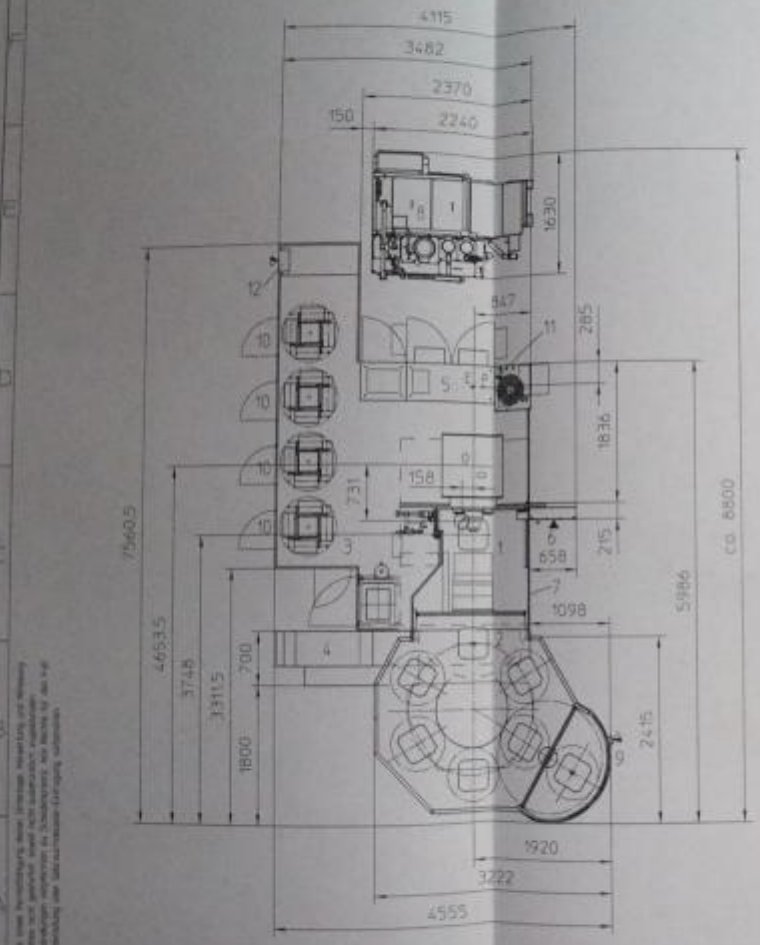


Bild 6: Arbeitsraumbild



1 Arbeitsraum
2 Werkstückwechsel
3 Werkzeugspeicher/Werkzeugwechsler mit Verkleidung
4 Spänef.örderer mit Schaurzbehälter
5 Elektroschrank
6 CNC-Steuerung mit Bedientafel
7 Arbeitsraumschutz
8 Kühlmittelbehälter
9 Sicherheitseinrichtung Spannplatz
10 Handeinlegeplatz für Werkzeuge
11 Hauptschalter
12 2. NC-Bedientafel

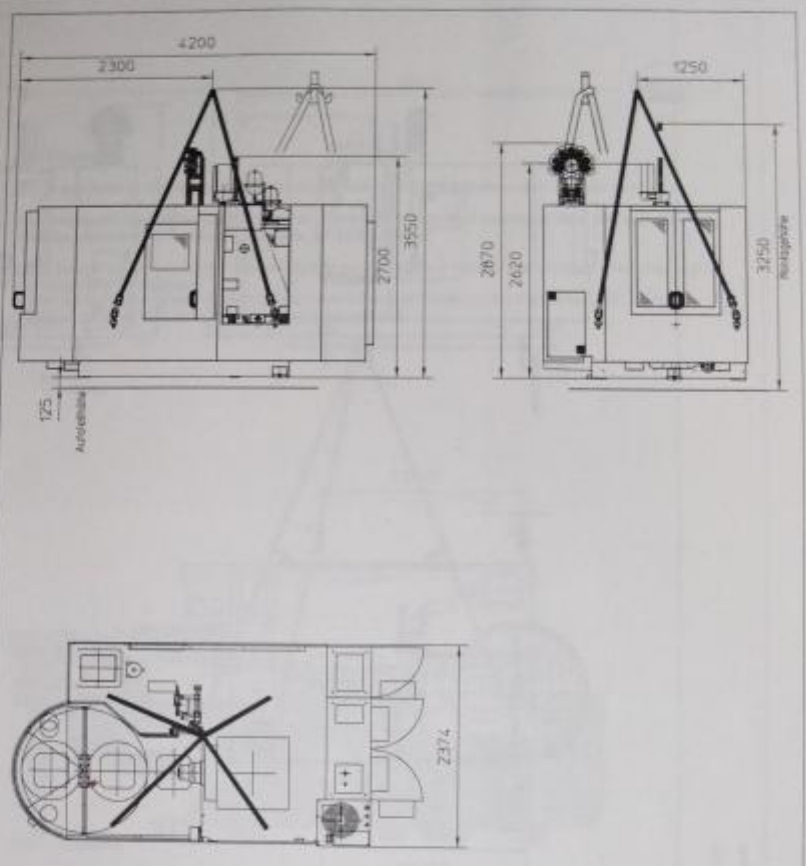
E Elektroanschluß (Netzanschluß)
P Luftanschluß
▸ Hauptbedienstelle
▸ Bedienstelle

1 Work area
2 Workpiece changer
3 Tool Magazin/tool change with paneling
4 Chip conveyor with oily coolant tank
5 Switch cabinets
6 CNC-control with operator control
7 Work area enclosure
8 Coolant tank
9 Safety device for clamping station
10 Manual loading station for tools
11 Main switch
12 2. NC-operator pane

E Power supply (mains connection)
P Compressed-air supply
▸ Main operator control
▸ Secondary operator's stand

