www.dmgmori.com

DMG MORI

CTV 160 / 250
CTV 160 / 250 / 315 *linear*
CTV 250 DF

Vertical production turning

CTV series

CTV series

CTV – one concept in four models for all production requirements.

CTV 160 / 250 – vertical production turning

+ A design fully suited to production with optimal accessibility for automation and interconnection
+ The lowest space requirements in this class thanks to the modern STEALTH design with integrated 15" DMG MORI SLIM*line*® panel and a footprint of just 10.7 m² including chip conveyor and automation
+ Automation with a prismatic conveyor belt for up to 40 workpieces as standard

Automotive: Drive flange
manufactured on a CTV 160 //
41CrMo4 // 55 / 45 sec (OP10 / OP20)

Automotive: Gear wheel
manufactured on a CTV 160 //
42CrMo4 // 35 / 38 sec (OP10 / OP20)

+ The highest level of flexibility when machining average quantities of complex workpieces thanks to the Y axis with ±90 mm travel (CTV 250: +90 / –65)
+ The highest precision and long-term accuracy thanks to the linear drive on the X axis (optional)
+ Optional automation in the form of a prismatic conveyor belt or disc-type magazine

Machine construction: Coupling
manufactured on a CTV 160 *linear* //
16MnGS // 75 / 68 sec (OP10 / OP20)

Machine construction: Connection flange
manufactured on a CTV 250 *linear* //
CK45 // 258 / 212 sec (OP10 / OP20)

CTV 160 / 250 (*linear*) – machining complex workpieces thanks to the integrated Y axis

CTV 315 *linear* – machining large workpieces ø 300 mm

+ The highest precision and long-term accuracy thanks to the linear drive on the X axis with 1 g acceleration
+ Machining complex workpieces thanks to the optional Y axis with ±50 mm travel
+ 12-station VDI 40 turret, optionally available as Direct Drive or as a VDI 50 turret with 40 Nm torque

Machine construction: Flywheel manufactured on a CTV 315 *linear* // GGG 30 // 67 / 58 sec (OP10 / OP20)

Machine construction: Flange manufactured on a CTV 315 *linear* // CK45 // 120 / 40 sec (OP10 / OP20)

CTV 250 DF – vertical 5-axis production turning and milling

+ Vertical turning and milling centre for fully machining all components for constant-velocity joints
+ The highest dynamics thanks to the drive of the turn-mill swivelling tool carrier (DF) as Direct Drive rated at 90 rpm, swivel range +105 / –45°
+ Machine-integrated automation with optional workpiece feeding and removal

Automotive: Ball hub manufactured on a CTV 250 DF // 20MnCr5 // 24 sec.

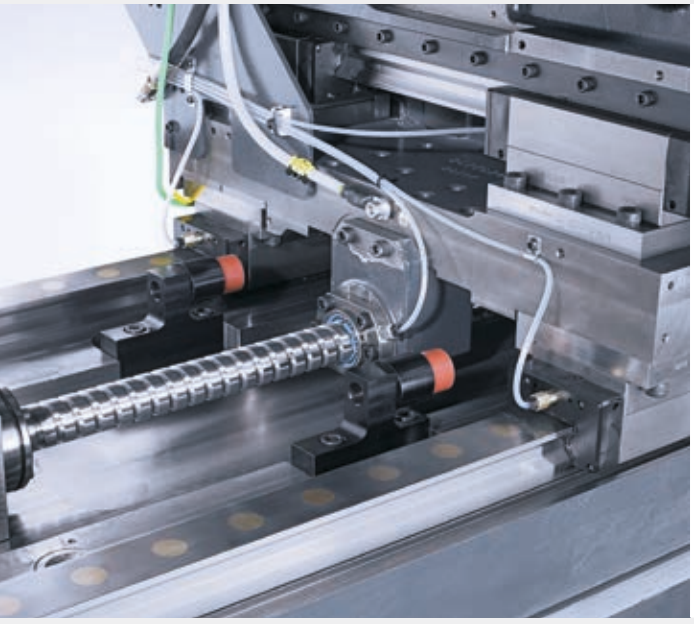
Automotive: Housing manufactured on a CTV 250 DF // CF53 // 30 sec.

Spacious working area

+ Use of large chucks up to ø 315 mm
(CTV 160: ø 220 mm // CTV 250: ø 260 mm)
+ CTV 160 / 250: Multi-function station for up to two additional tools, one for internal and one for external machining (external machining only with the Y axis)
+ CTV 315 *linear*: The extra tooling station can also be used for driven (multiple) tools or a milling spindle

Liquid-cooled integrated spindle motors

+ The highest long-term accuracy thanks to the liquid-cooled drives for maximum temperature stability
+ The greatest stability thanks to the use of the largest spindle bearing in its class:
CTV 160: ø 100 mm diameter of the front bearing
CTV 250: ø 120 mm diameter of the front bearing
CTV 315: ø 130 mm diameter of the front bearing



Maximum stability and long-term accuracy

+ Maximum precision thanks to direct measurement systems on all linear axes as standard
+ The highest stability thanks to large roller guides and ball screws mounted on both sides on the
CTV 160 / 250: 45 mm roller guides and ø 32 mm ball screws
CTV 315 *linear*: 45 mm roller guides and ø 40 mm ball screws
+ 60 % less friction and 50 % greater stiffness thanks to roller guides instead of ball guides

CTV – the shortest production times thanks to the latest technology.

Integrated automation solutions

+ Increased productivity with the integrated prismatic conveyor: up to 40 positions for workpiece diameters of up to ø 300 mm with the CTV 315 *linear*, no mechanical conversion necessary; component sizes can easily be changed using the control system
+ Alternative automation in the form of a disc-type magazine for the CTV 160 / 250 (*linear*) with height adjustment and minimal space requirements
+ CTV 250 DF with shuttle and steel link chain for feeding and removing workpieces

Automation tailored to the customer

+ Workpieces are fed and removed based on customer specifications, e.g. via shuttle, steel link chain conveyors, pallet accumulation conveyors or robots
+ Linkage of several machines via belt systems including the integration of turning stations or, alternatively, as robot cells
+ Integration of additional processes such as measurement, washing, deburring etc.

CTV series

CTV – vertical production turning of workpieces of up to ø 220 mm and 200 mm in height.

+ Machine configuration with automation on the right or left hand side
+ Automation in the form of an integrated prismatic conveyor belt for short loading times and no mechanical conversion as standard when switching workpieces (via the control system instead)
+ Spacious working area for additional tools on the multi-function station and larger (special) chucks
+ 12-unit VDI 30 turret (CTV 250: VDI 40), driven tools rated at 4,000 rpm optional
+ The machines are 100 % ready for production, including automation, chip conveyor, linear scales and quad-colour signal lights

NEW: CTV 160 / 250 in our STEALTH design

STEALTHDESIGN

1 **Space-saving design**
thanks to an integrated prismatic conveyor for up to 40 workpieces and a footprint of just 10.7 m²

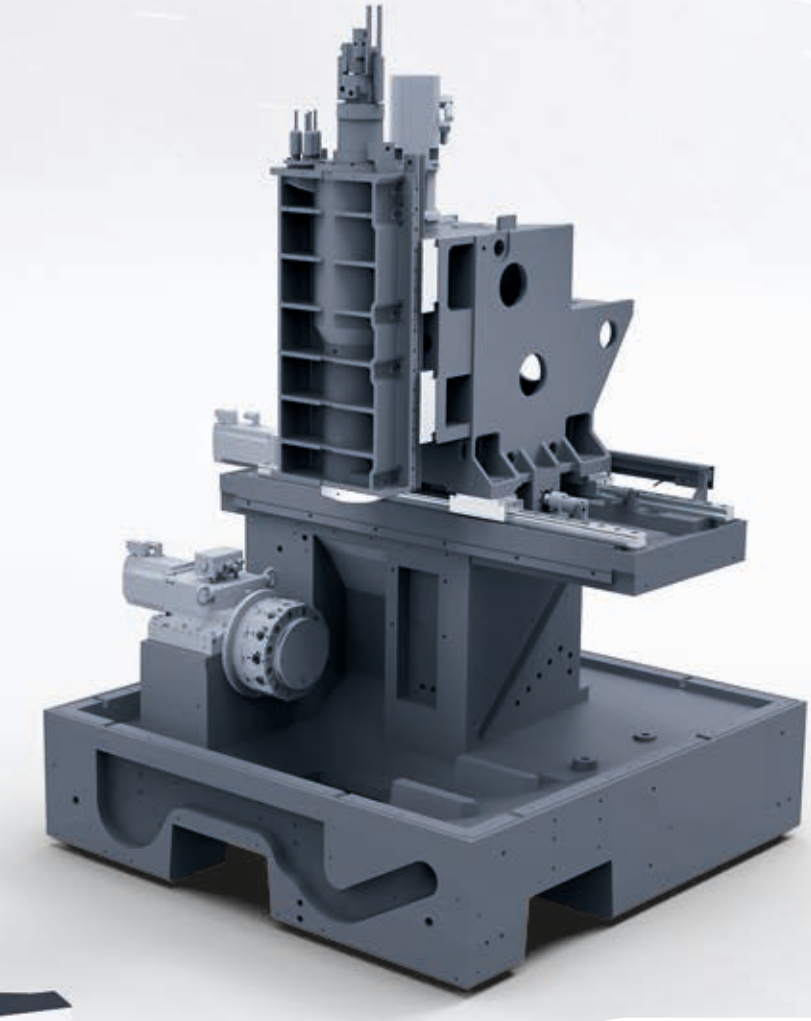
2 **Optimal accessibility**
thanks to the 550 mm wide door

3 **Optimal view**
of the working area through large panels

4 **DMG MORI SLIM*line*® panel**
with a 15" display and SIEMENS 840D solutionline operate // TRANSLINE optional

Workpiece loading and unloading

+ Drag frame conveyor for up to 40 workpieces or workpiece diameters of up to ø 220 mm (CTV 160 up to ø 160 mm) as standard
+ Additional linear belts, robot automation and machine linkage are optional
+ The machine concept makes dual-track loading and unloading of components up to ø 100 mm possible
  – Separation of raw and finished components
  – Shorter loading and unloading times



Highlights CTV 160 / 250

+ **The highest stability**
  – Consistent stiffness thanks to robust size 45 linear guides and ø 32 mm ball screws
  – Single-piece Z slide
  – Wide distance between the linear guides 425 mm on the X axis 340 mm on the Z axis
+ **Large spindle bearing** for maximum machining stability ø 100 mm with th e CTV 160 ø 120 mm with the CTV 250
+ **Optimised chip removal** thanks to free chip removal downwards
+ **Maximum precision** thanks to direct measurement systems on all linear axes
+ **Thermal stability** thanks to the liquid-cooled main spindle

		CTV 160	CTV 250 (160)*
Production – for medium and large batch sizes			
Maximum workpiece diameter	mm	ø 160	ø 220
Maximum workpiece height	mm	160 (200)*	160 (200)*
Maximum swing	mm	ø 220	ø 320
Maximum chuck diameter	mm	ø 220	ø 260
X / Z travel	mm	725 / 300	725 / 300
Turret		12 × VDI 30	12 × VDI 40
Automation in the form of a prismatic conveyor belt	# / mm	36 × ø 70 27 × ø 85 24 × ø 120 18 × ø 160 –	40 × ø 70 30 × ø 85 24 × ø 120 20 × ø 160 16 × ø 220

* Optional

CTV series

CTV – machining of complex workpieces with the integrated Y axis.

+ Eccentric machining thanks to ±90 mm Y axis
+ Machine configuration with automation on the right or left hand side
+ Automation in the form of an integrated prismatic conveyor or disc-type magazine is optional
+ Spacious working area for using additional tools on the multi-function station and large (special) chucks
+ 12-unit VDI 30 turret (CTV 250: VDI 40), driven tools rated at up to 4,000 rpm are optional
+ DMG MORI ERGO*line*® panel with 19" display and SIEMENS 840D solutionline Operate with ShopTurn 3G (optional) for the use of exclusive DMG MORI technology cycles (optional)

		CTV 160 (*linear*)	CTV 250 (*linear*)
Universal – for small and medium batch sizes			
Maximum workpiece diameter	mm	ø 160	ø 220
Maximum workpiece height	mm	160 (200)*	160 (200)*
Maximum swing	mm	ø 220	ø 320
Maximum chuck diameter	mm	ø 220	ø 260
X / Y / Z travel	mm	620 / ±90 / 300	650 / +90, –60 / 300
Turret		12 × VDI 30	12 × VDI 40
Automation* as a form of a prism conveyeur belt	# / mm	40 × ø 70 30 × ø 85 24 × ø 120 20 × ø 160 –	40 × ø 70 30 × ø 85 24 × ø 120 20 × ø 160 16 × ø 220
Automation* in the form of a disc-type magazine	# / mm	20 × ø 160	16 × ø 220 (24 × ø 150)*

* Optional

Highlights CTV 160 / 250 (*linear*)

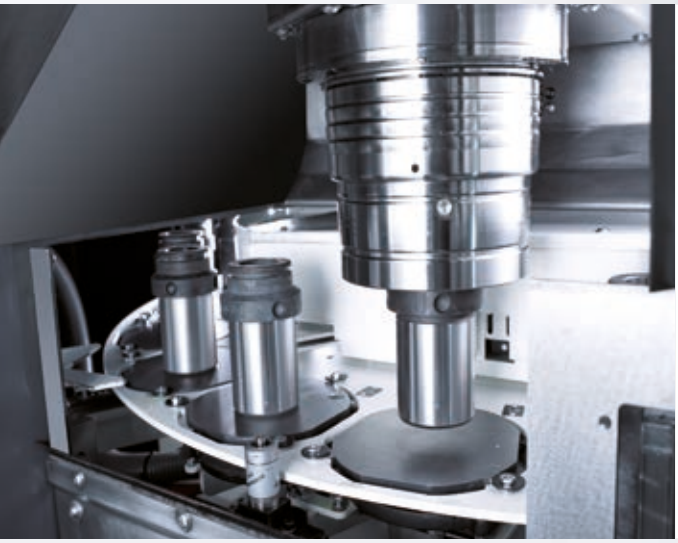
+ **The highest stability**
  – Consistent stiffness thanks to robust size 45 linear guides and ø 32 ball screws
  – Wide distance between the linear guides
    425 mm on the X axis
    340 mm on the Z axis
+ **Large spindle bearing** for maximum machining stability
  ø 100 mm with the CTV 160
  ø 120 mm with the CTV 250
+ **Optimised chip removal**
  thanks to free chip removal downwards
+ **Maximum precision**
  thanks to direct measurement on all linear axes
+ **Thermal stability**
  thanks to the liquid-cooled main spindle

The highest long-term accuracy thanks to the linear drive

+ Maintenance - free optional linear drive on the X axis for the highest long-term accuracy
+ 60 month guarantee on the linear drive

Workpiece loading and unloading

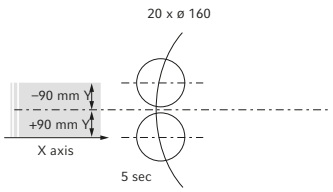
+ Prismatic conveyor belt for up to 40 workpieces or up to ø 220 mm (CTV 160 up to ø 160 mm)
+ Disc-type magazine for up to 24 workpieces or up to ø 220 mm (CTV 160: 20 x ø 160 mm)
+ Additional linear belts, robot automation and machine linkage are optional



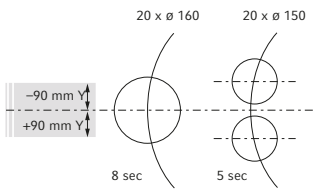
Automation in the form of a disc-type magazine loading method with the Y axis

+ Short loading and unloading times thanks to the use of the Y axis

CTV 160 (*linear*)



CTV 250 (*linear*)



Working area of a CTV 160 *linear* with a 12-unit VDI 30 turret and additional carrier for 2 tools

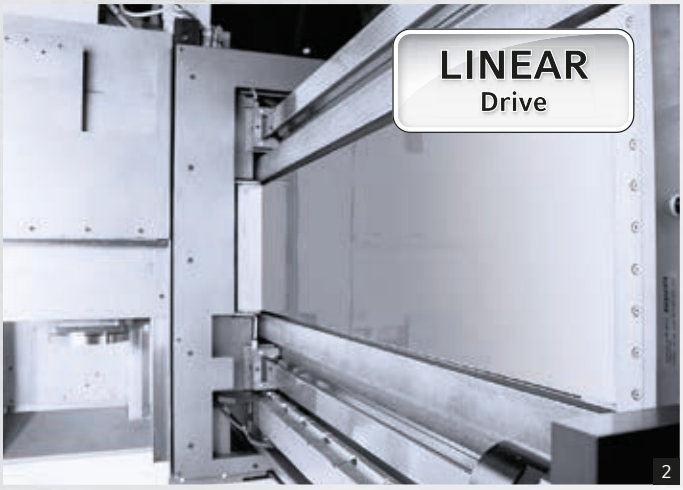
CTV 315 *linear* – machining large workpieces up to ø 300 mm.

