## 03 Technical data . C 650



## 03.1 Technical data . C 650

Traverse					
Traverse	Working area	Traverse	X-axis	1050 mm	
Rapid linear traverses		Traverse	Y-axis	900 mm	
Linear acceleration		Traverse	Z-axis	600 mm	
Linear feed force   X-Y-Z   7000 N		Rapid linear traverses	X-Y-Z	35 - 35 - 35 m/min	
Max. vertical table clearance 775 mm  Max. workpiece diameter 0 900 mm  Max. workpiece height 600 mm  Collision circle (A-axis) in 0° position 9 1100 mm  Main spindle drive Speed 15000 rpm SK 40  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 16000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 20000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 20000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Torque 20% c.d.f. 42 kW / 148 Nm  Speed 20000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  TNC 640 TNC7  Tool changer (pick-up) Interface SK 40 / HSK A 63  Magazine pockets 42 items  Chip-to-chip time approx. 6 s  Maximum tool length 350 mm  Max. tool diameter 0 8 kg  Max. tool weight 8 kg  Max. magazine load 168 kg  Extension of tool storage  Capacily  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine ZM 216 (HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine zM 88 k (SK 40 / HSK A 63) additional 88 pockets		Linear acceleration	X-Y-Z	6 m/s²	
Max. workpiece diameter       Ø 900 mm         Max. workpiece height       600 mm         Collision circle (A-axis) in 0° position       Ø 1100 mm         Main spindle drive       Speed       15000 rpm       SK 40         Main power/Torque       20% c.d.f.       42 kW / 148 Nm         Speed       16000 rpm       HSK A 63         Main power/Torque       20% c.d.f.       42 kW / 148 Nm         Speed       20000 rpm       HSK A 63         Main power/Torque       20% c.d.f.       42 kW / 148 Nm         Control unit       TNC 640 TNC7         Tool changer (pick-up)         Interface       SK 40 / HSK A 63         Magazine pockets       42 items         Chip-to-chip time       approx. 6 s         Maximum tool length       350 mm         Max. tool diameter       0 80 mm         with corresponding adjacent pocket allocation       0 125 mm         Extension of tool storage       Additional tool magazine ZM 50 (SK 40 / HSK A 63)       additional 50 pockets         Capacily       Additional tool magazine ZM 88 k (SK 40 / HSK A 63)       additional 50 pockets         Additional tool magazine ZM 88 k (SK 40 / HSK A 63)       additional 528 pockets         Additional tool magazine single ZM 216 (HSK A		Linear feed force	X-Y-Z	7000 N	
Max. workpiece height       600 mm         Collision circle (A-axis) in 0° position       0 1100 mm         Main power/Torque       15000 rpm       SK 40         Main power/Torque       20% c.d.f.       42 kW / 148 Nm         Speed       16000 rpm       HSK A 63         Main power/Torque       20% c.d.f.       42 kW / 148 Nm         Control unit       Heidenhain       TNC 640 TNC7         Tool changer (pick-up)       Interface       SK 40 / HSK A 63         Magazine pockets       42 items         Chip-to-chip time       approx. 6 s         Maximum tool length       350 mm         Max. tool diameter       0 80 mm         with corresponding adjacent pocket allocation       0 125 mm         Max. tool weight       8 kg         Max. tool weight       8 kg         Additional tool magazine ZM 50 (SK 40 / HSK A 63)       additional 50 pockets         Additional tool magazine single ZM 216 (HSK A 63)       additional 216 pockets         Additional tool magazine single ZM 216 (HSK A 63)       additional 228 pockets         Additional tool magazine single ZM 216 (HSK A 63)       additional 528 pockets         Additional tool magazine pondeter       0 80 mm         With		Max. vertical table clearance		775 mm	
Collision circle (A-axis) in 0° position 0° 1100 mm  Main spindle drive  Speed 15000 rpm SK 40  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 16000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 20000 rpm HSK A 63  Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Control unit  Heidenhain TNC 640 TNC7  Tool changer (pick-up)  Interface SK 40 / HSK A 63  Magazine pockets 42 items  Chip-to-chip time approx. 6 s  Maximum tool length 350 mm  Max. tool diameter 98 80 mm  with corresponding adjacent pocket allocation 0 125 mm  Extension of tool storage capacity  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 216 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter 0 80 mm  with corresponding adjacent pocket allocation in additional tool magazine 0 80 mm  with corresponding adjacent pocket allocation in additional tool magazine 0 80 mm  with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm		Max. workpiece diameter		Ø 900 mm	