Maßstab		Maschine
1:50		CWK400D

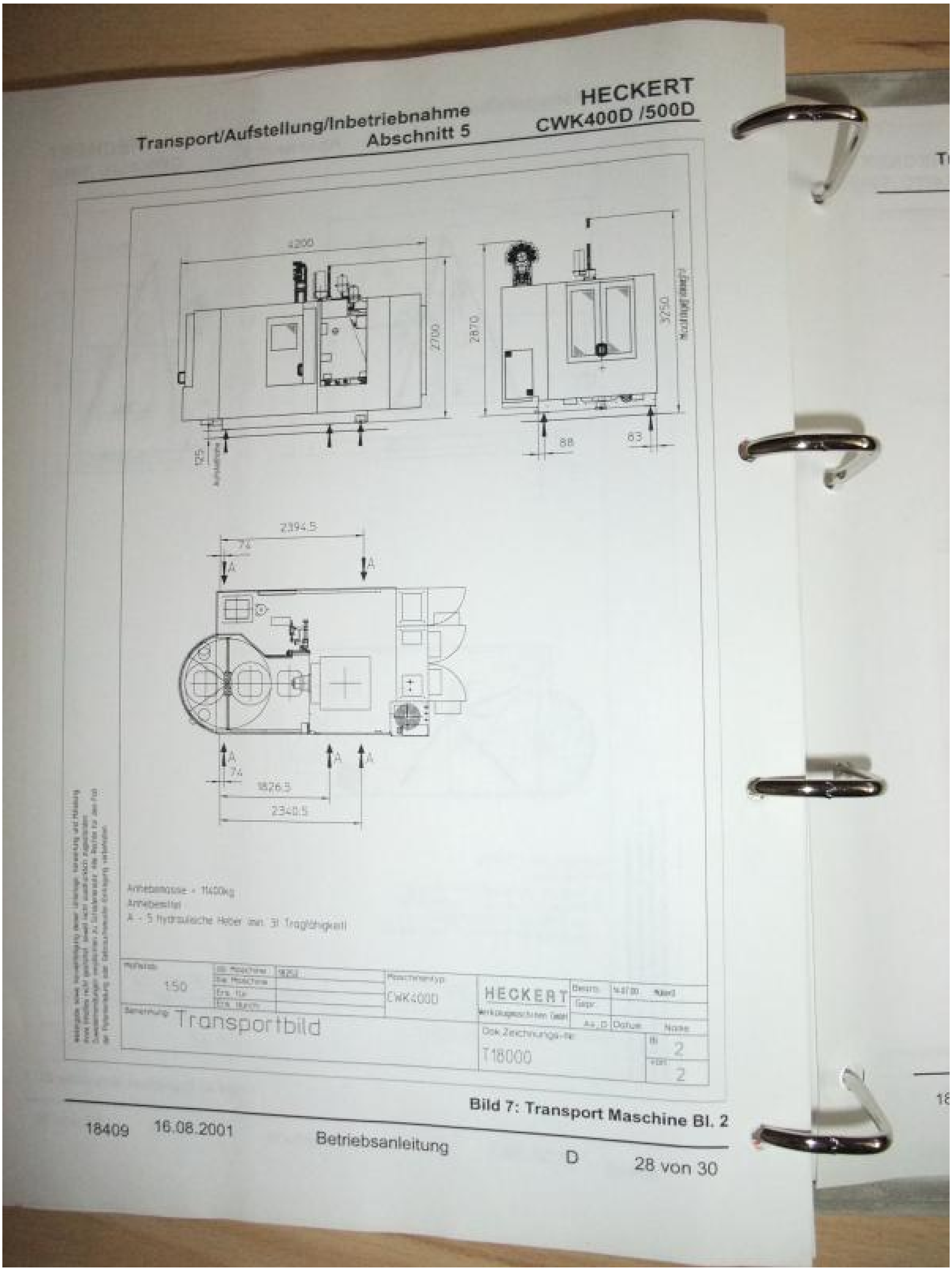
Benennung
RAUMBEDARFSPLAN



Anhängelasse = 11400kg
Anhängemittel
-2 Rundschlingen WLL6000kan 6m lang
-6 Schäkel A6 links je 1x, rechts je 2x
DIN 82101 (min St Tragfahigkeit)
-4 Anschlagwirbel M30 (min St Tragfahigkeit)

Maßstab: 1:50	ab Maschine: 38252	Maschinentyp: CWK400D	HECKERT Werkzeugmaschinen GmbH	Bearb.	Name
	bis Maschine:			Gepr.	
	Ers. für:			A4_D	Datum: Norm:
	Ers. durch:				
Benennung: Transportbild			Gek.Zeichnungs-Nr. T18000	Bl. 1	Var. 2

Bild 6: Transport Maschine Bl. 1


Transport/Aufstellung/Inbetriebnahme
Abschnitt 5

HECKERT
CWK400D /500D

Bild 7: Transport Maschine Bl. 2

18409 16.08.2001 Betriebsanleitung D 28 von 30

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2 Transport

Der Palettenpool ist eine kompakte Baugruppe die nach der Inbetriebnahme in dem Zustand verbleibt.

Das Anhängen des Palettenpool darf nur an den mitgelieferten M20 Anschlagwirbel erfolgen. Das Einschrauben anderer Anhängeschrauben ist nicht zulässig!

Die 6 Spannschrauben zwischen Verschiebeplatte und Grundkörper müssen beim Transport fest angezogen sein (siehe Bild Grundgestell).
Halten Sie die einschlägigen Unfallverhütungsvorschriften beim Transport des Palettenpool ein, die unter anderem den Aufenthalt unter schwebenden Lasten verbietet.