+ The highest precision and long-term accuracy thanks to the linear drive on the X axis with 1 g acceleration
+ Spacious working area for using additional tools, a milling spindle on the multi-function station and larger (special) chucks
+ Machining complex workpieces thanks to the optional Y axis with ±50 mm turret travel
+ 12-unit VDI 40 turret (VDI 50 is also available), optional driven tools rated at up to 4,000 rpm or Direct Drive turret rated at up to 10,000 rpm
+ Machine configuration with automation on the right or left hand side
+ KunOptional customer-specific automation, e.g. as an integrated prismatic conveyor for workpieces up to ø 300 mm
+ Modern STEALTH design with an integrated 15" DMG MORI SLIM*line*® panel and SIEMENS 840D solutionline Operate // TRANSLINE optional

STEALTHDESIGN

		CTV 315 *linear*
Universal – for small and medium batch sizes		
Maximum workpiece diameter	mm	ø 300
Maximum workpiece height	mm	210
Maximum swing	mm	ø 340
Maximum chuck diameter	mm	ø 315
X / Y / Z travel	mm	1.100 / ±50 / 300
Turret		12 × VDI 40 (VDI 50*)
Automation* in the form of a prismatic conveyor	# / mm	52 × ø 80 26 × ø 130 13 × ø 230 (with the use of up to ø 300)

* Optional // Automation also as an accumulation conveyor



1 Automation tailored to the customer

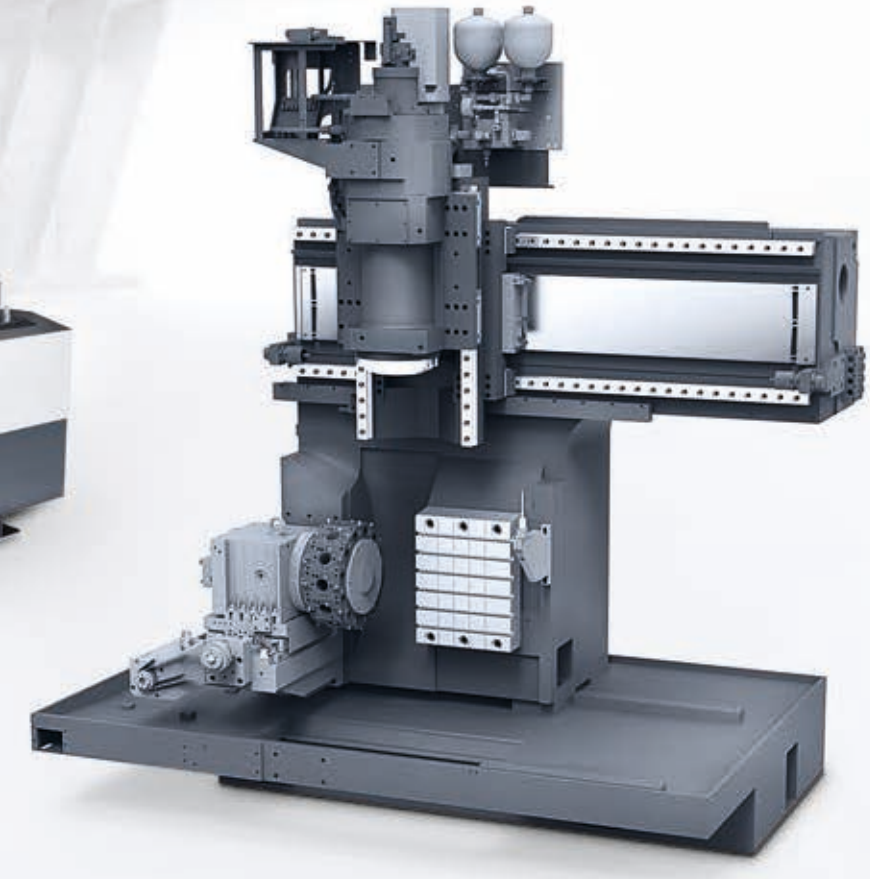
+ Optional prism conveyor belt for up to 52 workpieces or up to ø 300 mm
+ Additional linear belts, robot automation and machine linkage are optionall

2 Linear drive for 1 g acceleration

+ Maintenance-free linear drive on the X axis with 1 g acceleration as standard, for the highest dynamics and long-term accuracy
+ 60 month guarantee on the linear drive

3 Large working area for work pieces up to ø 300 mm

+ Workpieces up to 300 mm in diameter and 210 mm in height
+ Multi-function station-type for the use of additional (driven) tools or a milling spindle



Highlights CTV 315 *linear*

+ **The highest stability** thanks to the knee design
  – Robust size 45 linear guides and ø 40 mm ball screws;
  – Wide distance between the linear guides 465 mm on the X axis 374 mm on the Y* and Z axes
+ **Large spindle bearing** with ø 130 mm for maximum machining stability
+ **Optimised chip removal** thanks to free chip removal downwards
+ **Maximum precision** thanks to direct measurement systems on the X and Z axes (Z axis is optional)
+ **Thermal stability** thanks to the liquid-cooled main spindle

CTV 160 / 250 / 315 (*linear*) – integrated automation for maximised productivity.

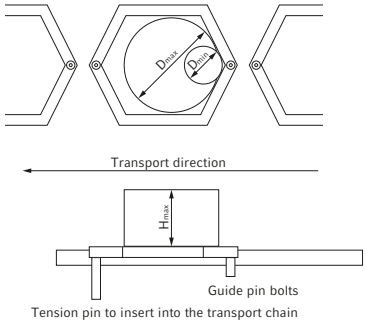
+ Integrated prismatic conveyor for up to 40 workpieces
  – no mechanical conversion work is necessary when changing workpieces, The component size can easily be changed using the control system
+ Use of optional inserts or pallets in the drag frame conveyor
  – for machining workpieces based on their state
  – for asymmetrical and long, thin workpieces under < ø 30 mm
+ The capacity can be increased by using smaller drag frames on the existing conveyor belt
+ The drag frame runs from the rear to the front, through the machine, and if two machines are linked a chain runs from front to rear
+ Prismatic conveyor as the standard automation for the CTV 160 / 250 in our STEALTH design

The CTV 160 has a footprint of just 10.7 m² including chip conveyor and automation

Configuration and sizes

Prism conveyor belt for the CTV 160 / 250 / 315 (*linear*)

	CTV 160 STEALTH*	CTV 160 STEALTH** / (*linear*)**	CTV 250 STEALTH** / (*linear*)**	CTV 315 *linear***
ø 30 – 70 mm	36 Slots	40 Slots	40 Slots	–
ø 30 – 80 mm	–	–	–	52 Slots
ø 30 – 85 mm	27 Slots	30 Slots	30 Slots	–
ø 30 – 120 mm	24 Slots	24 Slots	24 Slots	–
ø 30 – 130 mm	–	–	–	26 Slots
ø 30 – 160 mm	18 Slots	20 Slots	20 Slots	–
ø 80 – 220 mm	–	–	16 Slots	–
ø 30 – 230 mm (with the use of up to ø 300 mm)	–	–	–	13 Slots
Workpiece height	160 (200) mm**	160 (200) mm**	160 (200) mm**	210 mm
Workpiece weight	max. 17 kg // max. 320 kg	max. 17 kg // max. 320	max. 19 kg // max. 320	max. 25 kg // max. 240 kg



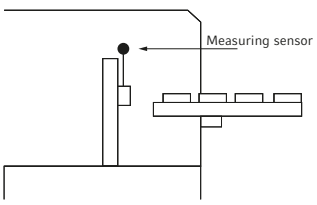
Tension pin to insert into the transport chain

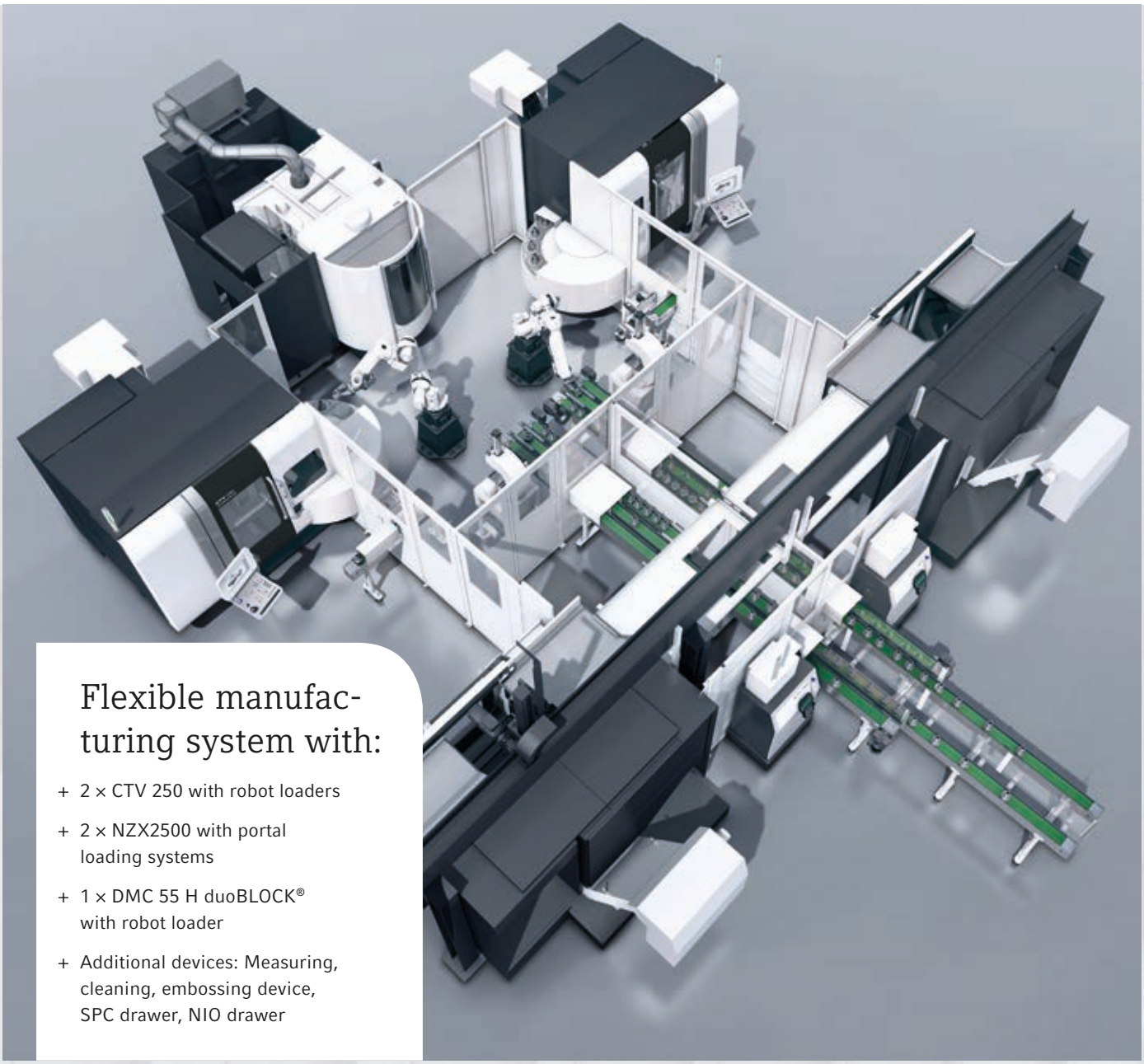
Disc-type magazine (only for the CTV 160 / 250 (*linear*) with Y axis) CTV 160 (*linear*): 20 Slots, ø 160 × 210 mm, max. 8 kg // CTV 250 (*linear*): 16 Slots, ø 200 × 210 mm, max. 20 kg // * Prism conveyor belt with extension possibility for optional feed / discharge conveyor for work pieces up to ø 100 mm, or a work piece slide // ** Optional

Prismatic conveyor as automation for
the CTV 160 / 250 / 315 (*linear*)

In-process workpiece measurement

+ Position of the measuring sensor outside of the working area
  – no contamination
+ Measurement of the workpiece in its clamped state
+ The measured results are automatically used to correct the tool offsets
+ < 2 µm repeatability
+ Can be used for radial orientation





Flexible manufacturing system with:

+ 2 × CTV 250 with robot loaders
+ 2 × NZX2500 with portal loading systems
+ 1 × DMC 55 H duoBLOCK® with robot loader
+ Additional devices: Measuring, cleaning, embossing device, SPC drawer, NIO drawer

1: WH 10 robot cell for automatically loading and unloading a workpiece conveyor belt
2: Work piece turning station for 6-sided complete machining

CTV – turnkey solutions, from automation to a complete manufacturing cell.

	CTV 160 / 250	CTV 160 / 250 *(linear)*	CTV 315 *linear*	CTV 250 DF
Prismatic conveyor	standard	•	•	–
Disc-type magazine	•	•	•	–
Pallet conveyor	•	•	•	–
Steel link chain	•	•	•	•
Shuttle	•	•	–	•
DMG MORI Automation				
WH 2	•	•	•	–
WH 3 / WH 3 U	•	•	•	–
WH 10	•	•	•	•
Linking				
Integrated turning station	•	•	•	•
Articulated robot arm	•	•	•	•
Complete manufacturing cells	•	•	•	•
Configuration levels / periphery				
Wash	•	•	•	•
Deburr	•	•	•	•
Measure	•	•	•	•
Workpiece labels	•	•	•	•

• Optional, – not available

Linkage of two CTV 160 / 250 (*linear*) machines by means of a disc-type magazine with integrated turning station

Manufacturing cell consisting of 2 × CTV 250 DF and one 6-axis robot for the fully automatic production of components for constant-velocity joints

Maximum stability for permanently high machining performance thanks to the use of a large spindle bearing with a wide spread.

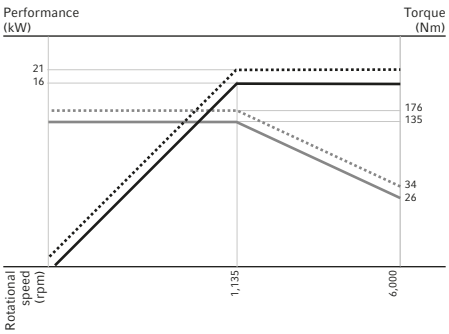
	CTV 160 (*linear*)	CTV 250 (DF / *linear*)	CTV 315 *linear*
Bearing spread (front to back)	300 mm	300 mm	344 mm
2 bearing (front)			
Bearing type	Angular contact ball bearing	Angular contact ball bearing	Angular contact ball bearing
Outer diameter	ø 150 mm	ø 180 mm	ø 200 mm
Inner diameter	ø 100 mm	ø 120 mm	ø 130 mm
2 bearing (rear)			
Bearing type	Angular contact ball bearing	Angular contact ball bearing	Angular contact ball bearing
Outer diameter	ø 140 mm	ø 165 mm	ø 180 mm
Inner diameter	ø 100 mm	ø 120 mm	ø 130 mm

Liquid-cooled main spindles for maximum temperature stability.

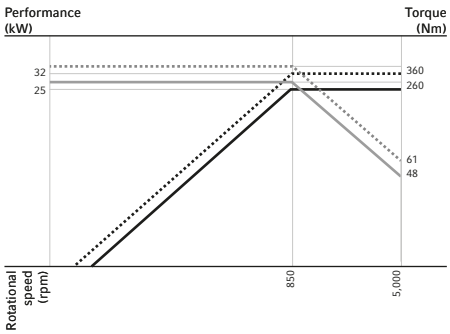
+ Bearing with four spindle bearings in the form of angular contact ball bearings for 30 % higher stiffness per 10 mm bearing diameter – Bearing diameter up to ø 130 mm
+ Large bearing spread of 300 – 320 mm (3 × D) for maximum stability and 500 N stiffness – radial and axial
+ The highest precision with < 4 µm angular misalignment (concentricity and cylindricity)

		CTV 160 (*linear*)	CTV 250 (DF / *linear*)	CTV 315 *linear*
Rotational speed	rpm	6,000	5,000	5,000
Power (40 / 100 % DC)	kW	21 / 16	32 / 25	32 / 25
Torque (40 / 100 % DC)	Nm	176 / 135	360 / 260	360 / 280
Spindle flange		140h5	170h5	170h5

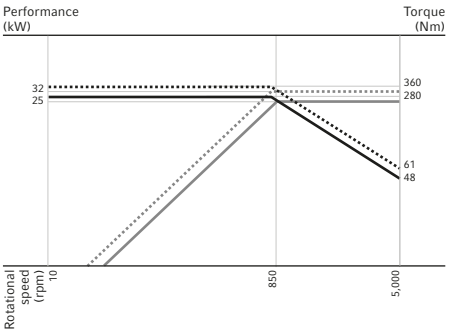
CTV 160 (*linear*)



CTV 250 (DF / *linear*)



CTV 315 *linear*



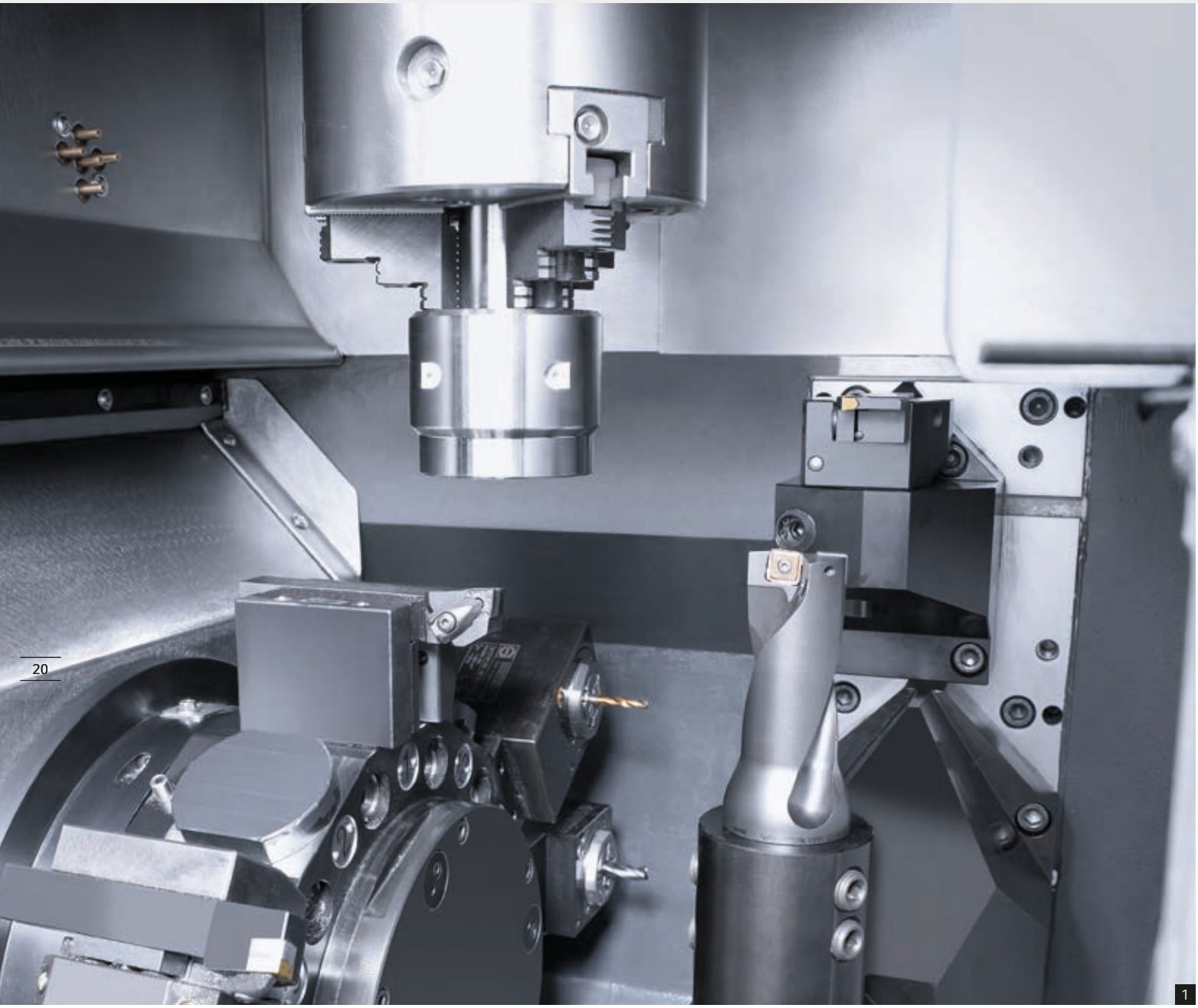
CTV 160 (*linear*) // 21 kW, 176 Nm, 6,000 rpm

High-performance roughing (CK45 // 100 mm component diameter)	
Material removal rate	**336 cm³/min**
Clamping depth	4 mm
Cutting speed	240 m/min
Feed	0.35 mm/U
High-performance boring (CK45)	
Workpiece diameter	28 mm
Spindle speed	909 U/min
Cutting speed	80 m/min
Feed	0.15 mm/U

CTV 250 / 315 (*linear*) // 32 kW, 360 Nm, 5,000 rpm

High-performance roughing (CK45 // 170 mm component diameter)	
Material removal rate	**420 cm³/min**
Clamping depth	5 mm
Cutting speed	240 m /min
Feed	0.35 mm/U
High-performance boring* (CK45)	
Workpiece diameter	28 mm
Spindle speed	909 U/min
Cutting speed	80 m/min
Feed	0.15 mm/U

* limited by 6 kN feed force of the Z axis // values for the CTV 315 *linear* are available on request



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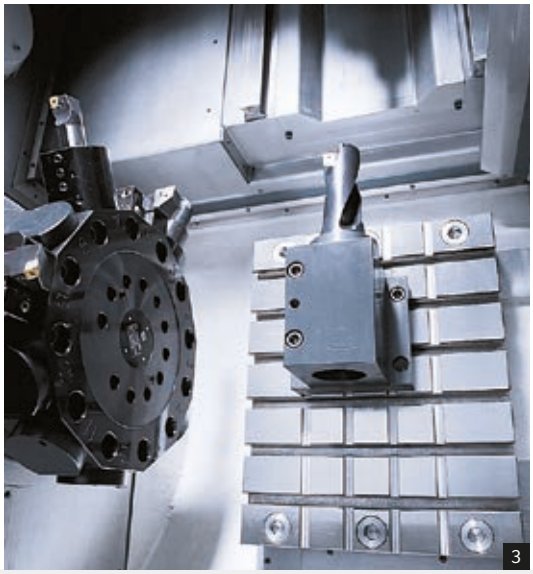

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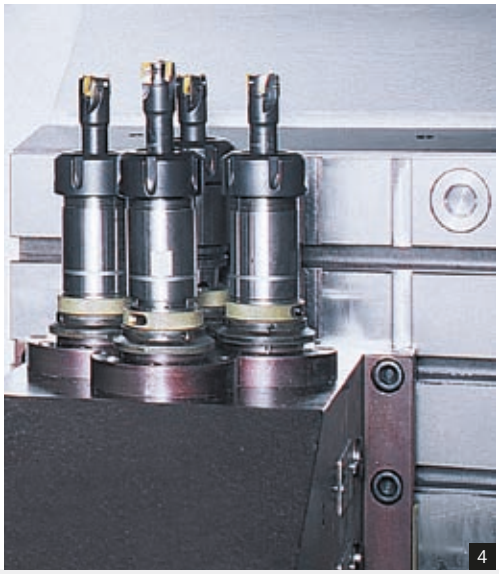


4

Short chip-to-chip times thanks to the servo turret with an indexing time of 0.25 second.

+ Short non-productive times thanks to the electric turret, which can turn through 90° in just 0.25 seconds
+ The highest stability when machining thanks to three-part Hirth serration with hydraulic interlocking
+ The space-saving design allows the turret to use long tools:
  215 mm = VDI 30 (CTV 160 (*linear*)
  190 mm = VDI 40 (CTV 250 (*linear*)
  230 mm = VDI 40 (CTV 315 *linear*, 220 mm with the Direct Drive* turret)
  200 mm = VDI 50* (CTV 315 *linear*)

*Optional

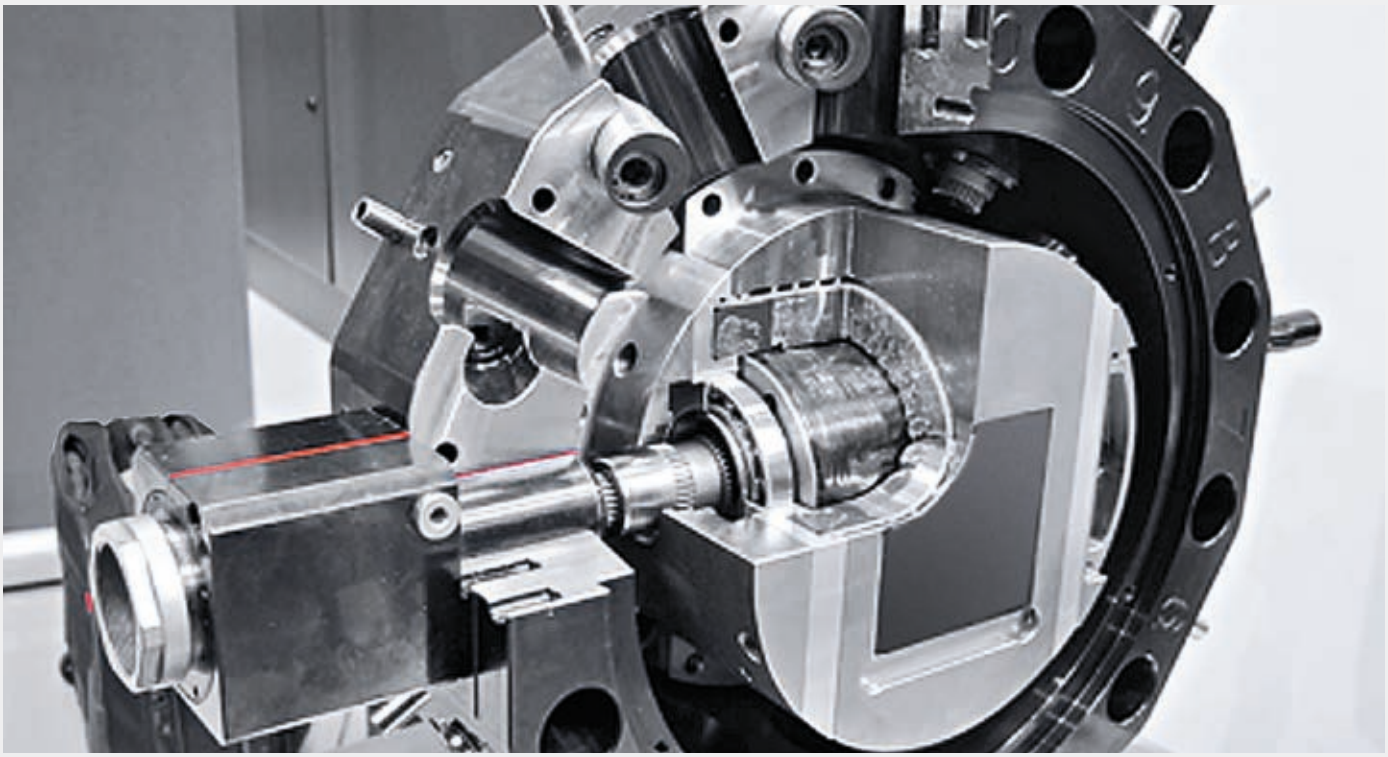
1: Working area of a CTV 160 *linear* with multi-function station and two tools
2: Tool carrier of a CTV 160 or 250 (*linear*) for two additional cutters
3: Heavy-duty tool on the function plate of a CTV 315 *linear*
4: Driven four-unit tool on the multifunction plate of a CTV 315 *linear*
5: Two driven tools on the multi function plate of a CTV 315 *linear* including stainless steel cover

Multi-function station* for additional tools

+ CTV 160 / 250 (*linear*)
  Multi-function station (140 × 390 mm) for the addition of two extra tools
  (CTV 160: VDI 30 // CTV 250: VDI 40)
  – Optional steel tool holder extension for external machining (top)
  – Optional steel tool holder extension for internal machining (bottom)
  – Optional internal coolant supply for both tools
+ CTV 315 *linear*
  Multi-function station (390 × 445 mm) for the addition of additional heavy-duty tools in the VDI 40 size range
+ CTV 315 *linear*
  Integration of an HSK-A63 milling spindle rated at 12,000 rpm, 22 kW and 100 Nm

DIRECT Drive

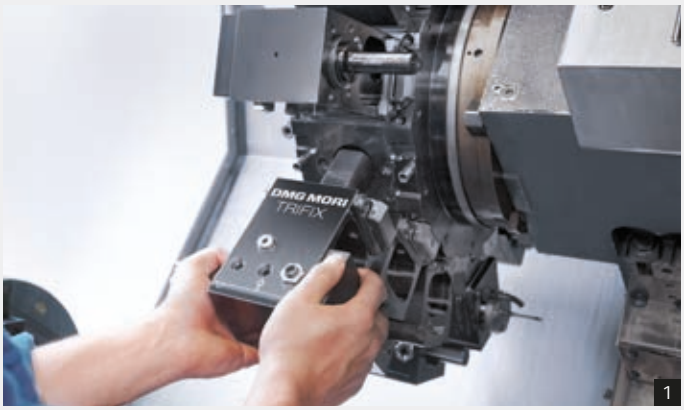
Direct Drive turret rated at 10,000 rpm for increased productivity thanks to the highest material removal rate.



Highlights

+ **Low-wear direct drive** with low heat generation thanks to the elimination of the transmission
+ Runs more quietly thanks to the gear-free drive and maximises tool life
+ **Higher speed, performance and torque** than conventional drives, optionally available as a star turret for the following machines:
  CTV 315 *linear*:
  VDI 40, 10,000 rpm, 14.2 kW and 34 Nm
+ **TRIFIX® precision interface** with a tool setting time of less than 30 seconds as standard
+ **Torque of up to 160 Nm** thanks to the 4:1 gear ratio

TRIFIX® – equip your machine with VDI compatibility quickly and easily.



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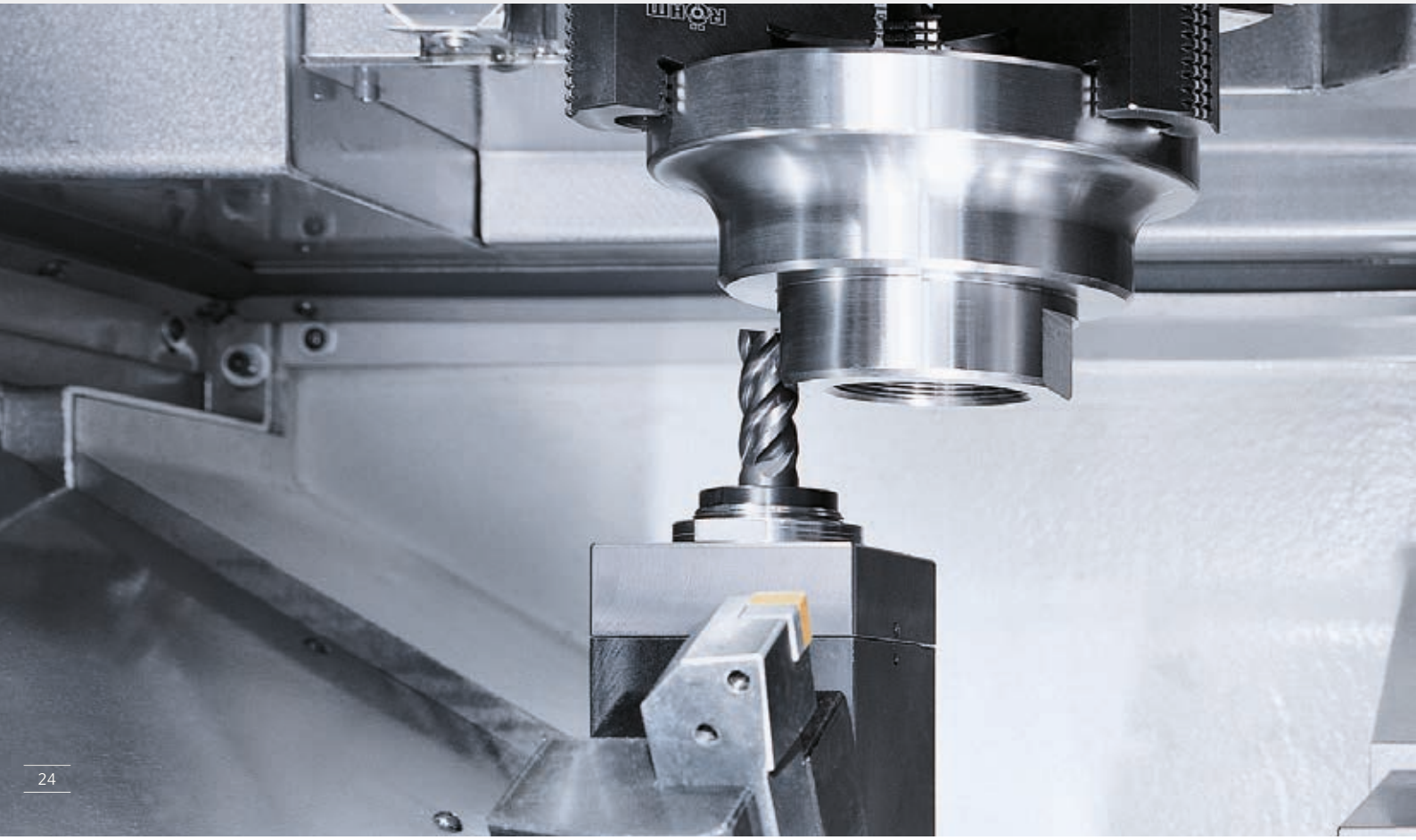
1+2: Tools with TRIFIX®-holders for the highest stability and 6 µm repeatability
3: 12-station turret with TRIFIX® holder for < 10 µm positioning accuracy
4: Direct Drive turret with TRIFIX® holder and speeds of 10,000 rpm

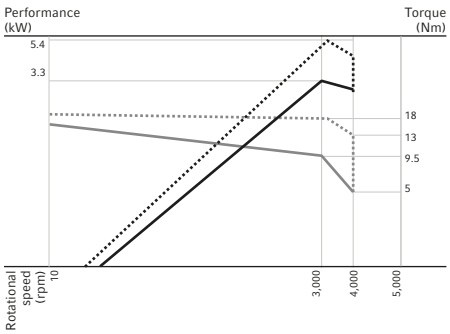
Highlights TRIFIX® precision interface

+ **Available for the Direct Drive turret**
+ **Tool set-up time of less than 30 seconds thanks to VDI with TRIFIX®**
+ **Maximum stability and long-term accuracy:** backlash-free and flexible double alignment and increased stability thanks to increased planar support with a hole pattern
+ **< 6 µm repeatability** (same tool, same position)
+ **< 10 µm positioning accuracy from one station to another**
+ Fully aligned driven tools
+ Standard VDI holders can be used



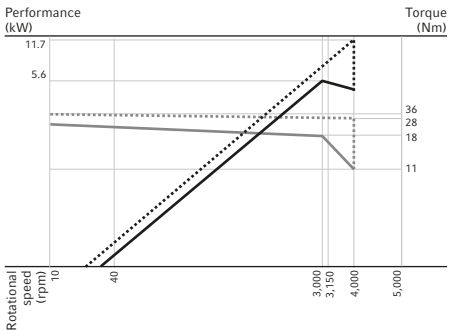
CTV 160 (*linear*)

VDI 30 standard turret
4,000 rpm, 5.4 kW, 18 Nm



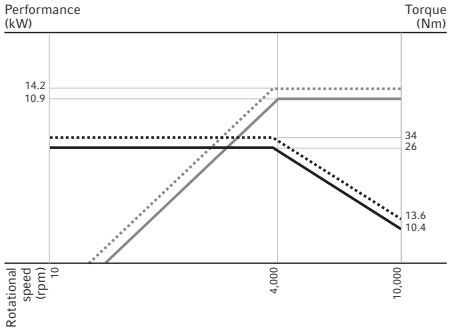
CTV 250 / 315 (*linear*)

VDI 40 standard turret
4,000 rpm, 11.7 kW, 28 Nm



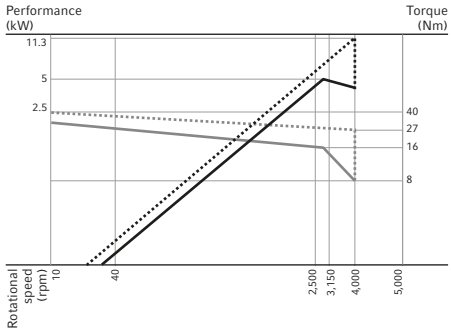
CTV 315 *linear*

Direct Drive VDI 40 turret optionally available
10,000 rpm, 14.2 kW, 34 Nm



CTV 315 *linear*

VDI 50 turret optionally available
4,000 rpm, 11.3 kW, 40 Nm



Driven tools rated at up to 10,000 rpm, 14 kW and 34 Nm for the highest milling performance.

		CTV 160 (*linear*)	CTV 250 / 315 (*linear*)	CTV 315* *linear*	CTV 315* *linear*
Turret size		VDI 30	VDI 40	VDI 40	VDI 50
Number of stations		12	12	12	12
Number of driven tools*		12	12	12	12
Speed of driven tools	rpm	4,000	4,000	10,000	4,000
Power (40 / 100 % DC)	kW	5.4 / 3.3	11.7 / 5.6	14.2 / 10.9	11.3 / 5.0
Torque (40 / 100 % DC)	Nm	18 / 13	28 / 18	34 / 26	40 / 27
Turret width across flats	mm	270	320	340	380

		CTV 160 (*linear*)	CTV 250 / 315 (*linear*) VDI 40	CTV 315* *linear* VDI 50
		5,000 rpm, 5.4 kW, 18 Nm	4,000 rpm, 11.7 kW, 28 Nm	4,000 rpm, 11.3 kW, 27 Nm
CK45 high-performance milling		1:1 tool drive	1:1 tool drive	1:1 tool drive
Material removal rate	cm^3/min	61.1	131.3	131.3
Spindle speed	rpm	2,546	1,401	1,401
Power	kW	4.9	4.2	4.2
Torque	Nm	18	28	28
Feed	mm/sprkt.	0.1	0.25	0.25
Cutting depth / width	mm	4 / 20	1.5 / 50	1.5 / 50
Cutting speed	m/min	160	220	220
Number of teeth		3	5	5
Mill diameter	mm	20	50	50
Spec. cutting force	N/mm^2	1,910	1,910	1,910
Tapping CK45				
Thread size	mm	M20 × 1	M16 × 1.5	M16 × 1.5
Spindle speed	rpm	318	397	397

DIRECT Drive		Direct Drive	CTV 315* *linear* VDI 40
			10,000 rpm, 14.2 kW, 34 Nm
CK45 high-performance milling		1:1 tool drive	4:1 tool drive
Material removal rate	cm^3/min	171.9	385.1
Spindle speed	rpm	4,775	5,602:4
Power	kW	2.4	4.7
Torque	Nm	5	33
Feed	mm/sprkt.	0.75	0.25
Cutting depth / width	mm	1.2 / 20	5.5 / 50
Cutting speed	m/min	300	220
Number of teeth		2	4
Mill diameter	mm	20	50
Spec. cutting force	N/mm^2	1,910	1,910
Tapping CK45			
Thread size	mm	M20 × 1.5	M20 × 1.5
Spindle speed	rpm	318	318

* Optional

Toothed gear // CTV 160

Sector	Automotive	Machining time	32 sec.
Material	20MnCr5	Highlight	Hard turning
Workpiece dimensions	ø 100 × 30 mm		

Impeller (contour) // CTV 160

Sector	Automotive	Machining time	24 sec.
Material	Aluminium	Highlight	Special clamping device
Workpiece dimensions	ø 50 × 30 mm		

Guide bush // CTV 160

Sector	Machine construction	Machining time	48 sec.
Material	16MnCr5	Highlight	Hard turning
Workpiece dimensions	ø 60 × 110 mm		

Drive element // CTV 160

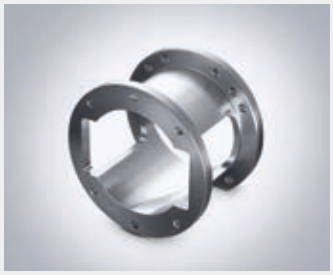
Sector	Automotive	Machining time	42 sec.
Material	30MnVS6	Highlight	Tool shank loose turning
Workpiece dimensions	ø 70 × 200 mm		

Spur gear (pre-turning) // CTV 250

Sector	Automotive	Machining time	74 / 72 sec. (OP10 / OP20)
Material	16MnCr5		
Workpiece dimensions	ø 160 × 32 mm	Highlight	Large volume production

Bearing flange // CTV 250

Sector	Automotive	Machining time	50 / 36 sec. (OP10 / OP20)
Material	42CrMo4		
Workpiece dimensions	ø 120 × 32 mm	Highlight	Hard turning



Toothed gear // CTV 160 *linear*

Sector	Machine construction	Machining time	4:22 / 3:56 min. (OP10 / OP20)
Material	CK45		
Workpiece dimensions	ø 160 × 160 mm	Highlight	Machining with the Y axis

Transmitter wheel // CTV 160 *linear*

Sector	Machine construction	Machining time	128 sec.
Material	CK45	Highlight	High proportion of milling
Workpiece dimensions	ø 120 × 40 mm		

Connection flange // CTV 250 *linear*

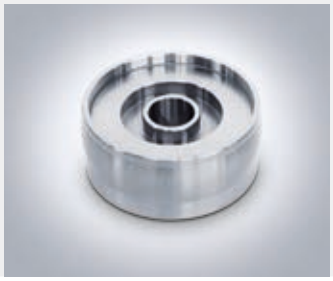
Sector	Machine construction	Machining time	148 sec.
Material	42CrMo4	Highlight	Full machining
Workpiece dimensions	ø 200 × 38 mm		

Connector // CTV 250 *linear*

Sector	Machine construction	Machining time	89 / 96 sec. (OP10 / OP20)
Material	C45		
Workpiece dimensions	ø 90 × 60 mm	Highlight	Machining with the Y axis

Housing // CTV 315 *linear*

Sector	Machine construction	Machining time	4:35 min.
Material	42CrMo4	Highlight	Heavy-duty cutting
Workpiece dimensions	240 × 240 × 70 mm		



Roller // CTV 315 *linear*

Sector	Machine construction	Machining time	3:25 / 3:17 min (OP10 / OP20)
Material	C45		
Workpiece dimensions	ø 260 × 120 mm	Highlight	Heavy-duty cutting

CTV series

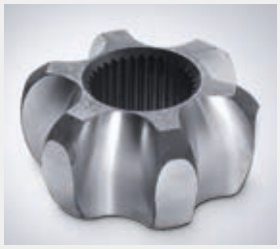
CTV 250 DF – the vertical turning and milling centre for machining constant-velocity joints.

Highlights CTV 250 DF

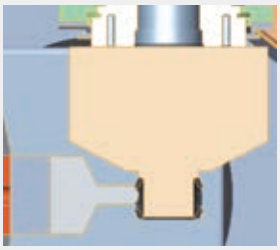
+ The highest dynamics thanks to the drive of the turn-mill swivelling tool carrier (DF) as Direct Drive rated at 90 rpm, swivel range +105 / –45°
+ Turn-mill swivelling tool carrier for up to two HSK-C63-F80 milling spindles, 6,000 rpm, 14.5 kW and 46 Nm (one milling spindle as standard)
+ Additional Capto C5 holder for multiple tools with up to four cutting edges
+ The highest durability thanks to stainless steel covers in the working area
+ Machine-integrated automation in the form of a metal link conveyor for feeding and removing workpieces
+ Machine configuration with automation on the right or left hand side

Machining an inner race

CTV 250 DF – parts overview for constant-velocity joints.