Main spindle drive       Speed Main power/Torque       15000 rpm 20% c.d.f.       42 kW / 148 Nm         Speed Speed Speed Speed Speed Main power/Torque 20% c.d.f.       42 kW / 148 Nm         Speed Speed Speed Speed Speed 20000 rpm Amin power/Torque 20% c.d.f.       42 kW / 148 Nm         Control unit       Heidenhain       TNC 640 TNC7         Tool changer (pick-up)       Interface       SK 40 / HSK A 63         Magazine pockets       42 items         Chip-to-chip time       approx. 6 s         Maximum tool length       350 mm         Max. tool diameter with corresponding adjacent pocket allocation       Ø 125 mm         Max. tool weight       8 kg         Max. magazine load       168 kg         Extension of tool storage capacity       Additional tool magazine ZM 50 (SK 40 / HSK A 63)       additional 50 pockets         Additional tool magazine ZM 8 k (SK 40 / HSK A 63)       additional 50 pockets         Additional tool magazine ZM 88 k (SK 40 / HSK A 63)       additional 50 pockets         Additional tool magazine Single ZM 216 (HSK A 63)       additional 216 pockets         Additional tool magazine double ZM 528 (HSK A 63)       additional 528 pockets         Max. tool diameter with corresponding adjacent pocket allocation in additional tool magazine       Ø 80 mm		Max. workpiece height		600 mm	
Main power/Torque 20% c.d.f. 42 kW / 148 Nm Speed 16000 rpm HSK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm Speed 20000 rpm HSK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm Speed 20000 rpm HSK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Control unit Heidenhain TNC 640 TNC7  Tool changer (pick-up) Interface SK 40 / HSK A 63 Magazine pockets 42 items Chip-to-chip time approx. 6 s Maximum tool length 350 mm Max. tool diameter with corresponding adjacent pocket allocation 0 125 mm  Max. tool weight 8 kg Max. magazine load 168 kg  Extension of tool storage capacity  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets Additional tool magazine zm 528 (HSK A 63) additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets Max. tool diameter with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm		Collision circle (A-axis) in 0° position		Ø 1100 mm	
Speed 16000 rpm ABK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Speed 20000 rpm ABK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Control unit Heidenhain TNC 640 TNC7  Tool changer (pick-up) Interface SK 40 / HSK A 63 Magazine pockets 42 items Chip-to-chip time approx. 6 s Maximum tool length 350 mm Max. tool diameter with corresponding adjacent pocket allocation 0 125 mm  Max. magazine load 168 kg  Extension of tool storage capacity Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets Max. tool diameter with corresponding adjacent pocket allocation in additional tool magazine 0 80 mm with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm	Main spindle drive				
Main power/Torque 20% c.d.f. 42 kW / 148 Nm Speed 20000 rpm HSK A 63 Main power/Torque 20% c.d.f. 42 kW / 148 Nm  Control unit Heidenhain TNC 640 TNC7  Tool changer (pick-up) Interface SK 40 / HSK A 63 Magazine pockets 42 items Chip-to-chip time approx. 6 s Maximum tool length 350 mm Max. tool diameter with corresponding adjacent pocket allocation 0 125 mm  Max. magazine load 168 kg  Extension of tool storage capacity  Additional tool magazine ZM 80 (SK 40 / HSK A 63) additional 50 pockets Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets Max. tool diameter with corresponding adjacent pocket allocation in additional tool magazine 0 80 mm with corresponding adjacent pocket allocation in additional tool magazine 0 980 mm with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm					
Speed Main power/Torque 20000 rpm 20% c.d.f. 42 kW / 148 Nm  Control unit Heidenhain TNC 640 TNC7  Tool changer (pick-up) Interface SK 40 / HSK A 63  Magazine pockets 42 items Chip-to-chip time approx. 6 s Maximum tool length 350 mm Max. tool diameter with corresponding adjacent pocket allocation 0 125 mm  Max. tool weight 8 kg Max. magazine load 168 kg  Extension of tool storage Capacity  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets Additional tool magazine ZM 8 k (SK 40 / HSK A 63) additional 216 pockets Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets Additional tool magazine tooket allocation in additional tool magazine 0 80 mm with corresponding adjacent pocket allocation in additional tool magazine 0 125 mm					
Tool changer (pick-up)  Interface  Magazine pockets Chip-to-chip time Approx. 6 s Maximum tool length Max. tool diameter With corresponding adjacent pocket allocation Max. tool weight Max. magazine load  Extension of tool storage Capacily  Additional tool magazine ZM 50 (SK 40 / HSK A 63) Additional 50 pockets Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional 88 pockets Additional tool magazine according adjacent pocket allocation  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) Additional 528 pockets Max. tool diameter With corresponding adjacent pocket allocation in additional tool magazine  Ø 80 mm With corresponding adjacent pocket allocation in additional tool magazine					