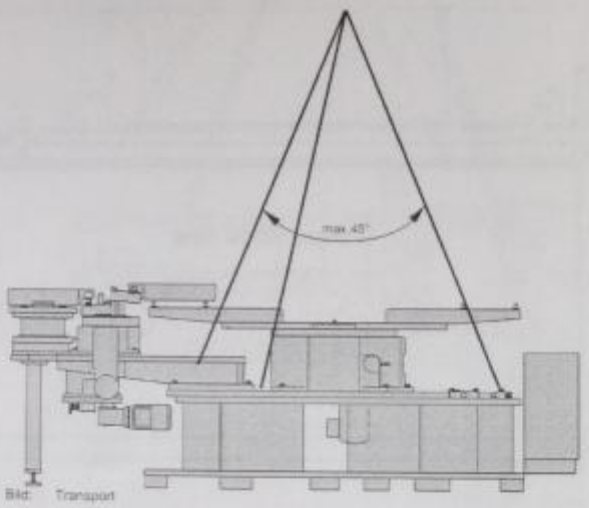
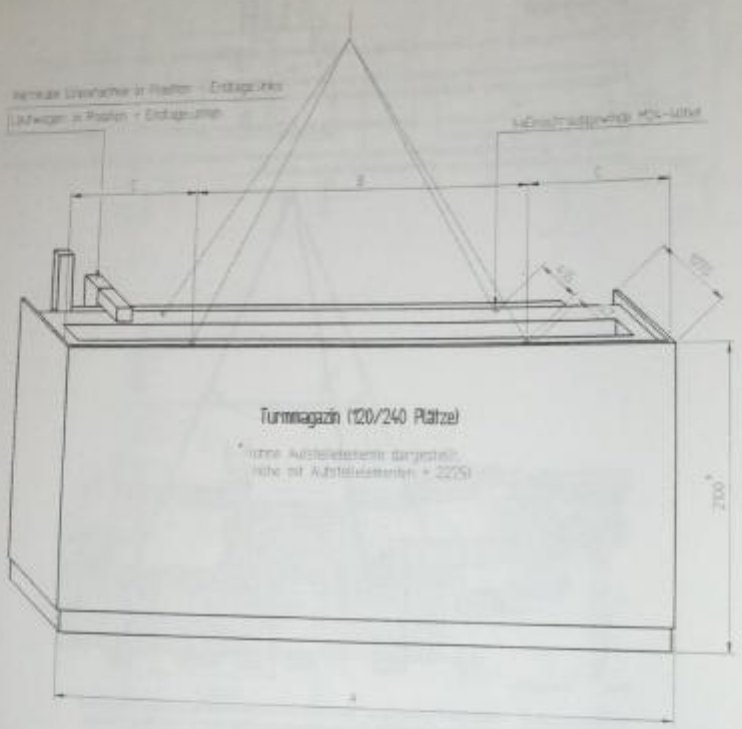


Bild: Transport

Anhängemasse: 3800 kg (Palettenpool komplett mit elektromechanischem Wechsler)
Anhängemittel: 3 Anschlagwirbel M 20 (pro Anschlagwirbel sind 2 Tonnen zulässig)

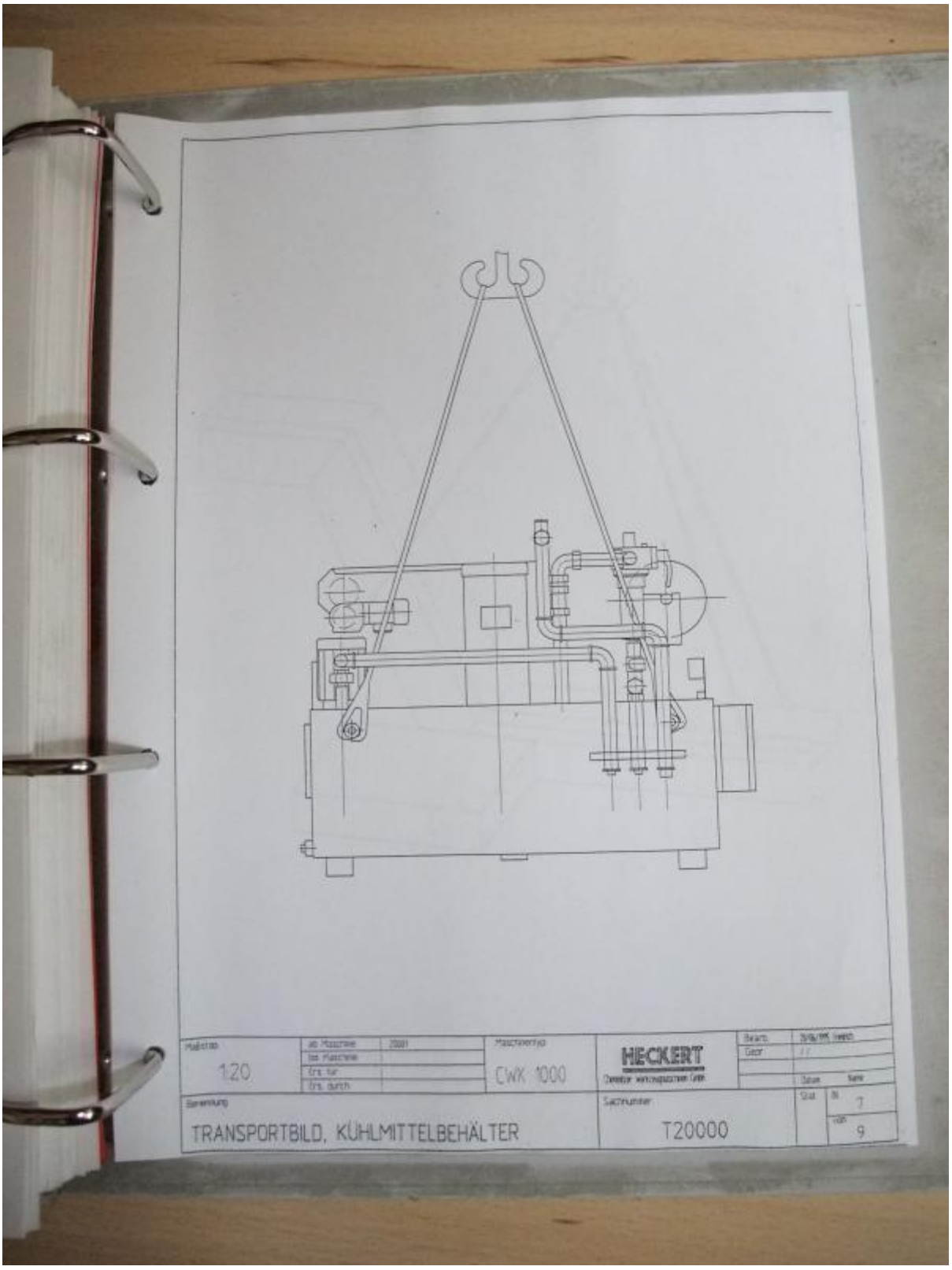
Bild 8: Transport Palettenpool

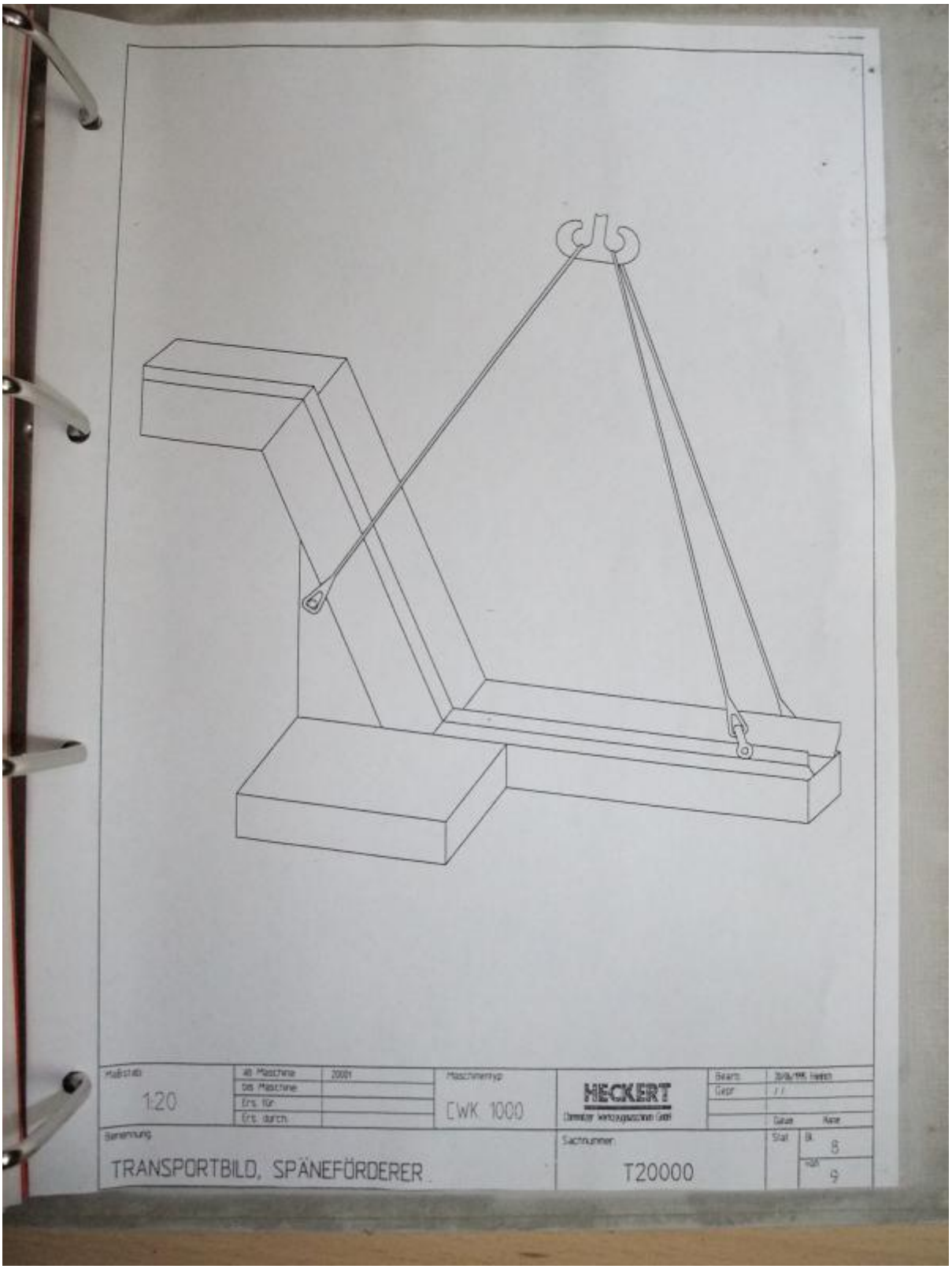
Anhängebild-Krantransport



Turmmag.-Typ	A (mm)	B (mm)	C (mm)	Masse (kg)
240 Plätze	4250	2965	672	1260
120 Plätze	2570	1965	302	710

Bild 9: Transport Turmmagazin


1:20
CWK 1000
HECKERT
TRANSPORTBILD, KÜHLMITTELBEHÄLTER
T20000
7
9


Maßstab
1:20
Maschinentyp
CWK 1000
HECKERT
Bezeichnung
TRANSPORTBILD, SPÄNEFÖRDERER
Sachnummer
T20000
Blatt
8
9

With Ever More
To The New Mill

The new HECK
CWK 500 D
Centres have b
the demands o
more reliable,
effective.
Using motor
speed ranges o
15,000 rpm o
conditions have
metal machinin
high static an
machining cap
the customers'
could be reduc
extent. The CW
highest dynam
achieving top
rates of up to 1
rates of up to
centres are n
values with 82
Innovative ide
mented in too
the well-prove
with max. 240
developed a r
with 60 pocket
between mag
This also sub
sequential too
1.5 sec. and
reduced to 3.5

All Around
A Direct Hit

1 Installation without any need for foundation
thanks to compact design with T-type bed and column with reduced mass

2 Safe and extremely fast swarf removal
from the working zone thanks to slant-bed design, swarf conveyor worm and swarf conveyor as preconditions for dry machining

3 Highest positioning accuracies
P ≤ 0.006 mm and Pumax ≤ 0.004 mm
in all linear axes by means of linear motion guideways

4 Highest rapid traverse rates and short controller acting times
thanks to digital AC servo drives with pre-loaded ball lead screws

5 Dynamic package 1 g (optional)
with rapid traverse rate of 82 m/min, acceleration rate of 10 m/s² and motor-driven spindle of 15,000 rpm

6 Dynamic package 1.5 g (optional for CWK 400 Q)
with rapid traverse rate of 100 m/min, acceleration rate of 15 m/s² and motor-driven spindle of 15,000 rpm

7 Main drive
in variants with motor-driven spindle
– driving power ratings of up to 21 kW, speed range of up to 10,000 rpm, steep-taper tool receptor AD 40 or hollow-shank taper HSK 63
– driving power ratings of up to 21 kW, speed range of up to 15,000 rpm, HSK 63 tool receptor
– driving power ratings of up to 60 kW, speed range of up to 24,000 rpm, HSK 63 tool receptor
or with hollow shaft-type motor
– driving power ratings of up to 35 kW, torque up to 335 Nm, speed range of up to 10,000 rpm, steep-taper tool receptor AD 40

8 Pallet changeover time 8 to 9 sec.
thanks to hydraulic rotary changer

9 Rotatable clamping station
with 4 × 90° indexing facility for operator-friendly workpiece setting work whilst the machining cycle is running

10 NC rotary table
for multisided and complete machining to satisfy highest accuracy demands (P ≤ 6", Pumax ≤ 5") with coupling unit for hydraulic workholding fixtures

11 High-performance in-process control and monitoring facilities
use of Siemens 840 D CNC continuous-path controller in 32-bit technology or, as an option, Fanuc 16i including comprehensive control and monitoring facilities

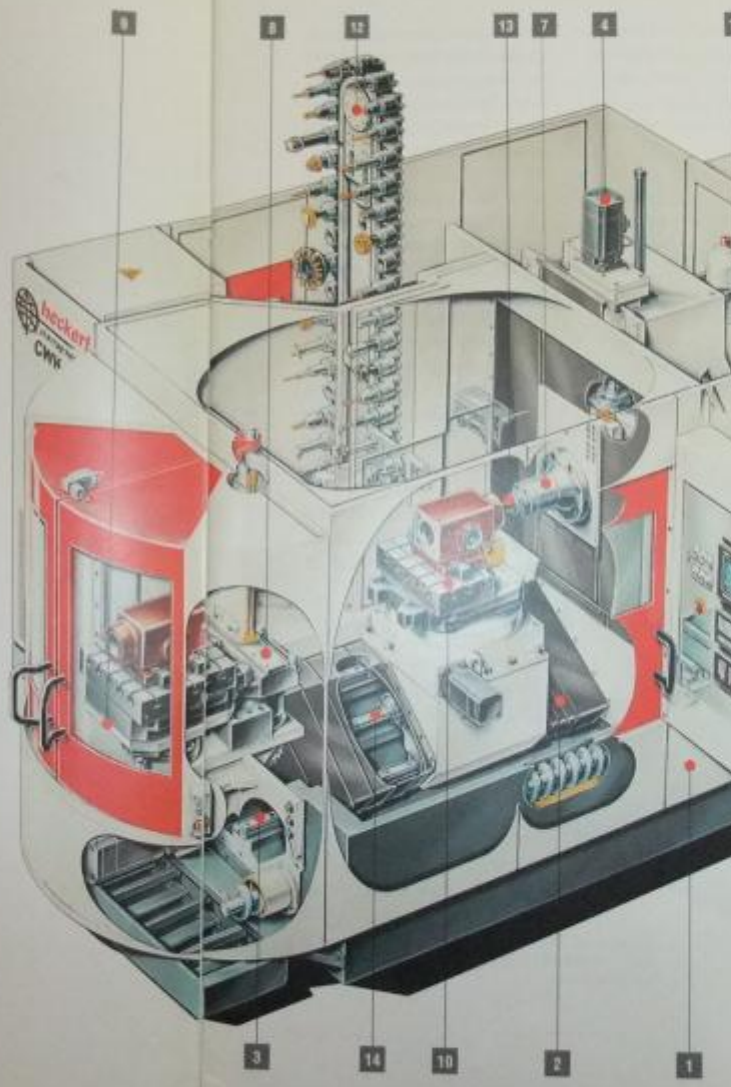
12 Tool handling with chain-type magazine, chip-to-chip times 3.5 to 4 sec., parallel tool location between magazine and main spindle, drive by means of AC servo motor to reduce the availability times for sequential tool and the chip-to-chip times

Tool handling with tool tower magazine
space-saving option with regard to chain-type magazine for increased tool demands of up to 240 pockets with smallest installation area and tool changeover in parallel to production time

13 Coolant system
wet machining with coolant supply through nozzles or through spindle centre with a delivery pressure rating of up to 50 bar or dry machining with minimum-quantity lubrication

14 Low-maintenance grease lubrication
for motor-driven spindle, ball lead screws and linear motion guideways

Conversion into manufacturing cells and flexible manufacturing systems
with circular and linear magazines for workpiece pallets



Economy And Ecology Form An Optimal Entity

■ The compact design of HECKERT CWK 400 D and CWK 500 D centres with a T-type bed, carrying all major machine elements is the condition for transporting the machine as a single complete entity, for installation without any need for foundations and instant readiness for use. This saves foundation, transportation, and assembly costs and makes sure that full production can be started even earlier.

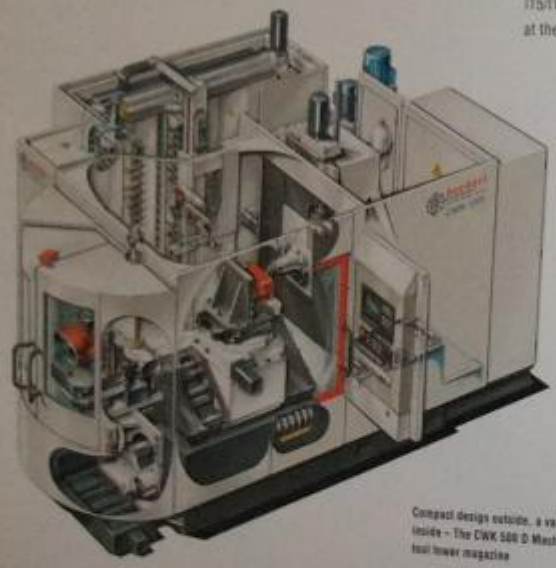
■ All major machine elements feature excellent shock absorbing qualities and a very limited heat expansion to ensure vibration-free machining with high performance.

■ To ensure fast and safe swarf removal from the working zone, the machine bed has been configured in slant-bed design. The consequential prevention of heat accumulation will create ideal conditions for dry machining.

■ Extremely high running, positioning and permanent accuracies are ensured by optimally dimensioned linear motion guideways in all linear axes.

■ Incremental, direct linear encoder systems with distance coding have been encapsulated in aluminium casings and are pressurized with compressed air. So, the encoder systems are protected from swarf, coolant and contaminations. An incremental encapsulated angular position encoder system is used for the NC rotary axis.

■ Manufacturing tolerance deviations and temperature fluctuations can be compensated for in conjunction with the CNC controller. In the stage of extension featuring enhanced machining accuracy, a positioning deviation of $P \leq 0.006$ mm and a positioning variation of $Psmax \leq 0.004$ mm in all linear axes and $Psmax \leq 5''$ in the rotary axis can be achieved. So, accuracies in the IT5/IT6 tolerance class can be obtained at the workpiece.



Compact design outside, a variety of innovations inside – The CWK 500 D Machining Centre with tool tower magazine

■ The technical concept of the HECKERT CWK 400 D and CWK 500 D consistently applies all necessary considerations for strict adherence to ecological requirements. Total-loss oil lubrication has become a thing of the past. Thanks to grease lubrication for main spindle, ball lead screws and linear motion guideways, maintenance requirements have been reduced quite considerably.

■ With the machine being sealed off the shop floor, any ingress of coolant and hydraulic oil is avoided. This has been achieved by a machine bed which carries all functional machine elements and is hermetically sealed.

■ Fleeceless coolant purification with vacuum edge strainer and return flow filter for the high-pressure circuit does away with cost-intensive special refuse disposal requirements.

■ In accordance with environment and operator-friendliness, a splash shower in the working zone with a coolant volume rate of 70 l/min, an air-blast gun at the clamping station for cleaning of workpiece and fixture and an emission extraction can be incorporated in the machining centres.

■ A clear view of the working zone is always ensured by a pneumatically operated, rotating inspection window in the working-zone safety door.

Construction princ
with slant bed

How A Reduction In Idle Times Can Be All Important

HECKERT CWK 400 D and CWK 500 D Machining Centres after best conditions for light-metal machining of engine components

Optimal cutting conditions with coolant supply through spindle centre and through external nozzles

■ Main drive

A characteristic of the new HECKERT CWK 400 D and CWK 500 D Machining Centres is the highly dynamic behaviour of the main drive. With a mass-reduced and grease-lubricated motor-driven spindle, speeds of up to 10,000 rpm, 15,000 rpm and 24,000 rpm at power ratings of 31 kW can be reached optionally.

Even for heavy-duty cutting work, HECKERT offers another solution. A hollow shaft-type motor ensures power ratings of 35 kW at torques of 335 Nm.

Optimal conditions are obtained for wet machining. Coolant supply is optionally possible through external, adjustable ball nozzles or through spindle and tool centre. Absolute swarf removal is guaranteed during core drilling with a delivery pressure rate of up to 50 bar.

Ideal machining results are achieved in dry machining thanks to the minimum-quantity lubrication.

Clamping and unclamping of tools with steep-taper receptor 40 or hollow-shaft taper HSK 63 function quickly and safely by means of Belleville spring pack and hydraulic cylinder. Blasting of spindle taper and internal coolant supply of tools with compressed air during the automatic tool changeover cycle avoids contaminations and prevents negative influences on the machining quality.

■ Feed drive

Digital AC servo motors in combination with preloaded ball lead screws ensure short positioning times, minimized controller acting times, maximum rapid traverse rates, and a high stability over the whole range of feed rates. They feature the cost-saving option to the linear drives and reduce idle times above average with rapid traverse rates optionally from 40 m/min up to 100 m/min and acceleration rates of up to 15 m/s². Such problems of linear drives as mastering of magnetic forces, expensive cooling and mass-dependent power capacity are excluded when using the rotary HECKERT drives.

Ever more dynamics can be achieved by the optionals:

Dynamic package 1 g
(CWK 400 D and CWK 500 D)
- rapid traverse rate 82 m/min
- acceleration rate 10 m/s² in all linear axes
- motor-driven spindle with max. 15,000 rpm
- hollow-shank taper HSK-A63
- chip-to-chip time 4 sec.

Dynamic package 1.5 g (CWK 400 D)
- rapid traverse rate 100 m/min
- acceleration rate of up to 15 m/s²
- motor-driven spindle with max. 15,000 rpm
- hollow-shank taper HSK-A63
- chip-to-chip time 3.5 sec.

■ Pallet changeover

Pallet changeover too is safe, comfortable and ultra-fast. A hydraulically operated rotary pallet changer ensures exchange

of pallets within a tim
Workpieces are clamp
unclamped at the clamp
machining takes plac
standard design of
with its 4 × 90° indexing
operator comfort cons
An NC rotary table is of
machining operations,
fitted with a high-pre
ensure a positioning d
and a position variatio
satisfy highest quality
The NC rotary table i
dable with a coupling
pressure stages to su
holding fixtures.

Highest Innovation During Tool Changeover

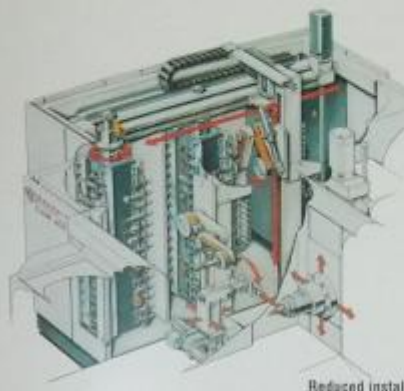
The tool handling is optimally matched with the machining job. Whether equipped with chain-type magazine for 80 tools or with tool tower magazine for 120 or 240 tools, the chip-to-chip time with dynamic package is only 3.5 to 4 sec. for tools of 10 kg in weight, 160 mm in diameter and up to 400 mm in length. The twin gripper is located outside the machining area and therefore not subject to coolant and swarf ingress.

The enhanced peripheral speed of chain-type magazine will reduce the availability time of sequential tool to 1.5 sec. This is of particular importance for light-metal machining.

The tool tower magazine featuring highest tool density at minimum space requirements reduces setup times, optimizes sequences of operation and enhances operator comfort.

Arrangement of tools in chain-type magazine in parallel to the main spindle ensures a chip-to-chip time of 3.5 sec.

Advantages of to as against chain



Dynamic tool changeover between main spindle and tool tower magazine

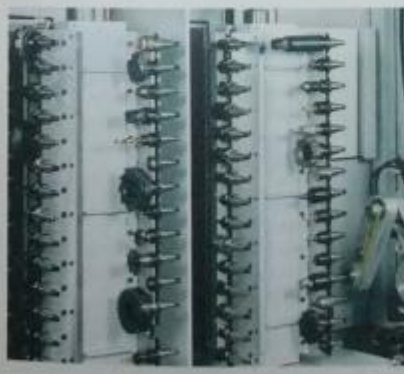
Reduced instal

– Highest tool d
0.25 m² installat
– Full occupatio
without vacant

Reduced setup

– Manual tool
magazine durin
within the auto
– Each tool ca
location
– Full occupati
without adjace

Tool tower magazine for max. 120 or 240 tools with highest tool density at minimum space requirements



Flexible Manufacture Can Be Extended

■ Linear magazine

A track-bound workpiece pallet transporter, clamping station for setup work, storage locations in linear arrangement for intermediate storage of workpiece pallets and a cell controller are included in the linear magazine.

The transporter featuring a traverse speed of 60 m/min as well as short acceleration and deceleration times guarantees short setup times.

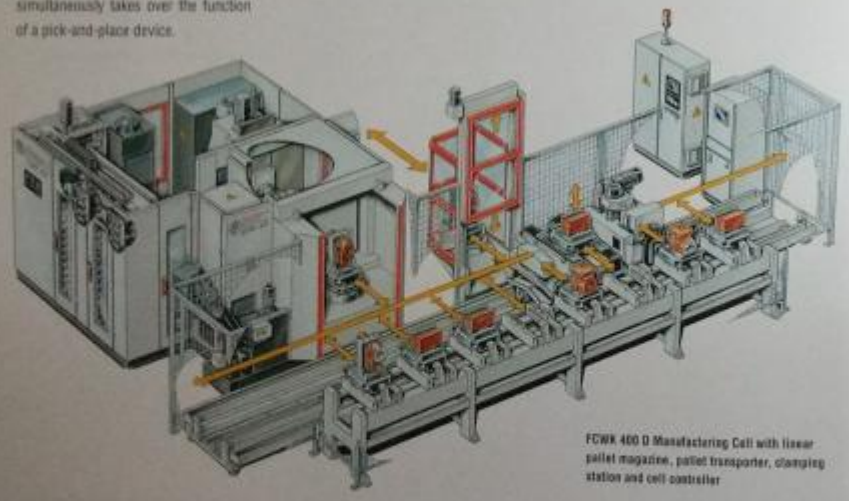
The independent NC controller of transporter increases operator comfort and reduces setup expenditure. The transverse conveyor at the transporter ensures double-sided loading and unloading of workpiece pallets and thus a high flexibility in cell structure.

When the storage locations are arranged in 2 or 3 tiers, the transporter simultaneously takes over the function of a pick-and-place device.

Setup work at the clamping station is carried out quickly, safely and under good ergonomic conditions. For clamping, positioning and unclamping of workpieces, for resetting the fixtures and for simple measuring operations, the clamping station can be rotated and indexed 4 × 90°.

A protection device designed as lifting cage with electric drive and locking functions will increase labour safety and ease of operation.

The storage locations guarantee limited operator attendance for intermediate and buffer storage and can be arranged in one tier or in 2 or 3 tiers to save space.



FCWK 400 D Manufactering Cell with linear pallet magazine, pallet transporter, clamping station and cell controller

■ Circular magazine

The circular magazine in compact and, thus, space saving design has got 6 storage locations and 1 clamping location and is driven by means of an AC servo motor.

To ease operation, the incorporated clamping station can be rotated and indexed for workpiece setup work.

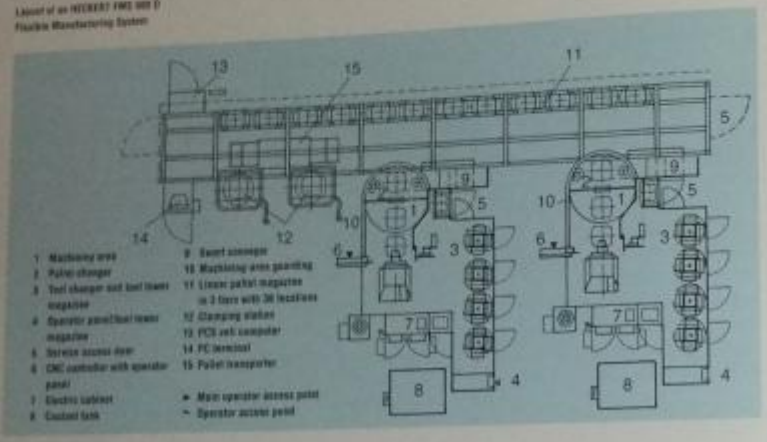
The workpiece pallets are quickly and safely transported from the clamping station to the circular magazine according to the rotary changer principle.

Following the same principle, the pallets

are introduce
zine into the
CWK 400 D
Centres. The
controls th
takes over p

Machining Area

Layout of an HECKERT FMS 600 D
Flexible Manufacturing System



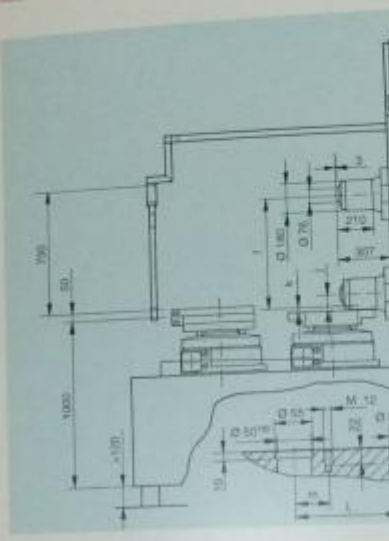
1 Machining area
2 Pallet changer
3 Tool changer and tool liners magazine
4 Operator panel/tool liners magazine
5 Service access door
6 CNC controller with operator panel
7 Electric cabinet
8 Coolant tank
9 Swarf conveyor
10 Machining area guarding
11 Linear pallet magazine in 3 tiers with 30 locations
12 Clamping station
13 PCS cell computer
14 PC terminal
15 Pallet transporter
► Main operator access point
~ Operator access point

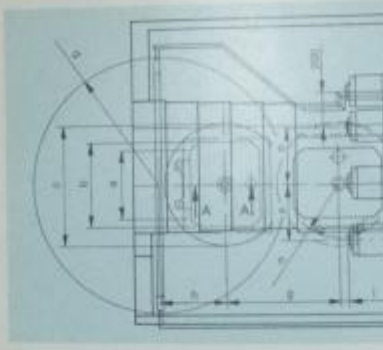
■ Control and monitoring facilities

Comprehensive control and monitoring facilities are at choice for the HECKERT CWK 400 D and CWK 500 D Machining Centres as a precondition for semi-unattended manufacture and for reducing manual inspection work.
The target value and remaining life expectancy per tool are indicated on the CNC monitor screen for monitoring of tool lifetime and consequential steps are automatically initiated upon any excess thereof. The main drive power rating is monitored for wear detection at the cutting edges of tool.
The speed given in the tool list for each tool is permanently monitored to avoid any overspeeding.
Direct tool break monitoring is ensured by means of break detector with pneumatic cylinder.

A 3 D measuring probe monitors machining quality and allows for safe and fast zeroing of workpieces, allowance measurements and cut segmentation.

Direct tool break monitoring
at break detector





		CWK 400 D
a	mm	400 × 400
b (optional)	mm	(500 × 400)
c	mm	700
d	mm	R 740
e/ longitudinal travel	mm	± 325
f/ vertical travel	mm	500 (550)
g/ transverse travel	mm	650
h	mm	385
i	mm	50
j	mm	95 for motor-driven spindle
	mm	(80 for hollow-shaft motor)
k	mm	30
l	mm	150 ± 0.013
m	mm	50
e	mm	R 310

Values in brackets = special execution

Technical Data

		CMX 400 D	CMX 400 D with dynamic package 1 g	CMX 400 D with dynamic package 1.5 g	CMX 500 D	CMX 500 D with dynamic package 1 g
NC rotary table						
Clamping surface/grid pattern (also DIN 55201	mm	400 × 400 (500 × 400)	400 × 400 (500 × 400)	400 × 400 (500 × 400)	500 × 500 (630 × 500)	500 × 500 (630 × 500)
Input and display resolution	degrees	0.001	0.001	0.001	0.001	0.001
Max. load	kgf	400	300	200	500	300
Max. speed	rpm	25	25	25	25	25
Workpiece swing diameter	mm	700	700	700	800	800
Automatic pallet changer						
Number of changeable pallets		2	2	2	2	2
Max. pallet changeover time	sec.	8	8	8	8	8
Traverse ranges						
Column, linear/X-axis	mm	650	650	650	750	750
Spindle head, vertical/Y-axis	mm	500 (650)	650	650	650 (750)	650 (750)
Table, transverse/Z-axis	mm	650	650	650	700	700
Main spindle/Motor-driven spindle						
Power rating at 100 % duty cycle	kW	19	19	19	19	19
Power rating at 40 % duty cycle	kW	31	31	31	31	31
Torque at 100 % duty cycle	Nm	165	165	165	165	165
Torque at 40 % duty cycle	Nm	200	200	200	200	200
Tool receptor		SK 40 DIN 69871 form A (HSK 63)	HSK 63	HSK 63	SK 40 DIN 69871 form A (HSK 63)	HSK 63
Speed range	rpm	50...10 000 (15 000)	50...15 000	50...15 000	50...10 000 (15 000)	50...15 000
Diameter of front bearing	mm	70	70	70	70	70
Increased power rating/hollow-shaft motor (optional)						
Power rating at 100 % duty cycle	kW	24	24		24	24
Power rating at 40 % duty cycle	kW	35	35		35	35
Torque at 100 % duty cycle	Nm	230	230		230	230
Torque at 40 % duty cycle	Nm	335	335		335	335
High-speed package (optional)						
Max. speed/motor-driven spindle	rpm		24 000			24 000
Automatic tool changer						
Chain-type magazine						
Magazine pockets		60	60	60	60	60
Max. tool diameter	mm	160	160	160	160	160
Max. tool length	mm	350	350	350	400	400
Max. tool weight	kg	10	10	10	10	10
Max. tilt torque	Nm	10	10	10	10	10
Max. chip-to-chip time	sec.	5	4	3.5	6	4
Tool tower magazine (optional)						
Magazine pockets		120/240	120/240		120/240	120/240
Other data same as chain-type magazine						
Traverse rates						
Feed rate range, infinitely variable	m/min	0...40	0...82	0...100	0...40	0...82
Rapid traverse rate	m/min	40	82	100	40	82
Acceleration rate	m/s²	7	10	15/12 for Z-axis	7	10
Coolant system						
Supply through spindle centre						
Volume	l/min	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)	24 (30/27/24)
Pressure	bar	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)	10 (30/40/50)
Supply via nozzles						
Volume	l/min	50	50	50	50	50
Pressure	bar	2	2	2	2	2
Coolant tank capacity	l	550 (900)	550 (900)	550 (900)	550 (900)	550 (900)
Machine accuracy according to VDI/DGQ 3441						
Linear axes X, Y and Z						
Positioning deviation P	mm	≤ 0.01 (0.005)	≤ 0.01 (0.006)	≤ 0.01 (0.006)	≤ 0.01 (0.006)	≤ 0.01 (0.006)
Positioning variation Pvmax	mm	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)	≤ 0.007 (0.004)
NC rotary table						
Positioning deviation P	sec.	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)	≤ 12 (6)
Positioning variation Pvmax	sec.	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)	≤ 10 (5)
Net weight	kg	12 800	12 800	12 800	15 000	15 000
CNC controller type		Sinumerik 840 D (Fanuc 16 i)	Sinumerik 840 D	Sinumerik 840 D	Sinumerik 840 D (Fanuc 16 i)	Sinumerik 840 D
Circular magazine (optional)						
Number of storage locations		6	6	6	6	6
Design of clamping station				rotatable and indexable 4 × 90°		
Number of pallets in total system, max.		8	8	8	8	8
Linear magazine (optional)						
NC transporter				track-bound, with transverse conveyor and lifting device		
Traverse speed, approx.	m/min	80	80	80	80	80
Clamping station				rotatable and indexable 4 × 90°		
Storage locations, optional design		1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers	1, 2 or 3 tiers
Number, optional		12/24/36	12/24/36	12/24/36	12/24/36	12/24/36
Number of pallets in total system, max.		14/26/38	14/26/38	14/26/38	14/26/38	14/26/38

Values in brackets = special execution

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