AC inner race	
Material	20MnCr5
Workpiece dimensions	18 mm ball diameter
Machining time	33 sec.



AC ball cage	
Material	16MnCr5
Workpiece dimensions	15.888 mm ball diameter
Machining time	60 sec.

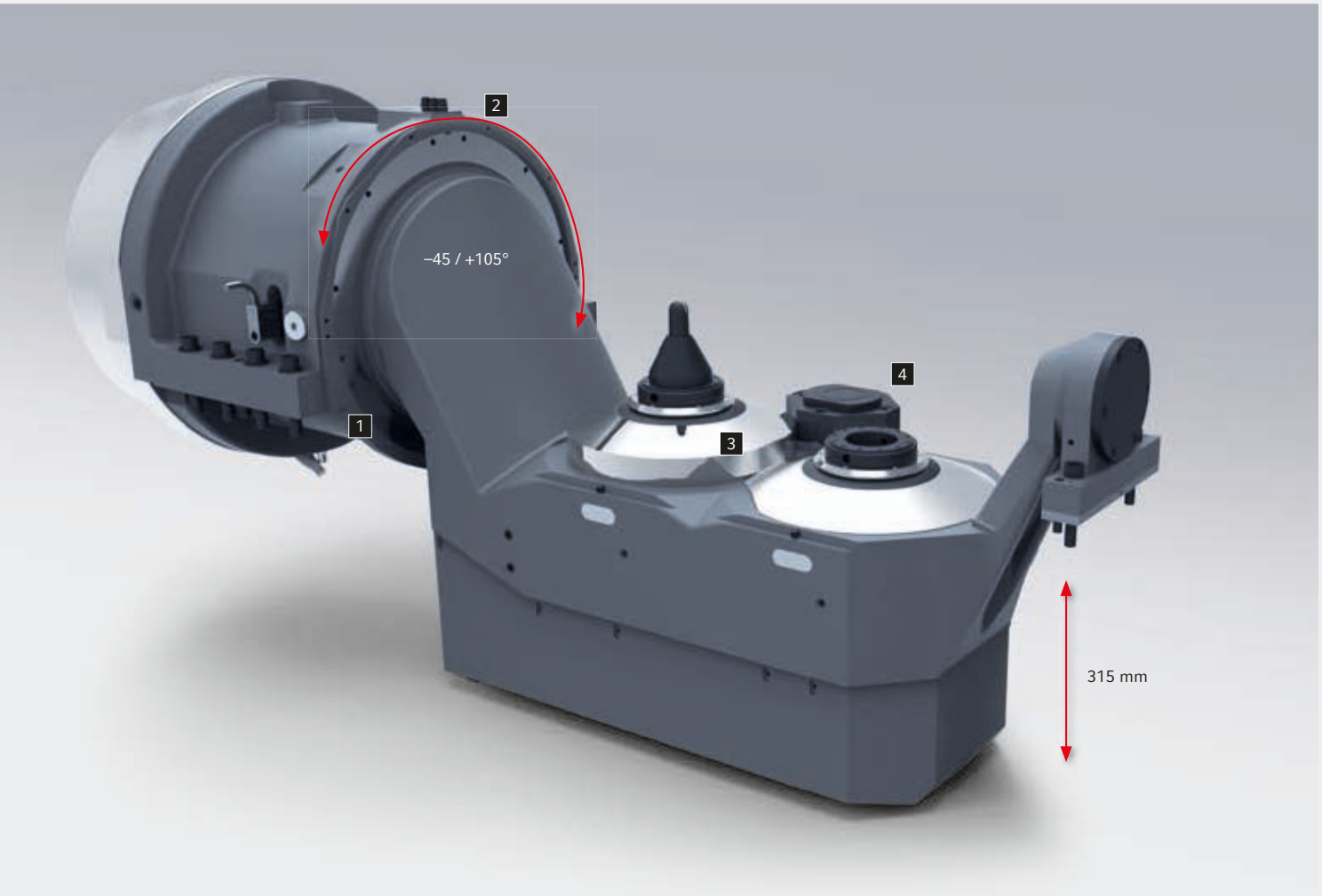
VL housing	
Material	CF53
Workpiece dimensions	18 mm ball diameter
Machining time	30 sec.

VL housing (section)	
Material	CF53
Workpiece dimensions	22.225 mm ball diameter
Machining time	27 sec.

Applications

Fixed joints (inner/outer races)	Sliding joints / axis drive joints (inner/outer races)
UF	VL
RF	DO
AC	

1: Machine with automation in the form of a metal link conveyor for feeding and removing workpieces
2: Workpiece gripper for automatically loading and unloading the moveable workpiece shuttle
3: Loading and unloading the workpiece shuttle using the Z travel of the main spindle



Highlights of the turn-mill swivelling tool carrier

1 Turn-mill swivelling tool carrier with Direct Drive
Swivel range of +105 / −45°, Direct Drive drive rated at 90 rpm and low moment of inertia thanks to its low height of just 315 mm resulting in 0.4 second swivel time (180°)

2 Multiple disc brake
Higher durability as standard

3 Swivelling tool carrier with 1 or 2 milling spindles
(HSK-C63-F80) max. 6,000 rpm, 14.5 kW, 46 Nm, The highest tool rigidity for maximised durability thanks to the ø 80 mm ball bearing and ø 80 mm tool contact surface

4 Capto C5 holder for multiple tools
(up to 4 cutting edges)

DMG MORI SLIM*line*® or DMG MORI ERGO*line*® panel.

1: 60 % reduction in programming time thanks to innovative multi-channel programming

Highlights of ShopTurn 3G (optional)

+ 3D graphics including real-time simulation
+ Absolute flexibility between DIN and WOP thanks to the combination of ShopTurn cycles with DIN
+ Quick, easy and clearly structured tool management
+ Full ShopMill functionality
+ User diagrams for quick installation
+ Available for machines with DMG MORI ERGO*line*® panels

CTV 160 / 250 / 315 in our STEALTH design

+ Swivel-mounted and integrated DMG MORI SLIM*line*® panel with **15" display** and SIEMENS 840D solutionline
+ Ethernet and USB interface for rapid data transfer
+ Optional TRANSLINE

CTV 160 / 250 (DF / *linear*)

+ DMG MORI ERGO*line*® panel with **19" display** and SIEMENS 840D solutionline
+ Ethernet and USB interface for rapid data transfer

1: Clear depiction of the block structure thanks to alignment based on synchronous points; colour display of productive and non-productive time as well as spindle utilisation
2: Tool management: efficient tool data management including all details, such as sister tools and tool life

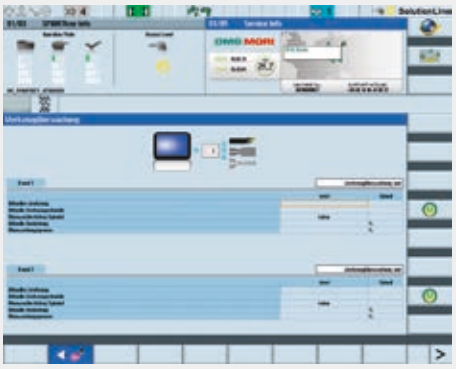
3: Cycle display with animated elements: graphically simulated work process with animated elements in the user interface for a clear display
4: Combination of DIN and ShopTurn programming: the blocks can comprise technical program sections consisting of DIN code, programGUIDE and ShopTurn / ShopMill task elements

5: 3D simulation: visual multi-channel machining thanks to 3D displays, detailed images and workpiece section
6: Copy & paste: by copying, cutting and pasting in blocks, it is possible to optimise even complex programs on two channels at once

Up to 50 % higher productivity with exclusive DMG MORI technology cycles.

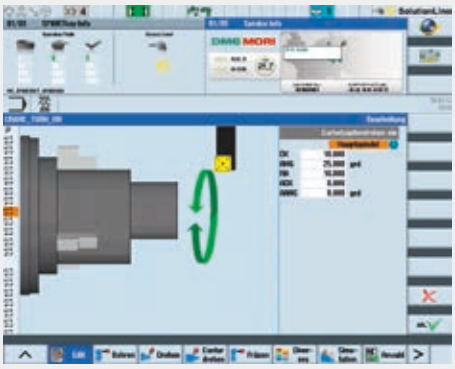
Technology cycle highlights

+ Exclusive context menus with parameters
+ Easy to enter the parameters in the user interface
+ Ready-made windows to enter data, easy to learn, knowledge of programming scarcely needed
+ No complicated DIN programming
+ Available for all machines with DMG MORI SLIM*line*® and DMG MORI ERGO*line*® panels



Easy tool monitoring

+ Driven tool load monitoring during the machining process in order to avoid damage to the machine and equipment



Eccentric turning and milling

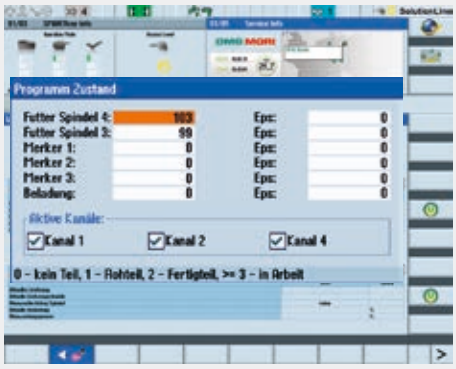
+ Machining cylindrical elements of a workpiece whose centre points are not located in the centre of the lathe spindle

Alternative speeds – for vibration-sensitive clamping operations

+ Modification of the spindle speed in order to avoid vibrations during the machining process

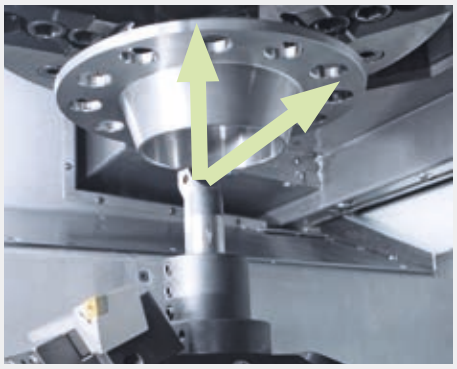
Multi-thread cycle

+ This cycle provides an interface for entering the inclination, number of threads and contour of the thread



Program mode control

+ Display of the workpiece number and data
+ Facilitates resuming work after the program is interrupted



Retraction cycle

+ Emergency function to retract the X and Z axes at the push of a button
+ Operation using SOFT*key*®

CTV series

Save up to 30 % energy – energy-efficiency measures with DMG MORI machines.

Efficient – optimised design

+ Optimal drive design
+ Drives capable of recovery
+ Controlled aggregates*
+ Minimised friction

Efficient – intelligent control system

+ Process optimisation
+ DMG Virtual Machine*
+ DMG AUTO*shutdown*

* Optional

Energy Saving

Smart technology already saves up to 20 % of energy costs as standard, over the entire life cycle of your DMG MORI machine tool.

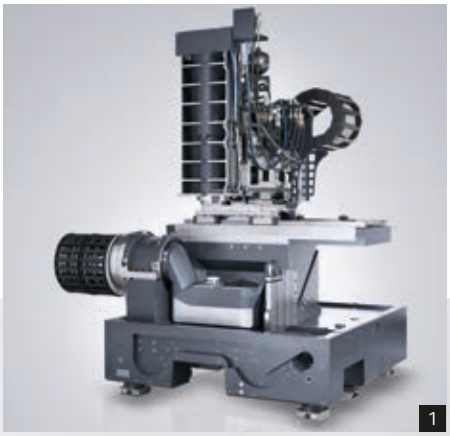
DMG AUTO*shutdown*:
Intelligent standby controls to avoid unnecessary energy consumption when idle.

DMG Virtual Machine* – optimised design

Unique – your DMG MORI machine 1:1 on the PC

+ Efficient production start-up thanks to optimal preparation
+ Real part production time calculation thanks to PLC integration
+ Full availability of all cycles and NC functions
+ The highest process safety thanks to collision detection and working area verification
+ Authentic machine model with a precise working area display
+ Set-up and tooling time are cut by 80 %

* Optional



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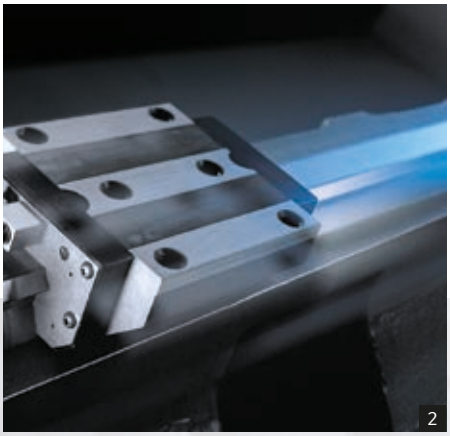

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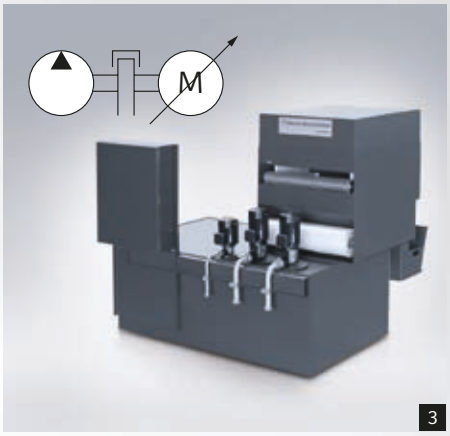

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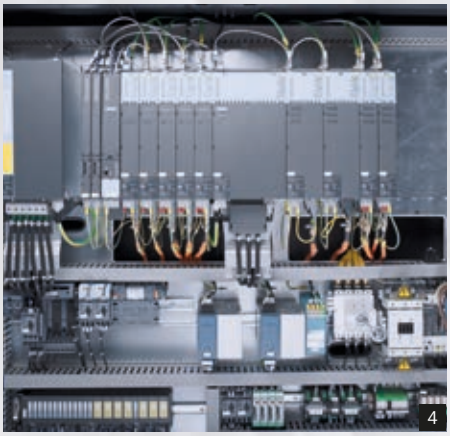

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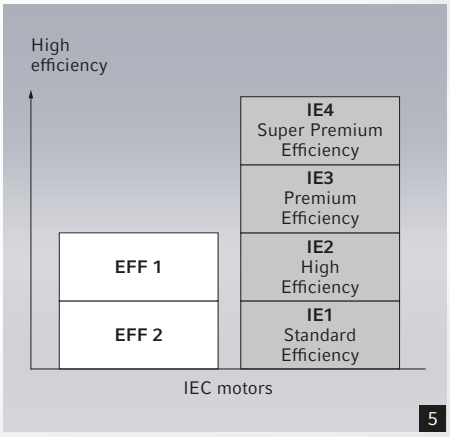


5

6

DMG MORI
ENERGY SAVING

1 **Design**

FEM-optimised design with high static and low moving masses

2 **Linear guides**

The most negligible friction effects thanks to the consistent use of roller bearing technology

3 **Servo technology / frequency control***

Frequency-controlled coolant and hydraulic pumps, instead of fixed displacement pumps with regulator technology

4 **Drives**

Energy recovery during the braking phases of spindles and feed drives

5 **Motor**

Use of the latest drive motors with up to 93 % efficiency

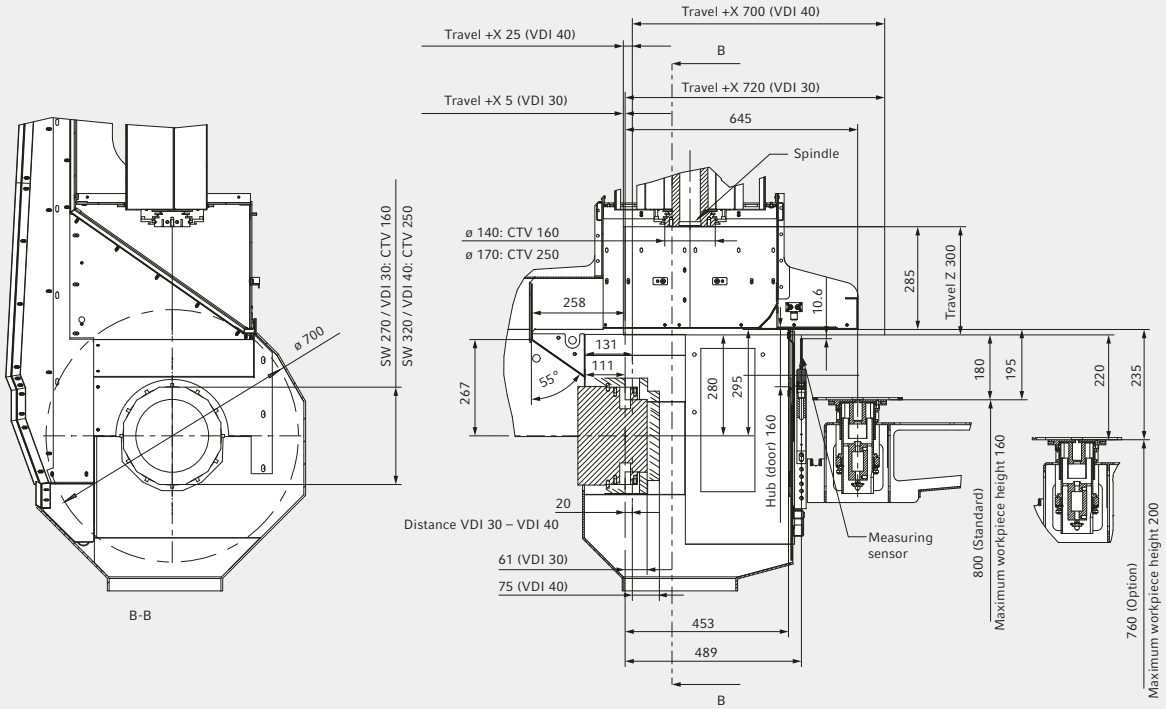
6 **Cooling***

Inverter-controlled systems for demand-based cooling performance

* Optional

CTV 160 / 250

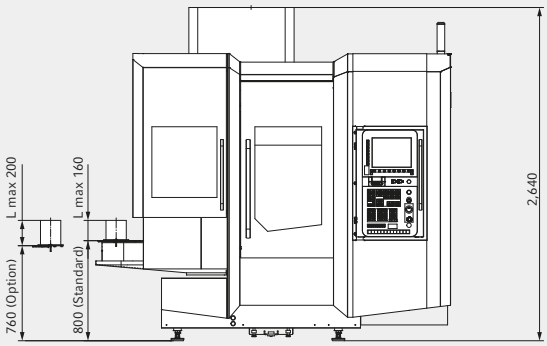
Working areas for the CTV 160 / 250 in our STEALTH design.



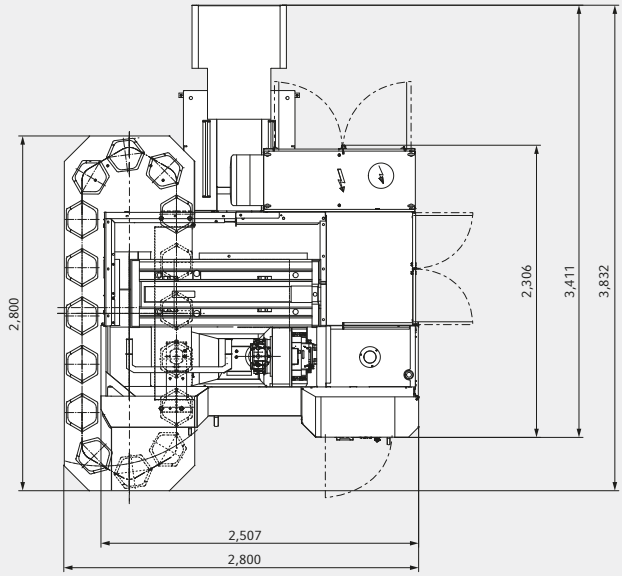
Floor plans

CTV 160 / 250 floor plan: Machine automation with a prismatic conveyor to the left and chip conveyor to the rear

Front view

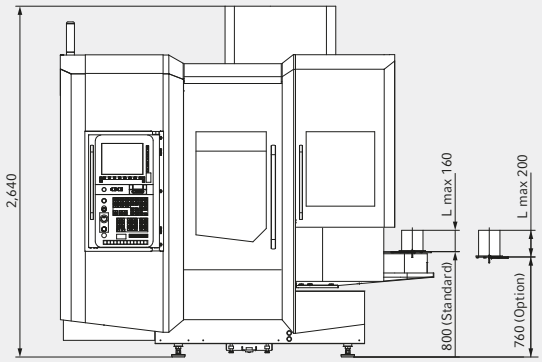


Top view

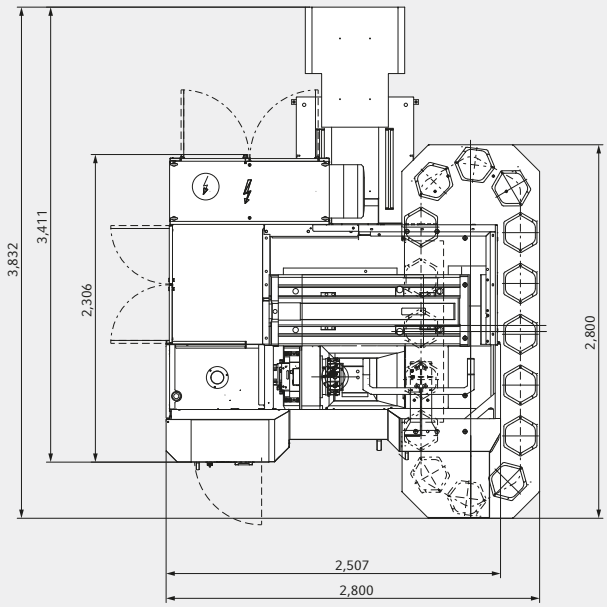


CTV 160 / 250 floor plan: Machine automation with a prismatic conveyor to the right and chip conveyor to the rear

Front view

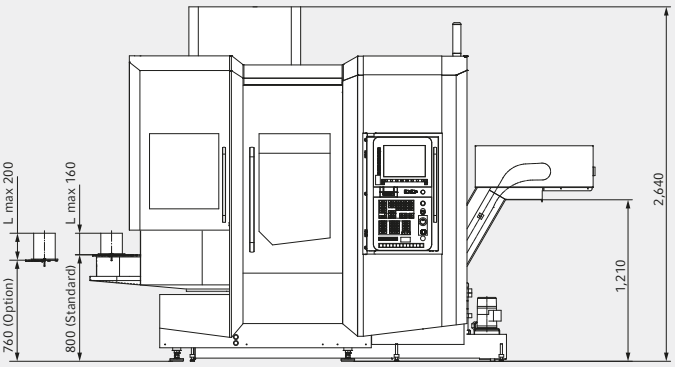


Top view

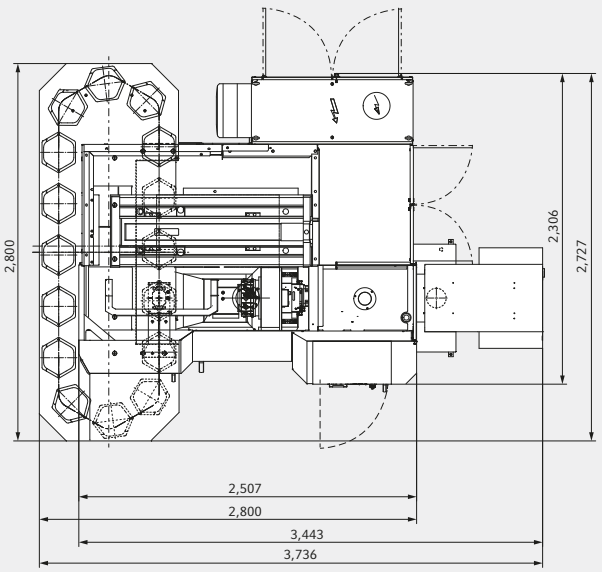


CTV 160 / 250 floor plan: Machine automation with a prismatic conveyor to the left and chip conveyor to the right

Front view

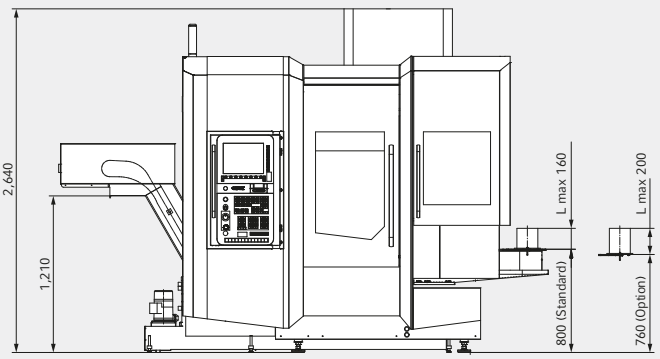


Top view

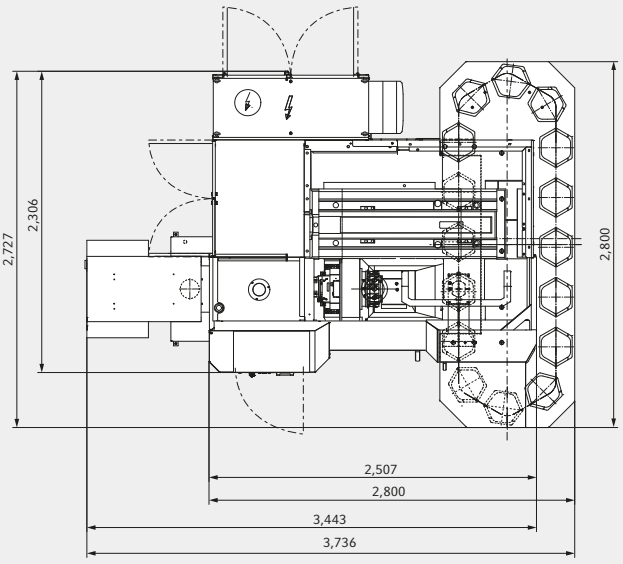


CTV 160 / 250 floor plan: Machine automation with a prismatic conveyor to the right and chip conveyor to the left

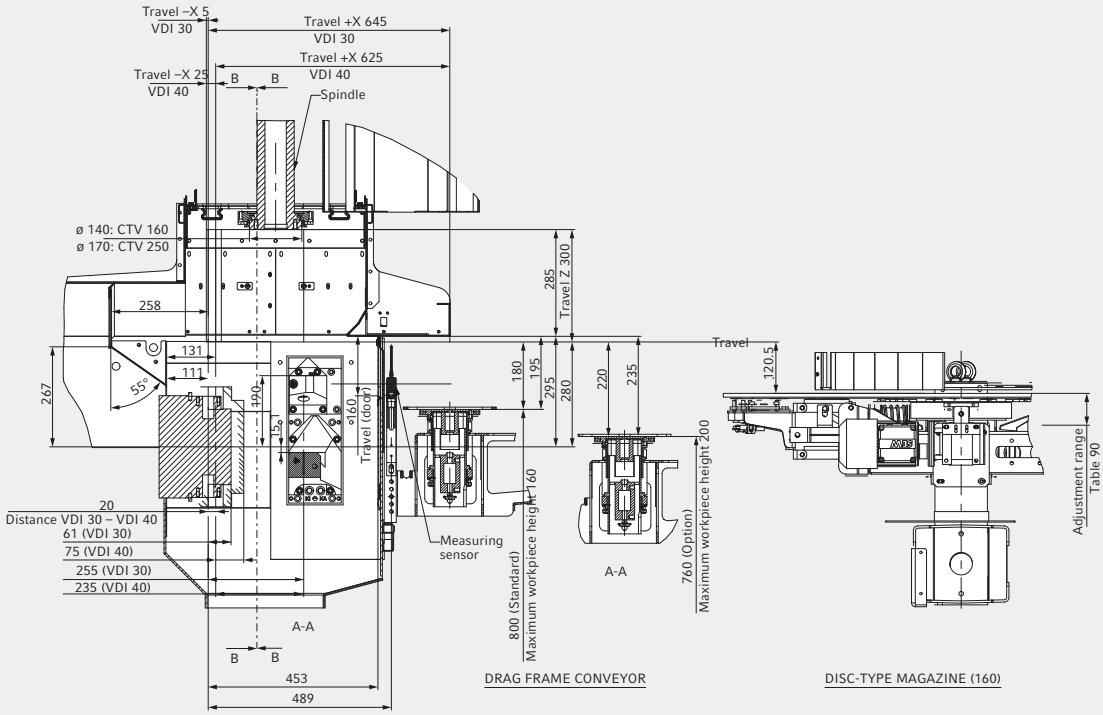
Front view

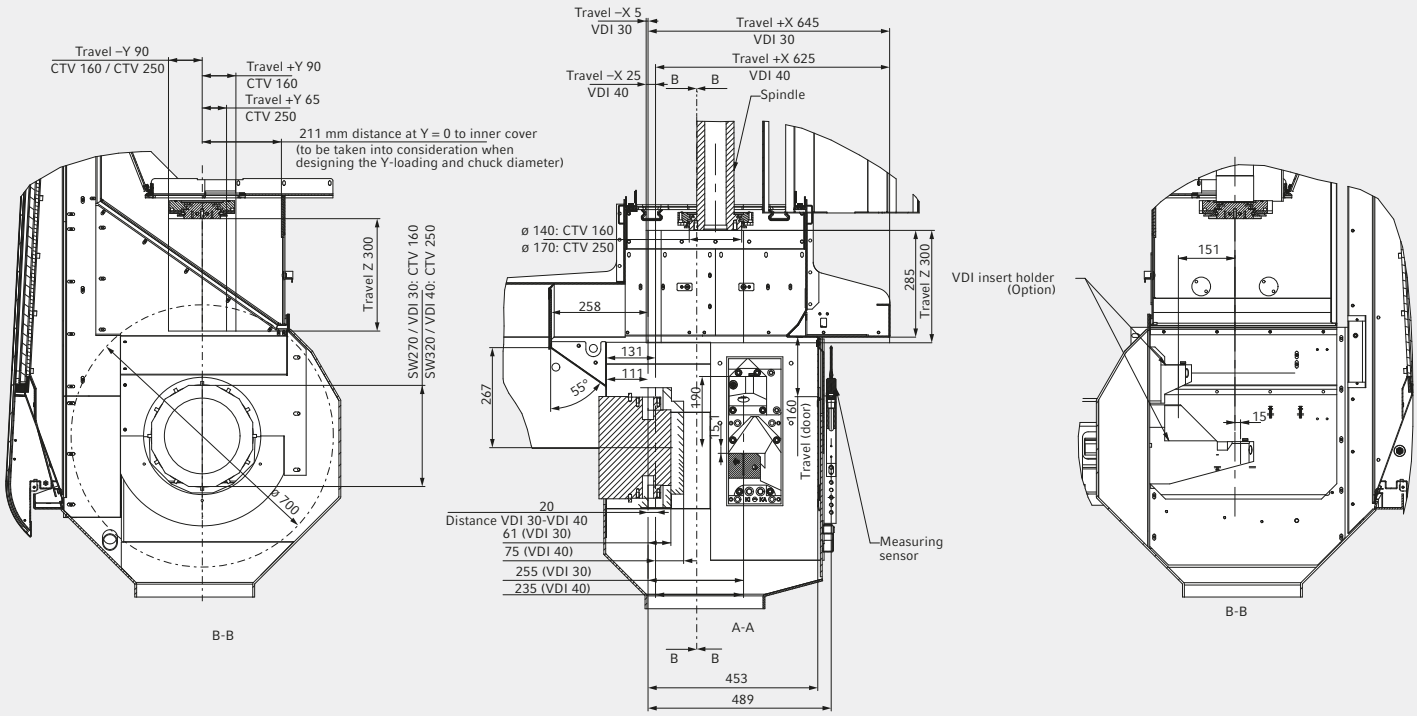


Top view



Working areas of the CTV 160 / 250 (*linear*)



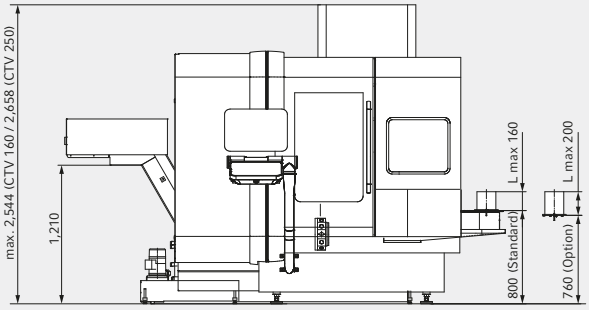


CTV 160 / 250 (*linear*)

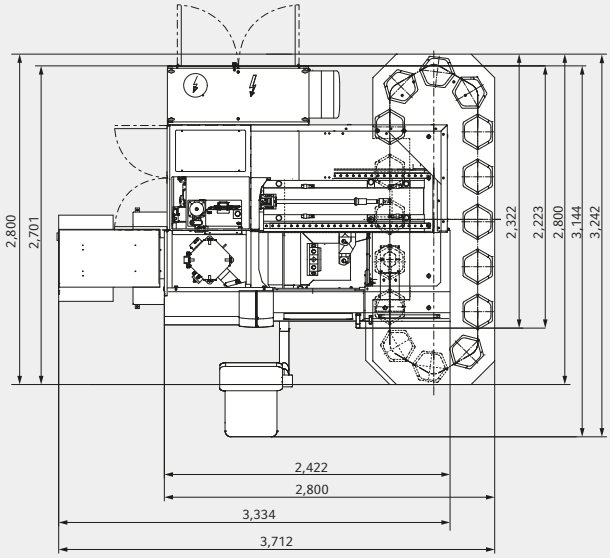
Floor plans

CTV 160 / 250 (*linear*) floor plan: Machine automation with a prismatic conveyor to the right and chip conveyor to the left (mirrored on machines with automation to the left)

Front view

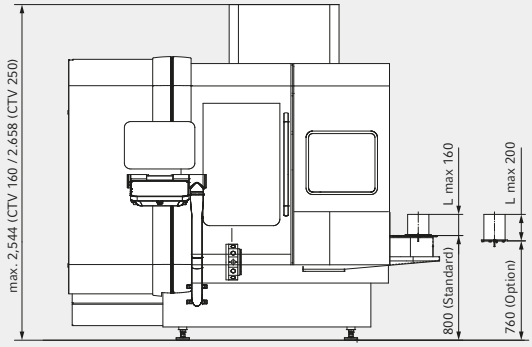


Top view

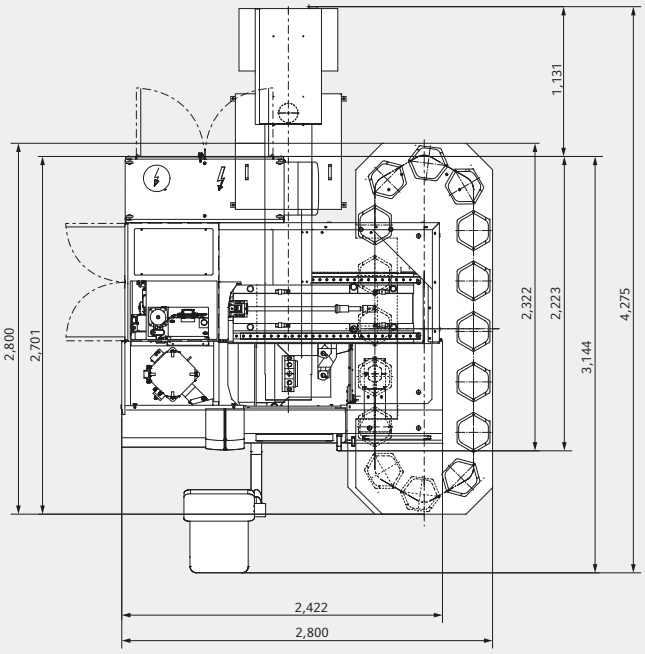


CTV 160 / 250 (*linear*) floor plan: Machine automation with a prismatic conveyor to the right and chip conveyor to the rear (mirrored on machines with automation to the left)

Front view

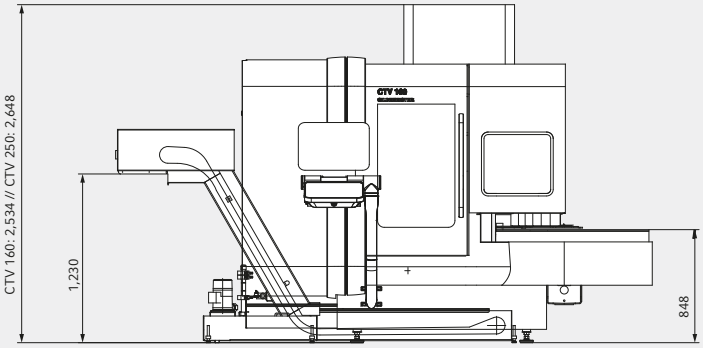


Top view

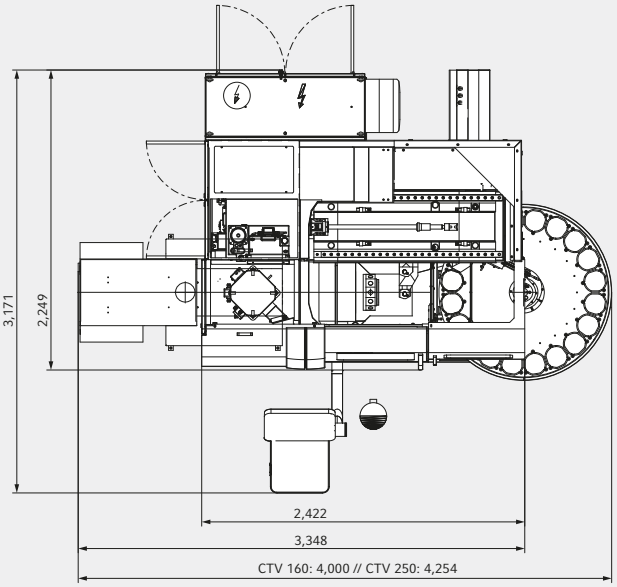


CTV 160 / 250 (*linear*) floor plan: Machine automation with a plate magazine to the right and chip conveyor to the left (mirrored on machines with automation to the left)

Front view

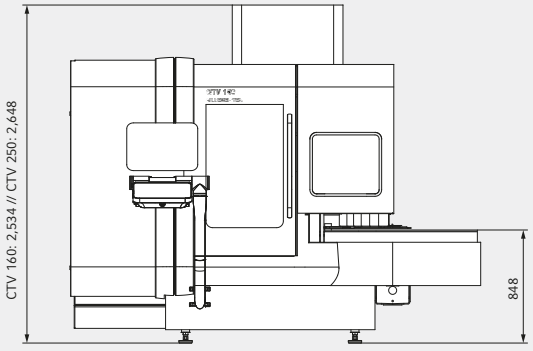


Top view

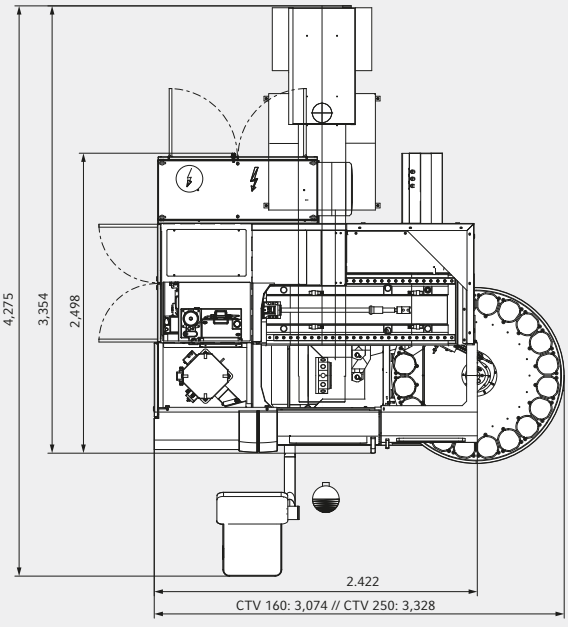


CTV 160 / 250 (*linear*) floor plan: Machine automation with a plate magazine to the right and chip conveyor to the rear (mirrored on machines with automation to the left)

Front view

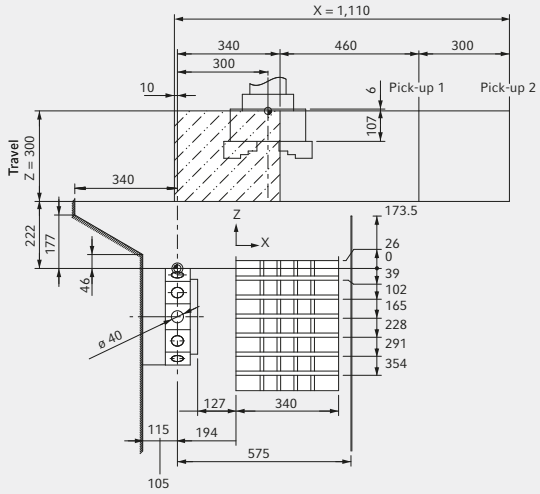


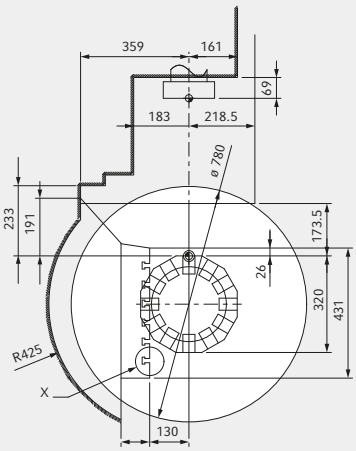
Top view

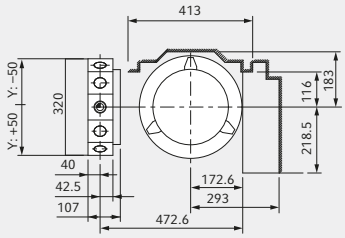


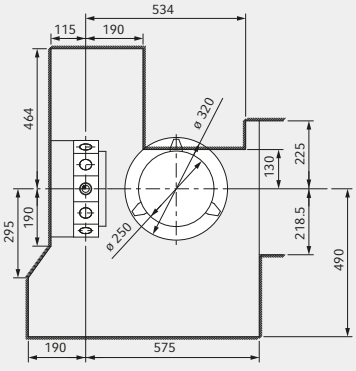
CTV 315 *linear*

Working areas of the CTV 315 *linear*





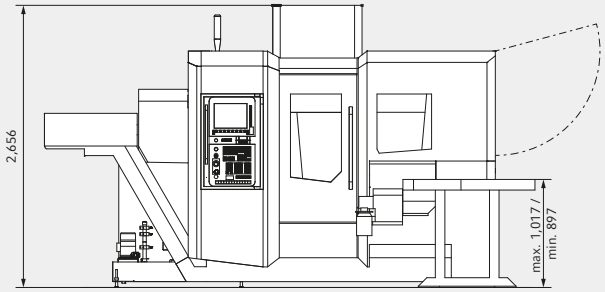




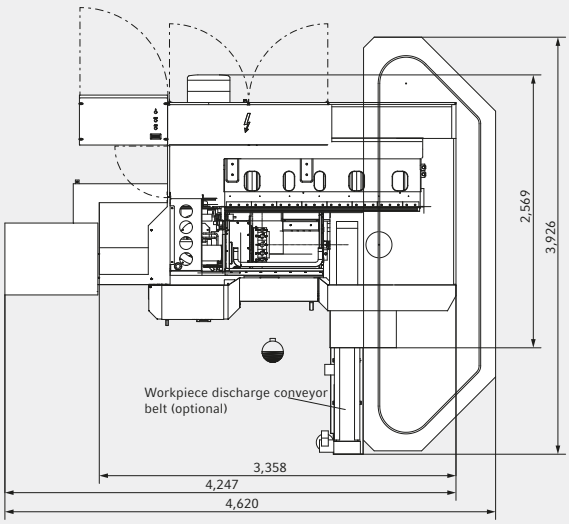
Floor plans

CTV 315 *linear* floor plan: Machine automation with a prismatic conveyor to the right and chip conveyor to the left

Front view

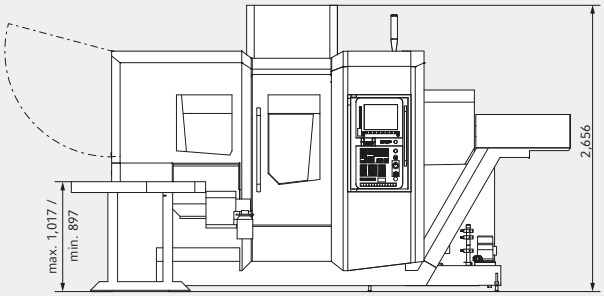


Top view

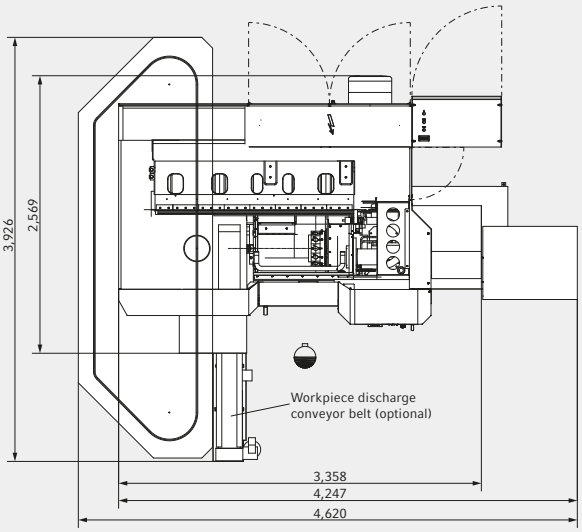


CTV 315 *linear* floor plan: Machine automation with a prismatic conveyor to the left and chip conveyor to the right

Front view

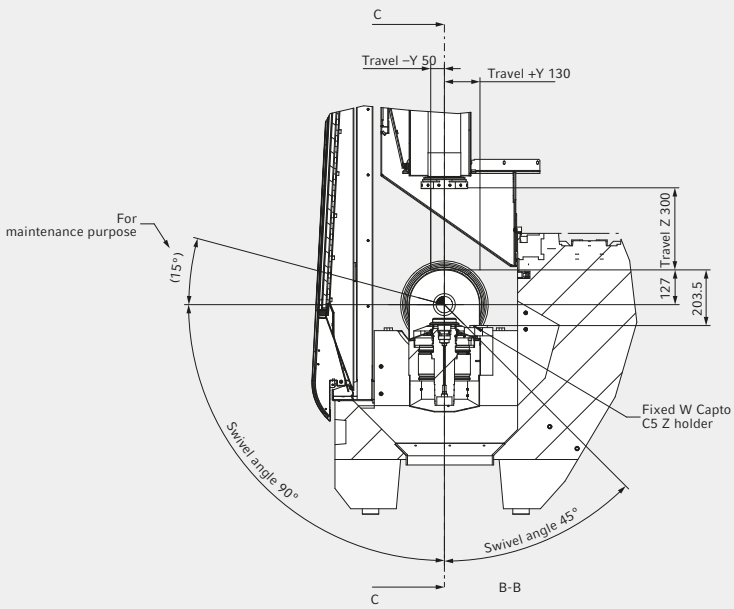


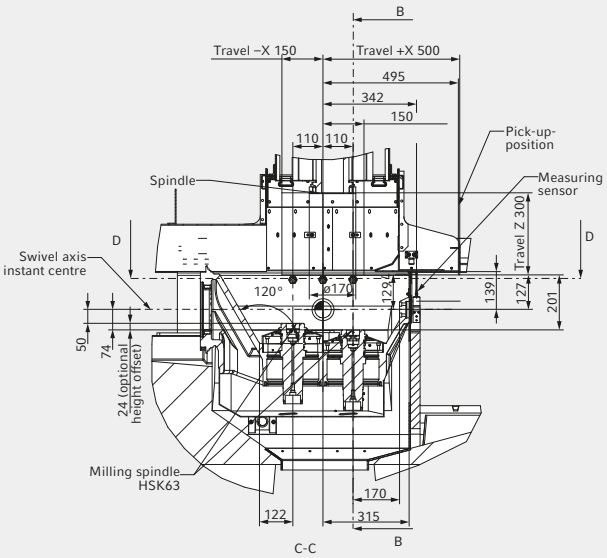
Top view

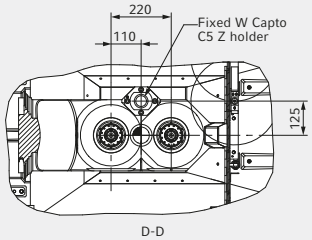


CTV 250 DF

Working areas* of the CTV 250 DF







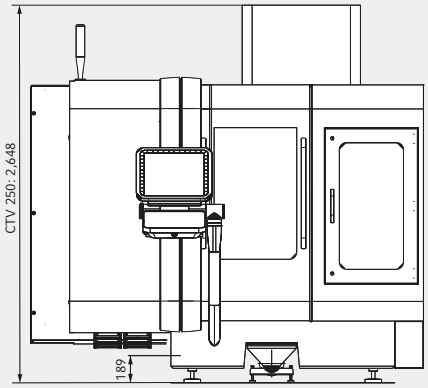
Machine zero point

* CTV 250 DF left-hand machine is reversed

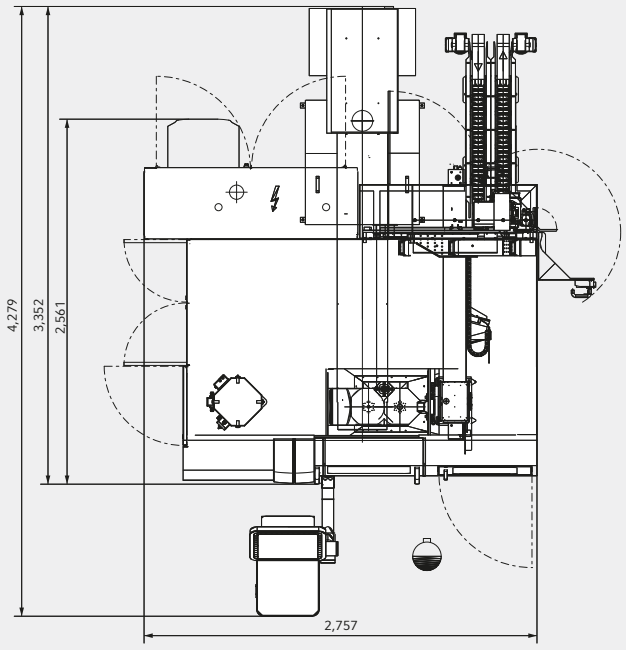
Floor plans

CTV 250 DF floor plan: Machine with automation to the right

Front view

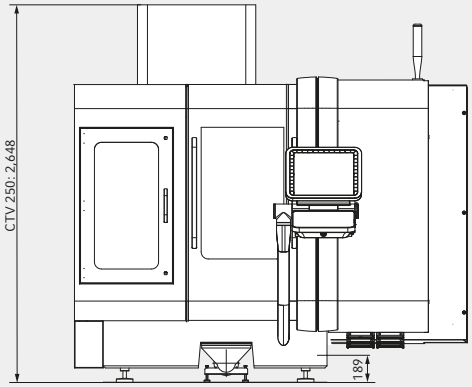


Top view

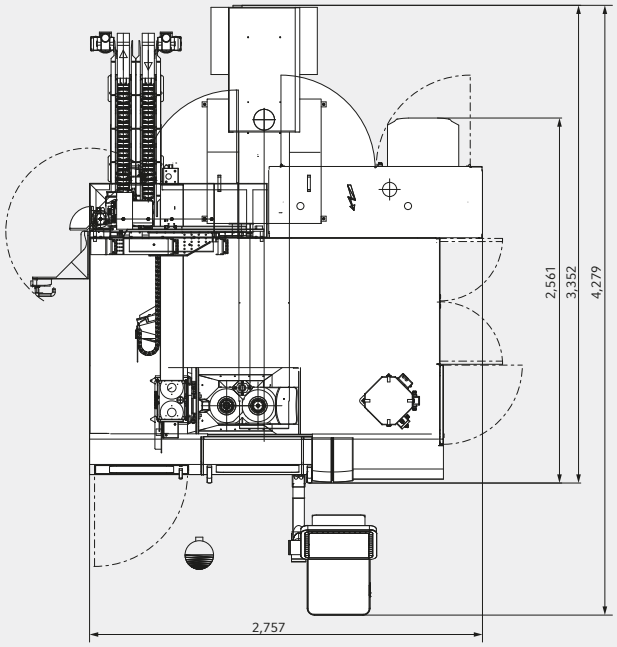


CTV 250 DF floor plan: Machine with automation to the left

Front view



Top view



CTV series

Technical data

		CTV 160 in our STEALTH design	CTV 250 in our STEALTH design
Working area			
Maximum chuck diameter	mm	220	260
Maximum swing	mm	240	320
Maximum workpiece diameter	mm	ø 160	ø 220
Maximum workpiece height	mm	160 (200)**	160 (200)**
Main drive			
Maximum speed	rpm	6,000	5,000
Power (40 / 100 % DC)	kW	21 / 16	32 / 25
Torque (40 / 100 % DC)	Nm	176 / 135	360 / 260
Spindle head (flat flange)		140 h5	170 h5
Front spindle bearing	mm	ø 100	ø 120
Rear spindle bearing	mm	ø 100	120
Tool holder			
12-station turret		12 × VDI 30	12 × VDI 40
Driven tools**	rpm	12 × 4,000	12 × 4,000
Torque / power (40 % DC)	Nm / kW	18 / 5.4	28 / 11.3
Turret indexing time	Sec.	0.25	0.25
Multi-function station** for up to 2 tools		VDI 30 // 140 × 390	VDI 40 // 140 × 390
Turn-mill swivelling tool carrier: A axis			
Maximum speed	rpm	–	–
Acceleration	rpm / s^2	–	–
Torque (40 / 100 % DC)	Nm	–	–
Turn-mill swivelling tool carrier: Milling spindle			
Number	#	–	–
Maximum speed	rpm	–	–
Performance (40 / 100 % DC)	kW	–	–
Torque (40 / 100 % DC)	Nm	–	–
Tool holder			
Turn-mill swivelling tool carrier: Turning tool			
Tool holder		–	–
Linear axes			
X / Y / Z axis travel	mm	725 / – / 300	725 / – / 300
X / Y / Z rapid traverses	m/min	60 / – / 40	60 / – / 40
X / Y / Z acceleration	m/s^2	4.5 / – / 4.5	4.5 / – / 5.5
X / Y / Z feed force	kN	4 / – / 6	5.5 / – / 8
X / Y / Z ball screws	mm	32 / – / 32	32 / – / 32
Roller guideways (size) X / Y / Z	mm	45 / – / 45	45 / – / 45
Accuracy			
$P_{smax.}$ (X / Y / Z)	µm	4 / – / 3	4 / – / 3
Automation			
Automation // example		• // Prismatic conveyor belt	• // Prismatic conveyor belt
Number of slots per size (ø 70 // ø 85 // ø 120 // ø 160 // ø 220 mm)	#	36 // 27 // 24 // 18 // –	40 // 30 // 24 // 20 // 16
Number of slots per size (ø 80 mm // ø 130 mm // ø 230 mm)	#	–	–
Loading time per workpiece	Sec.	5 (at 9 kg)	7 (at 11.5 kg)
Machine weight	kg	6,000	6,000
Controls			
SIEMENS 840D solutionline Operate		•	•
TRANSLINE		**	**
DMG MORI ERGO*line*® panel with 19" monitor		–	–
DMG MORI SLIM*line*® panel with 15" monitor		•	•

• Standard, – not available, * with linear drive, ** optional

CTV 160 (*linear*)	CTV 250 (*linear*)	CTV 315 *linear* in our STEALTH design	CTV 250 DF
220	260	315	260
240	320	340	320
ø 160	ø 220	ø 300	ø 220
160 (200)**	160 (200)**	210	230
6,000	5,000	5,000	5,000
21 / 16	32 / 25	32 / 25	32 / 25
176 / 135	360 / 260	360 / 280	360 / 260
140 h5	170 h5	170 h5	170 h5
ø 100	ø 120	ø 130	ø 120
ø 100	ø 120	ø 130	ø 120
12 × VDI 30	12 × VDI 40	12 × VDI 40	–
12 × 4,000	12 × 4,000	12 × 4,000	–
18 / 5.4	28 / 11.3	28 / 11.3	–
0.25	0.25	0.25	–
VDI 30 // 140 × 390	VDI 40 // 140 × 390	T-nut / 340 × 445	–
–	–	–	90
–	–	–	15
–	–	–	685 / 548
–	–	–	1 (2**)
–	–	–	6,000
–	–	–	14.5
–	–	–	46
			HSK-C63-F80
–	–	–	1 × CAPTO C5
650 / ±90 / 300	650 / +90, –65 / 300	1,100 / ±50 / 300	650 / +130, –50 / 300
60 / 40 / 40	60 / 40 / 40	100 / 10 / 45	60 / 40 / 40
6 / 4.5 / 5.5	6 / 5 / 5.5	8 / 8 / 6.5	4 / 5 / 5
2.8 / 3 / 6	2.8 / 5.5 / 8	3.5 / 6 / 6	5.5 / 5.5 / 8
32 (*linear**) / 32 / 32	32 (*linear**) / 32 / 32	*linear* / 40 / 40	40 / 32 / 32
45	45	45	45
4 / 3 / 3	4 / 3 / 3	4 / 3 / 3	4 / 3 / 3
** // Prismatic conveyor belt	** // Prismatic conveyor belt	** // Prismatic conveyor belt	** // Metal link conveyor
40 // 30 // 24 // 20 // –	40 // 30 // 24 // 20 // 16	–	dependent on components
–	–	52 // 26 // 13	dependent on components
5 (at 9 kg)	7 (at 11.5 kg)	8 (at 25 kg)	dependent on components
6,000	6,000	7,500	6,500
•	•	•	•
–	–	**	–
•	•	–	–
–	–	•	•

CTV series

Options

	CTV 160 in our STEALTH design	CTV 250 in our STEALTH design
Machine options		
Linear drive on the X axis	–	–
C axis and tool drive	○	○
Y axis	–	–
Measuring sensor for measuring workpieces including cover	○	○
Multi-function tool carrier	○	○
Aluminium package	○	○
Band filter system, 600 litres, 8 bar	○	○
Band filter system, 980 litres, 8 / 20 bar, coolant unit	○	○
Band filter system, 980 litres, 8 / 20 / 80 bar, coolant unit	○	○
Differential pressure clamping	○	○
Glass scale on the X axis	●	●
Glass scale on the Y axis	–	–
Glass scale on the Z axis	●	●
Chuck-changing device	○	○
Automation		
Prismatic conveyor belt to the right or left	●	●
Prismatic frame (ø 70 mm, ø 85 mm, ø 120 mm or ø 160 mm)	○	–
Prismatic frame (ø 70 mm, ø 85 mm, ø 120 mm, ø 160 mm or ø 220 mm)	–	○
Prismatic frame (ø 80 mm, ø 130 mm or ø 230 mm)	–	–
Rotary indexing table to the right or left	–	–
Additional options		
Operating hour meter	●	●
Spray pistol	○	○
Connection for operation data collection	○	○
Quad-colour signal lights	●	●
Tool breakage detection	○	○
Connection for an oil mist filter	○	○
Mechanical oil mist filter	○	○
Siemens 840 sl control system		
ShopTurn 3G	–	–
TRANSLINE	○	○

● Standard, ○ optional, – not available

	CTV 160 (*linear*)	CTV 250 (*linear*)	CTV 315 *linear* in our STEALTH design	CTV 250 DF
	○	○	●	–
	○	○	○	●
	●	●	○	●
	○	○	○	○
	○	○	○	–
	○	○	○	–
	○	○	○	–
	○	○	○	–
	○	○	○	–
	○	○	○	○
	●	●	●	●
	●	●	–	●
	●	●	○	●
	○	○	○	○
	○	○	○	–
	○	–	–	–
	–	○	–	–
	–	–	○	–
	○	○	–	–
	●	●	●	○
	○	○	○	○
	○	○	○	○
	●	●	●	○
	○	○	○	○
	○	○	○	○
	○	○	–	–
	○	○	○	–
	–	–	○	○

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MONTFORT WERBUNG

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