Magazine pockets Chip-to-chip time approx. 6 s Maximum tool length 350 mm Max. tool diameter with corresponding adjacent pocket allocation Max. tool weight Max. magazine load  Additional tool magazine ZM 50 (SK 40 / HSK A 63) Additional 50 pockets Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) Additional 528 pockets Max. tool diameter Wax. tool diameter	Control unit	Heidenhain		TNC 640 TNC7	•
Chip-to-chip time approx. 6 s  Maximum tool length 350 mm  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation Ø 125 mm  Max. tool weight 8 kg  Max. magazine load 168 kg  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm	Tool changer (pick-up)	Interface		SK 40 / HSK A 63	•
Max. tool diameter with corresponding adjacent pocket allocation  Max. tool weight Max. tool weight Max. magazine load  Additional tool magazine ZM 50 (SK 40 / HSK A 63) Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional tool magazine ZM 216 (HSK A 63) Additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) Additional 528 pockets  Max. tool diameter		Magazine pockets		42 items	
Max. tool diameter with corresponding adjacent pocket allocation  Max. tool weight Max. magazine load  Additional tool magazine ZM 50 (SK 40 / HSK A 63) Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional tool magazine ZM 88 k (SK 40 / HSK A 63) Additional tool magazine single ZM 216 (HSK A 63) Additional 216 pockets Additional tool magazine double ZM 528 (HSK A 63) Additional 528 pockets  Max. tool diameter With corresponding adjacent pocket allocation in additional tool magazine  Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine		Chip-to-chip time		approx. 6 s	
with corresponding adjacent pocket allocation Ø 125 mm  Max. tool weight 8 kg  Max. magazine load 168 kg  Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm  with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Maximum tool length		350 mm	
Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm			location		
Additional tool magazine ZM 50 (SK 40 / HSK A 63) additional 50 pockets  Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Max. tool weight		8 kg	
Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm				168 kg	
Additional tool magazine ZM 88 k (SK 40 / HSK A 63) additional 88 pockets  Additional tool magazine single ZM 216 (HSK A 63) additional 216 pockets  Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Additional tool magazine ZM 50 (SK 4)	Additional tool magazine ZM 50 (SK 40 / HSK A 63)		
Additional tool magazine double ZM 528 (HSK A 63) additional 528 pockets  Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Additional tool magazine ZM 88 k (SK 40 / HSK A 63)		additional 88 pockets	0
Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Additional tool magazine single ZM 216 (HSK A 63)		additional 216 pockets	0
Max. tool diameter Ø 80 mm with corresponding adjacent pocket allocation in additional tool magazine Ø 125 mm		Additional tool magazine double ZM 528 (HSK A 63)			
THAN COOL WORTH		Max. tool weight		8 kg	

Included in standard deliveryAvailable upon request

Chip drawer	Removable chip drawer			•
Chip conveyor	Scraper belt conveyor			
	Hinged belt conveyor	Advanced / Advanced 250		
	Ejection height		at least 940 mm	
	Chip cart		450 l	
External cooling lubricant supply	Capacity of standard tank		315	•
Internal cooling lubricant supply	Capacity of standard tank		112	0
with paper band filter	Capacity of cooling lubricant tank	1100 I with 80 bar	1100   with 80 bar / 570   with 40 bar	
	Pressure (adjustable up to)		max. 40 bar / 27 l/min ( max. 80 bar / 22 l/min	
	Power consumption		up to 22,5 kVA	
Table variants		Swivelling rotary table	Rigid clamping to	able
	Clamping surface	Ø 900 x 750 mm	1250 x 982	mm
	Swivelling range	+/-115°		-
	C-axis drive mode	Worm		-
	Swivelling axis A speed: Tandem drive	25 rpm		_
	Speed rotary axis C:	25 rpm		_
	Max. table load	 1500 kg	3000	 O kg
	T grooves parallel	7 / 18 H7	9 / 18	
Positional uncertainty	A in X-Y-Z axes according to ISO 230-2		≤ 0,006 mm	1
	(calculated at a constant ambient temperature of 20 $^{\circ}\text{C}$ +/-1 $^{\circ}\text{C}$ . Our products are subject to the German Export Law and require authorization since the attainable precision may be less/greater than 6 $\mu\text{m}$ .)			
Hydraulics	Operating pressure		120 bar	
Central lubrication	Minimum grease lubrication quantity			•
Connected loads (machine)	Mains connection		400 V / 50/60 Hz	
	Power consumption		up to 48 kVA	
	Compressed air		6 bar	
Weight	(standard version without optional extraspieces and cooling lubricant)	s, attachments, work-	approx. 15,4 t	: