Ansökan om stöd

1.1 Allmänna uppgifter

Namn: Investering i maskinutrustning för automatiserad produktion
Ansökansid: 674563
Ärendeid: 20371119

Erbjudande: Stora investeringar kostnader max 25 miljoner kronor
Sista ansökningsdag: 2049-12-31
Ansvarig organisation: Region Gävleborg

1.2 Stödsökande

Namn: Martin Fredin Precision AB
NORRKÄMSTALEDEN 16
827 31 LJUSDAL
Sverige

Org.Nr: 556788-2575

Arbetsställe

Namn:
Postadress:
NORRKÄMSTALEDEN 16
827 31 LJUSDAL

Arb.ställenr.: 39151865
Besöksadress:
NORRKÄMSTALEDEN 16
827 31 LJUSDAL

1.3 Ansökansuppgifter

Rubrik på din ansökan
Investering i maskinutrustning för automatiserad produktion

Vilken bransch ska du investera inom?
25620 / Metallegoarbeten

Offentliggörande av stöd enligt EU:s statsstödsregler
Jag samtycker till att uppgifter om det stöd som företaget beviljas och grundläggande information om företaget offentliggörs.

Vad ska du investera i?
MF Precision har utökad orderingång inom produktion av försvarsmateriel volymerna är stora och behoven inom detta kommer att öka under många år framöver.
För vår del innebär det att vi har möjlighet att expandera verksamheten ytterligare med fler maskiner och fler anställda.
Kunderna ser en fördel i att använda en leverantör som alltid strävat att ha uppdaterad maskinpark med högautomationsgrad detta ger för kunden en säkerhet i sina leveranser.
Viktigt är också att Sverige kan förse sin egen industri med bearbetade komponenter då detta i vissa fall måste köpas från utlandet men som säkerhetsläget är förändrat så behövs komponenter försörjas lokalt inom landet.
Vi avser att utöka vår maskinpark med flertalet CNC maskiner med tillhörande robotanläggningar i närtid även utökning på kvalitetssidan med ytterligare mätmaskiner och programeringsutrustning för både CNC maskiner , robotar och mätmaskiner.
Företaget söker ständigt efter ny personal och ökar varje år antalet anställda och omsättning.

I vilken kommun ska investeringen göras? Valda kommuner
Ljusdal

Under vilken tidsperiod kommer investeringen att pågå?
2024-11-29

Till och med
2026-06-30

Kommer ni att anställa som en följd av investeringen?

Kvinnor
3

Män
3

Kommentar
Investeringar kommer att innebära sysselsättningsökning med 3-6 personer

Finns nödvändiga tillstånd för investeringen?
Ja

Kommentar

Är era underleverantörer hållbara?
Ja

Kommentar

Vilka är era konkurrenter och var finns de?
Småland och södra delen av landet och framför allt utomlands

Har ni eller ska ni omlokalisera verksamhet?
Nej

Kommentar

Beskriv kort företagets verksamhet
MF Precision bedriver tillverkning i Ljusdal sedan 2000 företaget startades av nuvarande ägare Martin Fredin företaget har växt till en omsättning på snart över 50 miljoner .
MF Precision skall förse svensk och europeisk industri med högkvalitativa svarvade och frästa produkter som tillverkas i modern utrustning med hög automationsgrad.

Har ert företag miljömål?
Ja

Kommentar
Vi bidrar till miljön genom att använda modernutrustning som är mer energieffektiv förbrukar mindre fossila smörjmedel och mindre förslitningsvaror som skärverktyg med mera.
Nya maskiner är "stadigare" och har mer prestanda som ger längre verktygslivslängd.
Vår tillverkning sker till största del idag med robothantering det ger vår personal en bättre arbetsmiljö slipper tunga och ej ergonomiska lyft.
Maskinerna kan då bearbeta 24/7 som ger ett väldigt bra kapacitetsutnyttjande / investerad krona .
I och med sanktioner mot till exempel ryssland har vi fått jobba igenom vår försörjningskedja för att säkerställa att material och verktyg samt deras leverantörer är långsiktigt hållbara och inte stöder den typer av länder.

Har ditt företags verksamhet bedrivits tidigare under ett annat organisationsnummer?
Nej

Kommentar

Vilka villkor har företaget för de anställda?
Vi har kollektivavtal

Kommentar

Kollektivavtal med Teknikföretagen - IF Metall

Har ert företag personalmål?
Ja

Kommentar
Vi främjer arbetsmiljön med automation för att attrahera kvinnor till yrket.
All personal har möjlighet att träna under arbetsveckan.
Möjlighet till hemarbete för vissa typer av arbetsuppgifter.
Vi ser till att personalen trivs med träning och personalresor till leverantörer.
Personalomsättning är mkt låg.

Varför bedriver ni verksamhet just här, på den här orten?
Bra samarbete med kommun och skola , trogen och kompetent personal .
Strategiskt placerat i elområde 2

Vilka av de globala målen i Agenda 2030 förväntas er verksamhet bidra till?
3. God hälsa och välbefinnande, 4. God utbildning för alla, 5. Jämställdhet, 7. Hållbar energi för alla, 8. Anständiga arbetsvillkor och ekonomisk tillväxt, 9. Hållbar industri, innovationer och infrastruktur, 10. Minskad ojämlikhet, 11. Hållbara städer och samhällen, 12. Hållbar konsumtion och produktion, 13. Bekämpa klimatförändringarna, 14. Hav och marina resurser, 15. Ekosystem och biologisk mångfald, 16. Fredliga och inkluderande samhällen, 17. Genomförande och partnerskap

Hur bidrar ni till god hälsa och välbefinnande?
Erbjuder träning under arbetstid möjlighet till anpassad arbetstid vid behov

Hur bidrar ni till god utbildning för alla?
Erbjuder utbildning inom yrket och möjlighet att växa inom företaget med nya tjänster.

Hur bidrar ni till ökad jämställdhet?
modern och automatiserad produktion där fysiska förutsättningar för yrket elimineras.

Hur bidrar ni hållbar till energi för alla?
Moderna maskiner som förbrukar mindre energi och är effektivare i användningen av fossila smörjmedel och förbrukningsverktyg och artiklar.

Hur bidrar ni till anständiga arbetsvillkor och ekonomisk tillväxt?
Jobbar med skyddsronder kontinuerligt , tillbuds rapportering och analys .
Driver för att få bort manuella moment från arbetsuppgifterna

Hur bidrar ni till hållbar industri, innovationer och infrastruktur?
Extremt hög automationsgrad = hög utnyttjande av installerad kapacitet.
Serviceavtal med våra leverantörer som säkerställer tillgänglighet och långlivslängd.

Hur bidrar ni till minskad ojämlikhet?
Anställer gärna kvinnor vi gör ingen skillnad på personer från olika etniciteter eller bakgrunder.
Vår personal bor och verkar lokalt.

Hur bidrar ni till hållbara städer och samhällen?
Möjlighet till anpassad arbetstid för att främja samåkning .
Möjlighet till visst arbete från hemmet för vissa arbetsuppgifter .

Hur bidrar ni till hållbar konsumtion och produktion?
Restmaterial från produktion skickas för recycling eller för återvinning

Hur bidrar ni till att bekämpa klimatförändringarna?
Investering i eltransportbil , effektiva maskiner som förbrukar mindre energi och insatsvaror.
Att jobba med om möjligt lokala leverantörer för att minska transporter

Hur bidrar ni till målet hav och marina resurser?
Minskning av fossila smörjmedel

Hur bidrar ni till fungerande ekosystem och biologisk mångfald?

90 % av materialet i produkter som tillverkas kommer från återvunnet recyclat material

Hur bidrar ni till fredliga och inkluderande samhällen?
Vi är väldigt selektiva i val av kunder och leverantörer .

Hur bidrar ni till genomförande och partnerskap?
Samarbetsavtal med nyckelleverantörer vi jobbar alltid för långsiktiga relationer med både kunder och leverantörer

Har företaget något utestående återbetalningskrav på tidigare beviljat stöd?
Nej

Kommentar

Varför behövs finansiellt stöd för denna investering?
Med stöd kan investeringen göras rejält större som ger en trygg och ökande arbetsgivare på orten.
Möjligheten att ta på sig mer jobb till vår ort ökar då produktionskapaciteten blir större.
Utan stöd blir tröskeln större för att göra en så stor investering.

Ska du köpa från närstående företag eller säljare med anknytning till företaget?
Nej

Kommentar

Ingår köp av begagnad utrustning?
Ja

Kommentar
Eventuellt kan en mätmaskin köpas begagnad om den finns tillgänglig när det blir aktuellt .

Ingår kostnader för finansiell leasing?
Nej

Kommentar
Avbetalningsköp

Ska ni investera i en byggnad ni hyr?
Nej

Kommentar

Hur ser företagets ägarförhållanden ut?

Ägare	Organisationsnummer/Personnummer	Ägarandel
Martin Fredin	197405257630	100

1.4 Kontaktpersoner

Namn:	Martin Fredin
Organisation:	
Telefonnummer:	070-533 56 19
Mobiltelefonnummer:	070-533 56 19
E-postadress:	martin@mfprecision.com
Roll:	VD

1.5 Budget

Kostnader

Kostnadsslag	**Total**
Maskiner och inventarier: Wenzel mätmaskin LH 87	1 000 000
Maskiner och inventarier: DMG NZX 2000	5 200 000
Maskiner och inventarier: Mjukvara GIbbs	150 000
Maskiner och inventarier: Robotcell Fanuc / Marab	1 490 000
Maskiner och inventarier: DMG CLX 450 TC	4 600 000
Summa kostnader	**12 440 000**

Finansiering

Finansiär	Total
Banklån: Avbetalning Wasakredit el motsvarande	11 440 000
Egna medel: Kontantinsats	1 000 000
Summa medfinansiering	**12 440 000**

1.6 Dokument

Filnamn:	Offertnr. 52408954501, NZX2000, MF Precision AB.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02
Filnamn:	Offert-2012561.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02
Filnamn:	24005013 Beg. LH87 (LH0224) MF Precision.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02
Filnamn:	Offertnr. 52408894201_CTX beta 800 TC_MF Precision AB.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02
Filnamn:	Offertnr. 52408862602_CLX 450 TC_10000002602_Stock_MF Precision AB.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02
Filnamn:	Originalansökan
Beskrivning:	Inkommen originalansökan - Maskinläsbart format
Uppladdningsdatum:	2024-12-02
Filnamn:	Signeringsinformation
Beskrivning:	Ansökan
Uppladdningsdatum:	2024-12-02
Filnamn:	Offert M20iD-35 DMG 241108.pdf
Beskrivning:	
Uppladdningsdatum:	2024-12-02

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MF Precision AB
Martin Fredin
Norrtjämstaleden 16
827 31 Ljusdal

Västra Frölunda, 06/11/2024

CTX beta 800 TC – serial number: 10000000927
Offertnr. 52408894201
Projektnr. 1175510 / OP1535193

Enligt överenskommelse med vår säljare Emil Nilsson har vi härmed nöjet att offerera ovanstående maskin i utförande enligt nedan specifikation.

Om du har några frågor eller önskar ytterligare information är du alltid välkommen att kontakta oss!
Du når vår säljrepresentant via kontaktuppgifterna nedan och vårt övriga säljteam på
tel: 031-348 98 00, menyval 3.

Med vänlig hälsning,

Anders af Trampe
Säljsupport

DMG MORI Sweden AB

Kontaktuppgifter:
Emil Nilsson
Säljare
+46 768 52 18 78
emil.nilsson@dmgmori.com

Quotation

for

MF Precision AB

CTX beta 800 TC
Serial Number: 10000000927

Highlights

- TC version: counter spindle (optional) and turning-milling spindle for 750 mm turning length
- Large dimension of components (guide way size 45) for high stability and durability
- Powerful compact turning-milling spindle with torque motor for B-axis in standard
- Linear guides in X-, Y- and Z-axis for high machining dynamics
- Disk magazine with 24 tools
- Large, transparent working area with minimum required space
- ERGOline control with 21,5“-TFT wide screen with CELOS for facilitate machine operation

DMG MORI
CTX beta 800 TC

Machine and Options

Basic machine

Basic machine CTX beta 800 TC turning length 800 mm (31.4 in) - Main spindle as integrated spindle motor, ISM 76, drive power 25/32 KW (33.5/42.9 hp) (S1-100%d.c. / S3-40%d.c.), torque 280/360 Nm (206.5/265.5 lb*ft) (S1-100%d.c. / S3-40%d.c.), speed range 0-5000 rpm - Partial hollow clamping device (hydr.) internal diameter of draw tube Ø 67 mm (2.63 in) - C-axis and spindle brake (hydr.) - Upper compound slide with turning-/ milling spindle with max. 12000 rpm, 19/22,5 kW (25.4/30.1 hp) (S1-100%d.c. / S3-40%d.c.-2min), 85/120 Nm (62.6/88.5 lb*ft) (S1-100%d.c. / S3-40%d.c.-2min), with hydraulic locking, reception HSK-A 63, DIN 69893 - Y-axis ±100 mm (±3.9 in) - B-axis ±110º interpolating, torque motor - 24-fold disc magazine - Tailstock hydraulically operated, with life centre MT5 - Absolute, direct measuring systems in X-, Y- and Z-axis - Cooling pump 6 bar (72.51 psi); 20 l/min (5.28 gal/min), cooling filtration grade 50 µm - Cooling system for spindle motors, motor console, turning-milling spindle, B-axis torque motor - CELOS® with Siemens 840D sl	B-A72701*	1

Control

CELOS with Siemens 840D sl Operate includes 21,5“ ERGOline® Control with Multi-Touch-Screen	B-A70632*	1

* further description see attachment

Spindle

Counter spindle as integrated spindle motor ISM 52 (instead of tailstock) - Sync motor - Drive power (100%/40% d.c.) 12.5/14.5 KW (16.76/19.44 hp) - Torque (100%/40% d.c.) 170/200 Nm 125.37/147.5 lb*ft - Speed range 0-6000 rpm - Partial hollow clamping (hydraulic) - Draw tube ID 52 mm (2.04 inch) - C axis and spindle brake (hydraulic) - Basic slide (Z3), AC servo drive with ball screw, absolute encoder - Coolant through the spindle and pneumatic workpiece ejecting device (only in connection with bar package) - Chuck rinsing device, outside - Chuck diameter max. Ø 210 mm (8.27 in)	B-E72603	1

Option for spindle

Hydraulic hollow clamping device Ø67 mm for machining bar material - Pullforce at P max 45 bar: 64 kN - Max. allowed speed: 6000 rpm Note: Not suitable for clamping devices with Bar passage larger than Ø75 mm	B-B7022	1
Dynamic two-pressure clamping at the control for the main spindle With the dynamic two-pressure clamping function, the clamping pressure in the dynamic movement can be regulated down to 5 bar. The force or pressure adjustment is set via the control, so that an adjustment via manually operated valves is not necessary.	B-B0036*	1

* further description see attachment

Dynamic two-pressure clamping at the control for the counter spindle With the dynamic two-pressure clamping function, the clamping pressure in the dynamic movement can be regulated down to 5 bar. The force or pressure adjustment is set via the control, so that an adjustment via manually operated valves is not necessary.	B-B0036G*	1

Chucks for main spindle

3-jaw power clamping chuck with through-hole and fine serration Type BBD 210-66, SMW, with one set of base and hard top jaws, incl. connecting elements - Max. speed 5000 rpm - Max. clamping force 108 kN - Max. actuating force 38 kN - Serration 1/16" x 90°	B-S0634*	1

Chucks for counter spindle

3-jaw power clamping chuck with through-hole and fine serration Type BBD 210-66, SMW, with one set of base and hard top jaws, incl. connecting elements - Max. speed 5000 rpm - Max. clamping force 108 kN - Max. actuating force 38 kN - Serration 1/16" x 90°	B-S0634G*	1

Tool spindle

Turn/ mill spindle and magazine with tool mounting Capto C6 instead of HSK-A 63	B-H7020	1
Turning-/milling spindle compactMASTER 1 with increased spindle speed, instead of standard - Max. spindle speed 20.000 rpm - Power 19/22.5 kW (25.5/30.2 hp) (S1-100%d.c. / S3-40%d.c.-2min) - Torque 85/120 Nm (64.2/88.5 lbxft) (S1-100%d.c. / S3-40%d.c.-2min)	B-C7234*	1

* further description see attachment

Tailstock

Tailstock function for the counter spindle incl. foot switch. Mechatronic control of the supporting force, selectable per program Thrust force: CTX 2500, CTX beta, CTX beta TC, CLX TC: 2.5 - 6 kN CTX beta 2000 TC: 2,5 - 17 kN	B-D7020	1

Tool magazine

Tool magazine, 80-fold chain magazine instead of 24-fold disc magazine, tool reception Capto C6 -only with Siemens control-surcharge	B-H7028	1

Coolant supply / Chip removal

Hinged type chip conveyor incl. coolant tank	B-F7002	1
Compact coolant system, consisting of: - Coolant tank, 980 litre/258.8 gal - 8 bar/80 litre/min and 80 bar/20 litre/min (116.psi/20.8 gal/min and 1160 psi/5.2 gal/min) (theoretical pump performance) with frequency-controlled pumps programmable via M- and H-functions coolant supply tool carrier - The pressure of the 80 bar pump can be modified between 20 - 80 bar - Band filtration unit, grade of filtration 40 µm/1,57 µ in - Coolant chill, 4,5 kW (6.03 hp) - Level controlled pump	B-F0152	1
Preparation for oil mist extractor incl. electrical interface Connection diameter: Ø 198 mm (7.79 in)	B-H0010	1
Chuck rinsing device for main spindle, outside	B-B0011	1
Chuck rinsing device for counter spindle, outside	B-B0011G	1
Coolant supply through the counter spindle	B-B0041G	1

* further description see attachment

Coolant spray gun	B-Z0400	1
Window cleaning of the security window of the working area door by compressed air (Remark: The employment of coolant can limit the view on the workpiece at machining)	B-Z0262	1

Measuring / Monitoring

Sensor package Industry 4.0 for holistic condition monitoring with visualization in Condition Analyser App and analysis of the machine and the machining processes (Attention: The DMG Mori Condition Analyser App is not part of this option) Inclusive - Condition monitoring consisting of: Energy and air consumption measurement Hydraulic oil temperature sensor Pressure sensor on the central hydraulic unit Volume flow and pressure measurement on all coolant pumps - Accuracy Control Length measurement at milling spindle (Temperature control) - Machine Protection (MPC) - Process Monitoring via Easy Tool Monitor 2.0 (Attention: Easy Tool Monitor 2.0 is only available in connection from Siemens Operate 4.7)	B-H72501*	1

Automation

Automatic door, electrical	B-H7050	1

* further description see attachment

Electrical interface standard Profibus for Robo2Go Incl. - Additional compressed air supply - Additional Ethernet interface - Power supply of the robot by the machine - User interface integrated into CELOS* (Powertool with CELOS 4 as App) The Powertool / App will be installed with integration of the Robo2Go to the machine. Note: - Special operating mode 3 / operating mode grinding is not feasible in connection with the electrical interface - *Except CLX 450 TC	B-L7208	1

Measure

Measure mm	B-Z0110	1

Options for Siemens control with CELOS / Siemens

Excentric turning and milling operation (only with Siemens control and Y-axis)	B-A0326*	1
5-axis simultaneous machining (only with Siemens control)	B-A0329*	1
Turning-recessing cycle Manufacture of simple sealing Surfaces and grooves using turn/mill centers	B-A0330	1
Complete machining of shaft components without process interruptions on turning machines with counter spindle TC: Cycle for automatic exchange of a spindle tip into the counter spindle and back into the tool magazine Turret: Cycle for automatic exchange of a spindle tip into the counter spindle and back into the turret Note: - The spindle tip is not included in the delivery content - Additionally required "Tailstock function for counter spindle"	B-A0333	1

* further description see attachment

Technology cycle for the application of an alternating speed for vibration sensitive set-ups (Only in conjunction with Siemens control)	B-A0335*	1
Polygon Turning for machining of elliptic and polygonal shapes on end faces	B-A0337	1
Polygon/Oval Milling technology cycle for programming oval (P2G) and polygonal (P3G and P4H) geometries on the control. Attention: Only in connection with 5-axis simultaneous machining	B-A0358*	1
With the program state control of the part state is retained on the control and / or influenced. Particularly suitable for multi-channel machines.	B-A0342*	1
Technology cycle for safe decoupling of tool and component in the event of an emergency stop actuation triggered by the user. Once purchased, the option is exercised in the purchased cycles gearSKIVING 2.0, Multithreading 2.0, crownHOBBING and gearHoning unlocked.	B-A0378*	1
Order of the tools in the chain magazine according to the respective call in editing program. Time-optimized sort in chain magazine by using the shuttle instead of the spindle. No relocation of multitools and disc magazine.	B-A0345	1
Multi-thread cycle 2.0 Cycle to create position orientated threads with free contours, pitches and free number of threads, e.g. for big transmission or special threads. Targeted overlapping of threads with cross-holes, e.g. redirection systems with ball screw nuts are possible. (Available with Siemens Operate starting with version 4.5)	B-A0374	1

* further description see attachment

Technology cycle with dialog-guided programming for the production of any keyways according to DIN6885 or driving grooves according to DIN138 with standard tools. This option contains the technology cycle with the corresponding input mask.	B-A0349*	1
Technology cycle to parting off the workpiece by the Y-axis to achieve significantly higher feed, more process stability and less material loss. This option contains the technology cycle with the corresponding input mask to simplify the operation and to minimize the operator errors. Fully usable with the parting-cycle "Cycle 95" in DIN-ISO and ShopTurn.	B-A0351	1
Application Tuning Cycle ATC - Demand-oriented adjustment of axis dynamics for machining tasks: accuracy (contour accuracy) / surface (smoothing) / speed (high dynamics) - Beneficial for turning-milling operations (2+1 / 3+2 / 5-axis simultaneous), Siemens Operate 4.7	B-A0360	1
Reduced price, selection of ATC and 5-axis simultaneous machining	B-A0360M	1
Technology cycle for calculating the optimum clamping force with the functions: - Minimum clamping force – determination of the minimum clamping force according to VDI 3106 - Clamping of thin-walled components – determination of the maximum clamping force	B-A0352*	1

* further description see attachment

Technology cycle for calculating and monitoring the maximum permissible rotational speed limit of the rotating tool used in the milling spindle. This rotational limit can be Automatically calculated in the cycle for each tool to be balanced, depending on the weight and the residual unbalance from the balancing machine. The tools are transferred from the tool table to the monitoring and calculation list in a user-friendly manner. When the maximum allowed speed limit is exceeded, an event is generated in a CSV file with tool name and date. A corresponding note appears each time the speed limit is exceeded and after 100 detected events a popup window appears which must be acknowledged.	B-A0354	1
Technology cycle for automatic determination and adjustment of the drive parameters of main and counter counter spindle to optimize the control and positioning behavior as a depending on the component and chuck weight. An automatic reparameterization of the drive parameters of the main and counter spindles is possible in single-axis operation and in mechanical coupled operation. The drive parameters can be set in the NC program in relation to the workpiece and can be read in again later.	B-A03621	1
Technology cycle for easy use of FreeTurn tools from CERATIZIT. It enables the setting of any angle of the available cutting edges and contributes to the simple integration of the tools in the NC program. Pressing or pulling cuts are freely adjustable. The cycle takes over necessary changes to component turning and tool movement directions. Significant reduction of the necessary tools and the associated tool change times for external longitudinal and face turning are possible.	B-A0366	1

Documentation

Technical documentation	B-A0095	1

* further description see attachment

Special constructions

"Kurzbeschreibung zur Ausführung des Messe- / Showroomdesign an unseren Maschinen. Als Basis dient der Leitfaden „Exhibition Design Guide V 3.1 sowie die folgende Beschreibung: -New Lightline, (außer NEF und CTV) -proTime (B-Z0206), auß e r NEF -Schaltschrankkühlaggregat (falls vorhanden) in Titangrau lackieren -Augenschrauben entfernen -ggfls. Lüfterabdeckung anbringen -feste Verrohrung bei Einsatz eines ölnebelabscheiders -Türgriffe in Premium, Stealth und Common Sec ondar y -Handbedienfeld in aktuellem DMG Mori Design -Beschilderung in Untergrundfarbe -E-Schild (klein) auf Schaltschranktür -DMG Mori Meldeleuchte 4-fach (B-Z0205) -Fremdwerbung entfernen -versilberte Schrauben auf hellen Flächen_| _-schwarze Schrauben auf dunklen Flächen -Lackierung vor dem Versand prüfen ggfls. ausbessern -Steuerung / SW neuester Stand -Robo2Go in „calcit weiss“"	SK001	1
Werkstückmesstaster RMP60, Renishaw - Abmessungen Grundkörper (exkl. Tastereinsatz): L= 76 mm, Ø= 63 mm - Einwechselbar in die Dreh-/Fräs(„Spindel - Schaltmesskopf-Aufnahme mit Taster-Einsatz und Antenne zur Funk-übertragung - Inkl. Messzyklenpaket Inspection Plus Hinweise: - Kundenspezifische Messzyklen sind nicht enthalten - Bei der Bestellung dieser Option erhalten Sie zusätzlich die Option Renishaw Powerprobe Reporter App kostenlos dazu.	SK002	1

* further description see attachment

3D quickSET Erweiterungspaket für n-te Maschine - Zur Überprüfung und Korrektur der kinematischen Genauigkeit sowohl bei der konventionellen Drehbearbeitung als auch bei der 5-Achs Simultanbearbeitung - Setzt die 5-Achs Simultanbearbeitung voraus Nur in Verbindung mit Messtaster und vorhandenem Messmittelsatz Hinweis: - Diese Option enthält nur die Lizenz	SK004	1
SIEMENS Top Surface für SINUMERIK 840D sl Erweiterung des CYCLE 832 um die Funktionalität Top Surface für beste Oberflächengüten weitestgehend unabhängig vom CAM-Input. Dieses ist ein neuer “Kompressor“ namens COMPSURF und eine zusätzliche Option zum SINUMERIK MDynamics Paket • Top Surface ist nur in Kombination mit Advanced Surface nutzbar • Ist Top Surface aktiviert, so lässt sich auch Advanced Surface wahlweise nutzen • Eine Verringerung der Bearbeitungszeit mit Top Surface ist in Einzelfällen mit weiteren Anpassungen möglich, aber für gewöhnlich ähnlich wie mit Advanced Surface • Mit Top Surface wird im CYCLE 832 die neue Funktionalität “Glättung“ mit Auswahlmöglichkeit "ja/nein" verfügbar. Ohne Glättung werden Gravuren und Geometrien mit einer Tiefe <= 0.005 mm = 5µm auf der Werkstückoberfläche besser und klarer sichtbar Achtung: - Top Surface basiert auf der Option Advanced Surface und benötigt für die volle Leistungsfähigkeit die 3D-Werkzeugkorrektur und Mehrachseninterpolation. (5A-Paket)	SK005	1

* further description see attachment

proTIME Display zur Visualisierung der Restlaufzeit, Reststückzahl und des Maschinenstatus (B-Z0206) Bitte beachten: Es ist keine Aktivität erforderlich. Die Pos. war als Baustein bereits ausgewählt und in der Maschine verbaut.	SK006	1
Tool package from Haimer corresponding to a value of 10.000 EUR according to gross price list. To be called off within six months from delivery of machine.	SK010	1

Digitalization Products

DMG MORI Connectivity

Digital Manufacturing Package **(1) IoT*connector*** Allows the use of the Online services from DMG MORI **(2) Machine Data Connector (MDC)** Standardized machine data interface Protocols: OPCUA, MTConnect, MQTT **(3) NETservice** Qualified support through internet-based remote diagnosis	D-CO200*	1

DMG MORI Monitoring

Messenger V4 Clear presentation of the machine live status.	D-MO002*	1

DMG MORI Maintenance

Service Agent Overview of all maintenance work on the machine	D-MT001*	1

Services

Packing / Transport / Installation

Packing cost for road transport, means of transport and transport locks	B-Y0005	1

* further description see attachment

Special constructions services

B-A0352M - Price reduction cClamp	SK007	1
Retrofit option	SK011	1
Documents and signs in Swedish Please note: this retrofit option will be delivered and installed separately.		

Sales company services

Installation of all quoted equipment at customer's site Incl. travel and accommodation costs	330IT	1
Training 3,5 days at, customer's site Incl. travel and accommodation costs Day 1 - 08:30 to 15:15 or 12:45 to 15:15 Day 2 - 08:30 to 15:15 Day 3 - 08:30 to 15:15 Day 4 - 08:30 to 12:00 or 08:30 to 15:15 Max. 4 participants	330L06	1
Transportation of machine and accessories, CIP customer's site (INCOTERMS 2010) Excl. unloading and transport to installation point	330TD	1

Special price **397.800,00 EUR**

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* further description see attachment

Quotation note

FINANCING DIRECTLY FROM DMG MORI!

DMG MORI Finance supports DMG MORI customers with tailored and fair financing solutions. Benefit from an excellent machine tool know-how combined with best conditions.

Get in touch with your Key Account Manager at DMG MORI Finance and ask for a personalized financing quote. We are looking forward hearing from you.

Contact:

Mr. Nicolas Straub
Tel: +49 (0) 151 / 402 47 572
Email: nicolas.straub@dmgmori-finance.com

* further description see attachment

Attachment

Technical Description

B-A72701

TECHNICAL DESCRIPTION OF CTX BETA 800 TC Update rights reserved

Machine bed
The rigid 4-guide ways cast-iron machine bed with screwed-on linear slide ways ensures unrestricted chip disposal.

Headstock left, stationary
Headstock I is designed as spindle motor with integrated C axis and hydraulically operated spindle break. The spindle motor is water-cooled and stands out for high dynamic, high torque, high thermal stability and a low noise level.

Clamping attachment, L.H. spindle
Hydraulic clamping device, single action, solid clamping cylinder with safety device and stroke control, traction tube (partially hollow dia. 67 mm x 700 mm (2.63 inch x 27.55 inch) deep, pedal switch and electric/hydraulic control, fully assembled.

Upper slide
4-axes slide - X1-, Z1-, Y1- and B-axis - with friction-free, preloaded linear guiding elements and a round axis (B-axis).

Turning-, milling spindle
The turning- and milling spindle is designed as a direct drive, additionally equipped with hydraulic clamping for locking the spindle during turning operations. It includes a function for internal switching between coolant and oiled compressed air. The reception is type HSK-A 63 according to DIN 69893. The tool changer has HSK-T standard so that HSK-T tools can be used.
The tool clamping is hydraulically actuated. Integrated motor spindle compactMASTER® with 36 months warranty period for the component spindle without restriction of spindle hours.

Feed drives with digital drive control
Feed drives longitudinal, transversal and vertical with highly dynamic AC drives and circulating ball screw. Torque motor for B-axis.

Gauging system
The linear axes of the manufacturing slide in X-, Y- and Z-axis are equipped with linear scale. The B-axis has an incremental magnetic encoder.

Tool Magazine
Horizontal disc magazine with for 24tools - placed i front of the right side. Ergonomic front loading.
Service friendly access for easy maintenance in the magazine area.

Tailstock
The tailstock is equipped with preloaded friction-free linear guiding elements and is positioned hydraulically via M-code or foot switch with incremental path measurement. The life centre with MT5 reception is standard.
The tailstock force is adjusted by pressure control valves.

Control data
CNC-control with ERGOline control panel, manufacturer and type see control description.

Electrical data
Operating voltage: 400 V, ±10%, (L1, L2, L3), N, PE, 50 cycles, ±1%

Control voltage: relays 24 V direct current
Machine lamp: protection IP 67, 24 V direct current
Control equipment: DIN EN 60204 T1, control cabinet in protection IP 44 with filter fan

Protective measures
This turning machine is designed for the protective conductor system (protector ground).
It must not be operated at nets with earth-leakage protective devices.

Lubrication
Central lubrication system with oil container for impulse lubrication and electric monitoring.

Coolant equipment
Coolant equipment with separate cooling circuits, programmable via M-functions.
Coolant circuit for turning-/ milling spindle and chuck jaw rinsing.

Chip conveyor (option)
Hinged plate chip conveyor with electrical motion indicator, including transport rollers for easy mounting and dismounting, assembly elements and electric control. Discharge height approx. 1200 mm (47.24 inch).

Hydraulic unit
Frequency controlled hydraulic unit complete with regulator pump and micro filter system in the pressure line.

Protection covers
Closed machine cover with sliding doors on operator's side, with electric monitoring and electromagnetic locking according to accident preventive rules. All machine components are swarf and splash water protected from the machining area.

Colour
Painting (Design version “BLACK”)
Machine cover: calcite white (RAL 9010)
Protection door: deep black, smooth, glittering (RAL 9005)
Front cover: deep black, smooth, glittering (RAL 9005)
Front window frame: deep black, smooth, glittering (RAL 9005)
Control cabinet: titan grey (RAL 7016)
Chip conveyor: titan grey (RAL 7016)

Machine leveling elements
with 8 plates and 8 heavy-duty anchors

Scope of delivery documentation:
Operating Instructions:
Germany and German speaking countries: German
Europe (without German-speaking countries) German + national language
USA, Korea English
China, Japan, Russia: English + local language
Technical Documentation Mechanical Systems available in DE, EN, FR, IT
Technical Documentation Programming:
Germany and German speaking countries: German
Europe (without German-speaking countries) German + national language,
(depending on the availability of the control manufacturer)
USA: English
China (simplified) English + local language
Japan, Korea, Russia: English + national language
(depending on the availability of the control manufacturer)
Technical Documentation Electrics (incl. electrical circuit diagram with fluid diagram): available in DE, EN, FR, IT

The required languages must be ordered according to the country-specific legislation in consultation with the supplier plant.

Note
Cooling lubricant is not supplied with the machine.

Options for the basic machine

Counter spindle (option)
Counter spindle*
Counter spindle for rear machining (integrated spindle motor) mounted on separate slide instead of tailstock.

* Option Counter spindle with C-axis

Technical update rights reserved

Technical data

Working area
Swing dia. 500 mm 19.68 in
Turning dia. max. 500 mm 19.68 in
Turning length max. 750 mm 29.52 in
Spindles distance in machine with sub spindle 1020 mm 40.15 in
Distance between centres in machine with tailstock 800 mm 31.49 in

Spindle 1, left
Chuck dia. 250 mm 9.84 in
Bar dia. max. 65 mm 2.55 in
Spindle nose dia. (flat flange) 170h5 mm 6.69h5 in
Spindle bore dia. 87 mm 3.42 in
Draw bar dia. (internal) 67 mm 2.63 in
Spindle dia. in front bearing 130 mm 5.11 in
Drive power, S1-100%d.c. / S3-40%d.c. 25/32 kW 33.51/42.91 hp
Speed range 0-5,000 rpm
Power knee 850 rpm
Torque, S1-100%d.c. / S3-40%d.c. 280/360 Nm 206.5/265.5 lb*ft
Kind of drive/no. of range AC/1
Motor version ISM76
Angular value, min. 0,001°

Slide 1 – upper
Slide traverse X1 480 (-10/+470) mm 18.89 (-0.39/+18.5) in
Slide traverseY1 ±100 mm ± 3.93in
Slide traverse Z1 850 mm 33.49 in
Rapid traverse X/Y/Z 36/40/40 m/min 118.1/131.2/131.2 ft/min
Thrust S6-40% X/Y/Z 10/7/10 kN 2248/1573/2248 lbf
Resolution X/Y/Z 0,001 mm 0.0039 in
Balls screws-X,Y,Z dxh Ø40x10 mm Ø1.57x0.39 in

Turning-milling spindle
Tool type standard HSK-A 63
Speed range, max. 0-12000 rpm
Drive power, S1-100%d.c. / S3-40%d.c.-2min 19/22,5 kW 25.47/30.17 hp
Spindle torque, S1-100%d.c. / S3-40%d.c.-2min 85/120 Nm 62.68/88.5 lb*ft
Kind of drive/no. of range AC/1 AC/1

Type ISM synchronal ISM synchronal
Angular value, min. 0,001° 0,001°
Locking moment 1000 Nm 737.56 lb*ft

B-axis CNC
Positioning angle (continuously) ±110°
Speed range B1 25200°/min
Torque B-axis, S6-40% d.c. 410Nm 302.37 lb*ft
Angular value, min. 0,001°

Tool disc magazine
No. of tool stations 24
Tool dia./tool length max. Ø50x300/80x230 mm dia.1.96x11.81/3.14x9.08 in
Tool weight max. 7 kg 15.4 lb

Tailstock, hydraulically programmable
Traverse path 750 mm 29.52 in
Thrust force 8 kN 1798 lbf
Live center attachment MT 5
Drive type hydraulic
Rapid traverse Z 5 m/min 16.40 ft/min

Cooling unit
(turning-milling spindle, main spindle motor,
main spindle console, B-axis torque motor)
Capacity 38 l 10.03 gal.
Pump power 6 kW 8.04 hp
Pump rating 35 l/min. 9.24 l/gal.
Pressure 4 bar 58 psi
Cooling circuits (quantity) 1

Coolant equipment
Capacity 220 l 44.909 gal
Coolant pressure 6 bar 72.51 psi
Pump rating 20 l/min 5.28 gal/min
Filtration type Grid filter + cartridge filter
Grade of filtration 50 µm 3.93 µin

Chip conveyor
Capacity (approx.) 220 l 44.909 gal
Removel capacity 150 kg/h

Hydraulic unit
Capacity 40 l 10,56 gal
Pump power (frequency controlled) 4 kW 5.36 hp
Hydraulic pressure 100 bar 1450.37 psi
Pump rating 20 l/min 5.28 gal/min

Pneumatic
Pressure 5-8 bar 72.51-116 psi
Air consumption 40 m³/h

Electrical connections
Connected load, total approx 74 kVA
Voltage 400 (L1, L2, L3) V
±10% N, PE

Frequency 50 Hz 50 cycles
Fusing (slow-blowing) according to VDE 0100 125 A

Environmental conditions
Admissible ambient temperature + 15 to + 35ºC + 59 to + 95ºF
Max. relative air humidity 75 %
Max. installation height 1000 m 3280 ft

Accuracy according to VDI ISO 230-2 (at T=20 ± 2º C)
Two-sided position uncertainty A in X1/Y1/Z1/Z3 5/5/6/10 µm
Two-sided position uncertainty A in C3/C4 18/18 arcsec
One-sided systematic position deviation E in X1/Y1/Z1/Z3 4/4/5/8 µm
One-sided systematic position deviation E in C3/C4 15/15 arcsec
One-sided repeatability of positioning R in X1/Y1/Z1/Z3 2/2/3/6 µm
One-sided repeatability of positioning R in C3/C4 10/10 arcsec
Reversal span B in X1/Y1/Z1/Z3 2/2/3/4 µm
Reversal margin B in C3/C4 6/6 arcsec

Weights and dimensions
Machine dimensions LxBxH (without cooling unit) 4960/2260/2900 mm
195.27x88.97x114.17 in
Machine weight inclusive control cabinet 10000 kg 22046 lb

Emission sound pressure level
Emission sound pressure level LpA 75 dB(A)
Standard cycle according to ISO8525, without metal cutting
(ISO 230-5, ISO 8525)

B-A70632

CELOS with Siemens 840D sl Operate

CELOS® offers a uniform user interface for all new high-tech machines from DMG MORI. On a 21.5 "multi-touch screen, CELOS® APPs enables a consistent administration, documentation and visualization of order, process and machine data, enabling CELOS® to uniquely combine the machine with higher-level corporate structures (e.g. ERP). In addition to the pre-installed APPS, customer-specific APPS can also be installed.

Pre-installed APPS: CONTROL, JOB ASSISTANT, JOB MANAGER, JOB SCHEDULER, STATUS MONITOR, TECH CALCULATOR, APPLICATION CONNECTOR, DOCUMENTS, ORGANIZER, SETTINGS, SERVICE AGENT, NETSERVICE*, MY DMG MORI*, ENERGY SAVING, TOOL HANDLING, UPDATER*. Pre-installed services: JOB IMPORT for individual connection to ERP systems.

* Internet access required
** Configuration by customers

CONTROL DATA

Delivery content
ShopTurn 3G contents ShopTurn and DIN programming.

Type of control
Path control for all axes, spindles, tool changer, tool magazine, turrets and tool drives.

Dimension system metric

Input system	metric or inch
Data input	incremental/absolute
Input precision	0,001 mm (0.0001 inch)
Interpolation	linear ±99999,999 mm (±9999.9999 inch) circular ±99999,999 mm (±9999.9999 inch)
Feed input	direct in mm/rev. or mm/min. (inch/rev. or inch/min.)
Feed override	0 -120 percent
Feed range	0,001 mm/rev. (0.0001 in/rev) up to rapid traverse

Servo handwheel
For fine adjustment of slides, ranges selectable at handwheel: 0,1 mm, 0,01 mm and 0,001 mm (0.01, 0.001 and 0.0001 inch).

Threading
- 0,001 - 500,000 mm/rev. (0.001-19.685 inch/rev) longitudinal, transversal and taper threads
- Single or multiple threads with constant or variable pitch
- Thread with inclined intake and outlet

Rapid traverse limitation	by parameter input
Spindle speed	input in rev./min.
Spindle speed override	50 - 150 percent

Spindle speed limitation
Programmable and adjustable by parameter

* depending on machine configuration

Spindle stopping	by C-axis

Coordinate system
- Cartesian, polar or cylindrical coordinates

Constant cutting speed	input in m/min. (ft/min.)

Tool programming

Upper tool carrier (magazine)	tool name with tool data

Number of tools / tool offsets (cutting):
1500 tool offsets for a maximum of 750 available tools
Option:
3000 tool offsets for a maximum of 1500 available tools

- Tool types displayed as icons
- Tool name alphanumeric 24 characters
- Multitool with max. 64 tools

Cutting radius compensation
- Programmable by G40, G41 and G42

Tool life monitoring
- With automatic activation of spare tools

Tool list
- Uniformed tool list for all modes
- Fixed connection between Multitools
- Sort, search und filter functions inside the list

Real time clock
- Time is retained also after switching off

Machining time
- Registration of elapsed machining time between program start and program end

Limit switch
- Software limit switch per axis direction

Spindle pitch compensation	for all axes
Backlash compensation	available

Zero point shifting
- 4 obtainable by G54 to G57 and further ones additively programmable

Memory

NC memory on the NCU
- Up to 16 MB (depending on memory allocation)

Using the 'NC-Extend' function, additional user memory is available on the IPC, depending on the hard disk capacity

Program management
- Program name max. 24 characters

Surface machining	with C-axis

Front surface machining
- With C-axis in cartesian programming

Helical interpolation	available

Program administration
- Program names max. 24 characters
- Max. 750 programs in NC-memory (or Memory limit)

Subprograms	16 levels of nesting
Subprogram repetition	repeat cycle 1 - 9999-fold

Program format
- Program input similar to DIN 66 025 with variable block length with high level language extensions

Program support for cycles
- Screens and animated auxiliary displays
- Process oriented.cycles for drilling/milling and turning

Simulation
- Traverse path simulation without model broken-line grafics or volumetric model with dynamic material removal
- Parallel simulation during machining (not at NEF)
- Multichannel simulation (depending on machine configuration)

Program input/output
- USB, keyboard, machining from external memory by network (ethernet)

Ethernet interface	available
USB interface	in control panel

Program editor
- Mark, copy and delete areas
- Uniform editor for all modes
- ASCII
- ProgramGuide
- ShopTurn
- Multichannel editor

Cycles
- Cutting cycles for longitudinal turning, facing (rising contours), recesses, relief cuts, threads and drilling cycles

Search of blocks
- By program status and block number in selected program

Parameters
- Machine, setting and work parameters can be edited at the control

Variable programming
- 500 global and 200 local variables for programming of part families, trigonometric - arithmetic calculation functions, boolean relations

Chamfers and radius
- Programming of chamfers and radius at contour transitions

Direct programming of drawing dimensions	available

Step function
- Absolute and conditional jump

Real time clock
- Secured against voltage drop with battery

Diagnostic (automatic)
- Permanent state monitoring by the integrated diagnostic system
- Display of actual error states

Diagnostic upon selection display of:
- Internal storage contents
- Input and output
- The last error messages with time and date

MACHINEcheck
- Application with maintenance reminder function
- Optionally: maintenance training to your DMG MORI machine
- Optionally: DMG Service Agent with the functions
- Notification, instruction and support for spare part ordering

AUTOshutdown
Intelligent Standby-control for avoidance of unnecessary absorption of energy by time controlled switch-off of not used aggregates.
The times and switch-off conditions can be adjusted individual per machine with a easy to use NC-screen by the customer for his production.

Screen / Panel
- 21.5 "ERGOline ® control with multi touch screen
- Stepless adjustment of screen and keyboard
- Display of access permission
- Button for quick entry confirmation

Screen layout
- Display of actual values of all axes (position, speed) in the operation modes manual control and automatic
- Display of block number, feed, tool number and tool correction of the actually selected slide
- Actual value display for distance, feed, speed, tool, vertical and horizontal softkeys
- Multichannel display*

Clear text display
- Program text, block text, diagnostic text

Possible languages
- German
- English
- French
- Italian
- Spanish
- (more languages upon request)

Functions of control software ShopTurn 3G with operating system Operate

Fundamentals Integrated functions for programming in Jobshop or production mode

DIN/ISO
Programming in plain text mode and editing of external programs.

ProgramGuide
Programming of DIN-programs with graphic auxiliary help screens.

ShopTurn
Work step programming with graphical support and automatic generation of approach and departure routes.

Programsync
Programming in programGuide or ShopTurn, mixed mode possible.
Creating of machining blocks in ShopTurn or programGuide.

Programing in programGuide

Programming of cycles
- Easy programming cycles with graphical help screens

Manual/set up functions

Workpiece measurement
- Scratch workpiece in Z-axis

Tool measurement
- Measure tool with touch probe or tooleye (option)
- Measure tool scratching method

Automatic functions
- Block search (including blocks for individual holes in drilling pattern)
- Block sequence (automatic mode)
- Machining plan test (dry run)
  (Restrictions of the function depending on machine equipment possible)
- Reposition on contour, block search

Additional functions

Help functions
- Context sensitive help functions,
- Tooltips for each entry field
- Syntax check with coloured feedback

Simulation display
- Basic contour (cylinder, hollow cylinder, polygon)
- Machining in real-time or fast-track
- Top or side view
- Adjustable display (zoom)
- Real-time simulation parallel to the machining process

Programming ShopTurn

Fundamental contour
You can call up, parameterize, start and store the basic elements that describe a contour or link them to a machining plan, enabling a contour to be created quickly and easily. The following basic elements are available:

- Straight line X/Z, including machines with C axis
- Oblique line in X/Z or at an angle, including machines with C axis
- Circle can be parameterized with radius/end point or centre point

Cycles

Stock removal cycles
- Stock removal cycles against any contours roughing and finishing parallel to contour and axis
- End face, back face
- Residual material recognition
- Any blank specification

Drilling cycles
- Centric deep hole drilling
- Hole circle on end face
- On peripheral surface with C-axis
- Tapping
- Position pattern

Threading cycles
- Outside and inside threads
- Face and taper threads
- Processing of multiple threads
- Remachining of threads
- Linear or degressive delivery
- Constant or variable slope

Grooving / undercut cycles
- Marking cycles for straight lines and oblique
- Undercut form E, form F, DIN thread

Milling
- Line milling (C/X, C/Z)
- Grooves (straight and circle) on the shell and face
- Pockets (also with islands) on face
- Cones on the star surface
- Path milling, also possible shift in the machine coordinate system
- Engraving texts
- Sequence (automatic mode)
- Workplant test (Dry-Run)
- Returning to the contour, block search

Further functions

The step-by-step schedule creation allows:
- To characterize each step with easy-to-understand symbols
- Workplan creation without DIN / ISO knowledge
- Easily change, paste and remove special commands (for example M-functions)
- Insertion of transition elements, blockwise processing (single step)

Additional possibilities
- Easy to understand help images for each cycle
  (Animations are just a schematic representation of the function)
- Scale graphic for input support
- Graphical workplan test (test run)
- Creating/reading and processing of complete DIN / ISO programs

Technology input
- Tool definition possible per work step

DMG Mori technology cycles as an option depending on machine equipment
- Easy programming of complex technologies
(Depending on the function, a simulation may not be possible)

Functions for multichannel machining – programSync*

Time display
- Display of the processing times in the program per channel (after the first simulation)

Wait brand analysis
- Graphical display of the synchronization points

Setting up programs on the machine
- Channel or spindle dependent mode

4Axis-machining* (option)
- Balance cutting, 4-axis machining

B-B0036

Operating principle:
The chuck closes with a high pressure up to a freely definable changeover point (overcoming stick slip effects / time reduction during clamping).
The piston surface of the clamping cylinder is subjected to a reduced pressure from the defined switchover point. The chuck closes with a reduced clamping force.

Attention:
The minimum clamping force of the clamping cylinder results from the minimum adjustable clamping pressure and the respective piston surface of the clamping cylinder used and can be read off by the operator in the control. In the dynamic movement, the clamping pressure can be adjusted down to 5 bar.

B-B0036G

Operating principle:
The chuck closes with a high pressure up to a freely definable changeover point (overcoming stick slip effects / time reduction during clamping).
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The minimum clamping force of the clamping cylinder results from the minimum adjustable clamping pressure and the respective piston surface of the clamping cylinder used and can be read off by the operator in the control. In the dynamic movement, the clamping pressure can be adjusted down to 5 bar.

B-S0634

3-jaw power clamping chuck with tooth serration and through-hole Ø66 mm (Ø2.59 in),
complete with one set each of base jaws and hard top jaws, incl. connecting elements,
type BBD 210/66, make SMW
(max. speed = 5000 rpm, max. operating force = 38 kN / 8542 lbf)

B-S0634G

3-jaw power clamping chuck with tooth serration and through-hole Ø66 mm (Ø2.59 in),
complete with one set each of base jaws and hard top jaws, incl. connecting elements,
type BBD 210/66, make SMW
(max. speed = 5000 rpm, max. operating force = 38 kN / 8542 lbf)

B-C7234

Integrated motor spindle compactMASTER® with 36 months warranty period for the component spindle without restriction of spindle hours.

B-H72501

Sensor package Industry 4.0 for holistic condition monitoring (Advanced sensor with visualization in Condition Analyser App) and analysis of the machine and the machining processes.

Condition monitoring (Advanced sensor with visualization in Condition Analyser App)
Energy and air consumption measurement:
- Energy measurement at the connection point with detection of apparent, active and reactive power
- Detection of air consumption via a volume flow measurement

Media control with additional sensors to the standard monitoring sensors:
- Hydraulic oil temperature sensor
- Pressure sensor on the central hydraulic unit
- Volume flow measurement on all coolant pumps
- Pressure measurement on all coolant pumps

Attention: The DMG Mori Condition Analyser App is not part of this option.
The energy consumption is visualized in the custom area and the sensor data are provided in a data block for evaluation by the separate DMG Mori Condition Analyzer app or by the customer.

Accuracy control (Temperature control)
- Detection of temperatures via sensors in the machine (quantity and kind of sensors depends on machine)
- Internal storage and visualization of measured values via a Data - logger
- Algorithms supported compensation of relocation of milling head on TC machines
- Dressing of the machine with the utilization of half of the tolerance

Machine protection (MPC)
Machine protection by quick shutdown < 0,01 sec
Variable Tool- and Process-specific shut down limit
Process control with bar display in the machine control
Bearing condition diagnosis of the spindle

Note: No warranty in case of collisions

Process monitoring (Easy Tool Monitor 2.0)
Easy tool monitor is a cycle to switch off the spindles and axes controlled in the event of tool overload.

- Monitoring is only possible for tools, which will cause the spindle or axis parameters to be exceeded in the event of a tool breakage.
- Monitoring is only possible for one spindle or axis per machining step.
- Monitoring of only one limit.
- It’s possible to switch between the channels
- Monitoring of feed sentences, no rapid traverses.
- Selection of monitored tools via parameter of the tool management.
- Monitoring of all cutting edges of the tool
- Easy teaching of monitoring limit during tool is operating.

- Control screen for selection of monitoring function (soft key) data of selected tool will be shown on display
- Storage for specific tool values.
- The limits of detection of over load by Easy Tool monitor are material and tool specific
- The feed is immediately stopped when the monitoring limit is exceeded. The spindle is stopped after 1 second.

The axes are immediately stopped, if overload is detected during machining.
The spindles are stopped after a waiting time has elapsed during which the tool can cut free.
A message appears.
Once the spindles are at zero speed, the program can be continued with Cycle start.
If a further overload is detected, the same response as above will apply.
Easy Tool Monitor 2.0 can switched off at every time.
Easy Tool Monitor 2.0 cannot be switched on during machining process.

B-A0326

The rotation movement of the workpiece, additional movements in the X and Y are superimposed. This results in a shift of the rotation center (eccentric). Limitations in the eccentricity are resulting from the workpiece geometry, machine working space and technology.

Applicable to DIN programming and programming with ShopTurn 3G Version 4.4

B-A0329

5-axis interpolation at main and counter spindle. Evaluation of space and position vectors.
The machine will be equipped with higher accuracy and automatic compensation of electrical and mechanical deviations.
Only applicable with DIN programming, not with ShopTurn.

B-A0335

With this cycle, either the workpiece or the tool spindle speed can be brought into alternate speed.
By entering the parameter differential speed (amplitude) and time (frequency), the spindle speed oscillates harmonically along the programmed set speed. Excitation frequencies are absorbed and vibration of the tool at the workpiece can be avoided.

B-A0358

The Polygon/Oval Milling technology cycle offers the possibility of programming oval (P2G) and polygonal (P3G and P4H) geometries on the control.

Parametric programming is performed according to the definition of the shaft-hub connection according to DIN 32711 and DIN 32712. Machining is performed on the face side (B-axis 0°) as well as on the circumference side (B-axis 90°). The cycle supports inside, outside, roughing, finishing and chamfering operations with curvature-continuous approach, departure and reapproach movements to the contour.

Attention:
For internal machining, the tool must be swiveled in parallel to the center axis (Z axis) of the polygon or perpendicular to the G17 plane.

B-A0342

Especially on machines with multiple spindles and slides the display of the current state of the machine is important to continue after a break.

It can be visualized, the program number and status of the workpiece together with a workpiece number and the program status. The program number can be 9 digits specified.
The Programmstati be described by the NC program. It shows the position of the spindle and the processing status (blank, half-finished parts, machining step).

B-A0378

Technology cycle for safe decoupling of tool and component in the event of an emergency stop actuation triggered by the user. The operator can press the machine's emergency stop button in the event of unforeseeable events (e.g. noise development, incorrect parameter sets) and the tool is then pulled in a controlled manner out of the contact area with the workpiece in one direction until the workpiece comes to a standstill.

B-A0349

Technology cycle with dialog-guided programming for the production of straight grooves in bores or on the lateral surface in the Z direction of the workpiece. Inner and outer grooves in any position and number freely adjustable. If the groove to be created is wider or higher than the impact tool, the cycle automatically calculates the necessary displacements. Easy compensation of tool displacement.
Calculation of residual strokes based on selected machining strategy.

This option contains the technology cycle with the corresponding input mask.

B-A0352

Minimum clamping force function:

Input
Workpiece geometry
Clamping
Process forces or manipulated variables
Material properties
Speed

Output
Required clamping force at specified speed or maximum speed at given clamping force

Function Clamping of thin-walled components:

Input
Workpiece geometry
Clamping
Material properties

Output
Maximum clamping force at specified deformation
Deformation at specified clamping force

D-CO200

Digital Manufacturing Package

1) IoT*connector*
The integrated IoT*connector* enables to use the DMG MORI online services (eg NET*service*). With the integrated firewall, the machine is protected against attacks despite the online connection. In addition, the IoT*connector* receives security updates via an integrated Device Management.

Notes:
For the secure operation of a machine tool within a network, DMG MORI recommends orientation on IEC62443 IT-security for industrial automation systems.

2) Machine Data Connector
Uniform machine data interface as an integrated function of the DMG MORI Connectivity Hardware independent of the machine controller, the machine signals are available as a signal output through one of the following protocols:

- MQTT (MQTT Client)
- MTConnect (MTConnect Agent Version 1.4.0.3)
- OPC-UA (DMG MORI OPC-UA Server Konfiguration)

The used protocol is to be configured at machines with CELOS (Version 5) through the App "Connector Management" or through the Windows application “Connector Management” which is directly installed to an external PC (recommended) operated within the same network than the DMG MORI Connectivity Hardware.

CELOS Connector Management is included in CELOS or/ and is provided as a separate software for standalone usage.

Updates for the software function of the Machine Data Connector will be provided directly to the DMG MORI Connectivity Hardware via DMG MORI Device Management. An Internet connection of the DMG MORI Connectivity Hardware is required for this update function.

The following signals are available*:
- Machine Serial Number
- Operating hours
- Power On Time
- Controller Mode
- Status Stack Light
- Number of active alarms
- Notifications (Alarm/Warnings)
- Part Program Name
- Current Program Execution Time
- Spindle Override
- Desired Parts
- Feed Override
- Number of active Tool
- Rapid Override
- Execution State
- Part Counter
- Part Counter overall

*Additive DMG MORI machines (powder nozzle or powder bed) have a different signal set because of their machine technology.

3) NETservice
The NET*service* stands for a couple of new features for optimal remote service support. Besides of an interactive remote desktop feature for a direct view on HMI and control, direct file transfer of service related files the experts of DMG MORI can be involved in a single or multi-user-conference. A chat and whiteboard functionality complete the conference functionality. To use the DMG MORI NET*service* the supplied software DMG MORI NETservice Customer Application has to be installed on a PC/notebook.

Your customer benefits at a glance:
- Fast support through access to CELOS, IPC and NC
- Intuitive operation
- High transparency thanks to logging of all service activities
- Deposit of individual user profiles and rights
- Chat functionality for communication between customer and service

The usage of NET*service* is free of charge for the duration of the machine warranty and ends automatically. NETservice after Warranty is subject to monthly costs. The DMG MORI Service is able to create a suitable offer.

Requirements of usage:
- Requires IoT*connector*
- Requires Internet connection to the machine

D-MO002

DMG MORI Messenger V4

The latest version of DMG MORI Messenger displays web based the machine live status. It allows to analyze the machine run-time, downtime, alarms in individually configurable dashboards and transparently shows the actual status in the manufacturing shopfloor through the subscription to e-mail reports. The DMG MORI Messenger needs to be installed on a PC/Server. The access to the application is done web based through a web browser.

Scope of delivery:
- 1x Software "DMG MORI Messenger V4" on DVD
- 1x License key to connect a single machine
- 1x Manual on DVD

The Software needs to be installed and configured by the customer himself on his own computer or server. In case of any questions, the support team from DMG MORI Software Solutions GmbH will be available over the DMG MORI regio service by telephone and via E-Mail (support@dmgmori-digital.com, keyword "Messenger").

Requirements for connecting a machine:
- DMG MORI Connectivity Hardware with Machine Data Connector (min. version 2.4) or
- DMG MORI MAPPS control with active MTConnect interface or
- DMG MORI machine from at least 2013 with DMG MORI Connectivity Hardware Retrofit or
- Third party machine on request (professional-service@dmgmori.com).

System requirements server:
- Installation on an exclusive server or virtual machine
- Supported operating systems: Microsoft Windows Server 2019 Standard (1809), Microsoft Windows Server 2016 (current version 1607 [Build 14393.2828]) or Microsoft Windows 10 Enterprise LTSC (Long Term Service Channel version for corporate clients).
- Hardware requirements: CPU min. x64 2x1.4 GHz, min. 8 GB RAM, min. 80 GB SSD
- For further requirements, please visit https://dmgmori.com/messenger-preinstallationcheck

Besides applies the End-user license agreement for DMG MORI Messenger, which is available under www.dmgmori.com.

D-MT001

Service Agent
The SERVICE AGENT as integrated APP of the CELOS CNC-Control gives an overview of all maintenance work on the machine and makes in process support possible.

Advance warning of upcoming maintenance and service work.
List of all necessary spare parts and equipment.

Note:
The Service Agent can also be used with the CELOS PC-Version with an established network connection to the machine.

ALLMÄNNA BESTÄMMELSER
För denna offert gäller villkor enligt NL 17, dock med följande undantag;
Om köparen har rätt till vite påbörjas beräkningen av vitesbeloppet 14 kalenderdagar från den dag leverans skulle ha skett.
I stället för vad som stadgas i punkt 16 i NL 17 angående procentsatser och maximering av vite på grund av leveransförsening skall följande gälla; Vitet skall, för varje hel vecka förseningen varar, utgöra 0,5 %, dock max 5 %, av 90% av det avtalade priset för produkten.

GARANTI
18 månader efter installation, på maskin och styrsystem.
På spindlar av typen MASTER gäller 36 månaders garanti.

BETALNINGSVILLKOR
40% vid order
50% innan maskinen lämnar fabrik
10% inom en månad från godkänt övertagande
Samtliga betalningar per 10 dagar netto.
Efter förfallodagen debiteras dröjsmålsränta med gällande referensränta +8%.

OFFERTENS GILTIGHETSTID
Denna offert gäller en månad från anbudsdatum.
Offert på lagermaskin gäller med reservation för mellankommande försäljning.

LEVERANSVILLKOR
CIP enligt INCOTERMS 2020, inkl. emballage, exkl. avlyft och intransport till Er adress

LEVERANSTID
Enligt senare överenskommelse.
Leveranstiden gäller från mottagen förskottsbetalning.
I de fall finansiering av ordern kommer att ske via leasingbolag återkommer vi med en aktuell leveranstid i samband med att beställning och förskottsbetalning inkommit.

INSTALLATION
Installation av all offererad utrustning enligt ovan.
Inkoppling av huvudström samt eventuell bultning/limning i golv eller fundament ingår ej. Mottagningsinstruktioner för utrustningen översänds senast en månad innan leverans. Beakta instruktioner avseende fundament, förankring och anslutning. Tidpunkt för installation och utbildning bokas i samråd med vår installationskoordinator. Notera att installation av eventuella retrofit-optioner kan komma att utföras senare än maskininstallationen.
Leverantören ansvarar inte för installation eller sammankoppling mellan maskin och eventuell automation/robot i de fall leveransomfånget enbart omfattar automationsinterface.

RMS (Relocation Machine Security)
Exportkontroll:
För att förhindra att utrustningen placeras illegalt hos individer eller nationer som hotar den internationella säkerheten kan alla DMG MORI maskiner, från och med den 1 januari 2023, omma att utrustas med en RMS-enhet (Relocation Machine Security). RMS-enheten avaktiverar maskinen automatiskt vid flytt eller demontering. Avaktiveringen sker inte under normal användning eller vid underhåll.
Om utrustningen avaktiverats kan den endast aktiveras igen av en auktoriserad representant från DMG MORI. Återaktivering kan beställas från DMG MORI Service. Om avaktiveringen beror på en omfattande serviceinsats återaktiveras den utan kostnad.
DMG MORI har rätt att neka återaktivering om det bekräftas att en sådan åtgärd skulle innebära otillåten teknologiexport eller på annat sätt strida mot gällande exportrestriktioner. DMG MORI har i dessa fall ingen skyldighet att återaktivera maskinen och skall inte hållas ansvarig för konsekvenserna av en sådan handling.

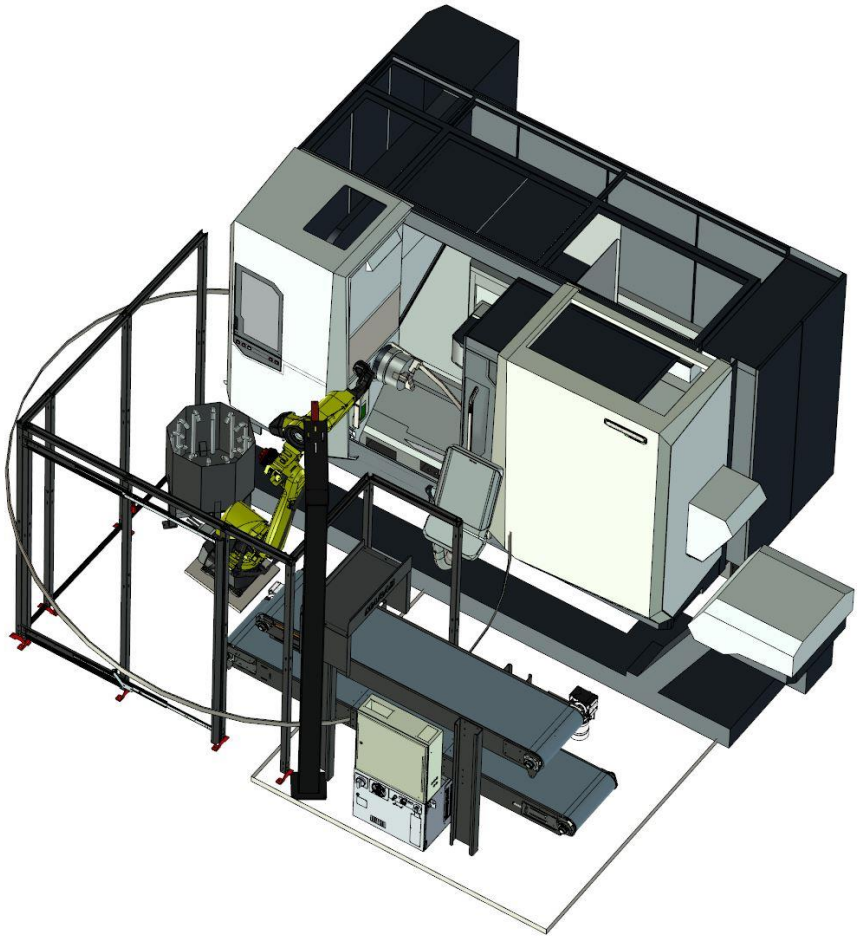
MARAB
Mora Automation & Robotteknik AB

2024-11-08

Att:
MF Precision
Martin Fredin

Vår referens:
Matilda Bastman
0250-186 60

OFFERT
Vi tackar för Er förfrågan angående en robotcell för betjäning av en DMG Svarv och har härmed nöjet att översända följande förslag:



En fast robotcell för betjäning av Er maskin från transportbana med hjälp av vision. Roboten har en hanteringsvikt på 35kg. Roboten programmeras så att programmet är parameterstyrt vilket gör robotcellen mycket flexibel och lätthanterad. I roboten görs också ett program för en specialdetalj som består av tre cirkeldelar.

Teknisk specifikation:

- Robot Fanuc M20iD/35.
    - Roboten kan hantera upp till 35kg.
    - Robotens räckvidd är 1831 mm.
- Roboten monteras på en lutande fot.

- Roboten utrustas med ett dubbelgripdon med två 3-backsgripdon med gripfingrar som kan justeras för flera olika diametrar.
    - Gripdonen är Schunk PZN+ 100.
    - Ritningar på omslutande gripfingrar ingår.
- Roboten plockar detaljer från en transportör för ingods och lämnar detaljer på en transportör för utgods.
    - Transportbanorna placeras ovanför varandra.
    - Inbanan är 2200x500 mm.
    - Utbanan är 3000x500 mm.
- Ett visionsystem guidar roboten så att den hittar detaljerna på banan.
    - Visionssystemet är integrerat med roboten.
- I robotens programmeringsdosa finns ett HMI för en enkel programmering av nya detaljer.
    - I roboten finns ett parameterstyrt grundprogram för kuts.
    - I roboten finns även ett specialprogram för er detalj med tre cirkeldelar där roboten orienterar detaljen med hjälp av vision innan den lämnar den i chucken.
- Roboten är utrustad med mjukvara:
    - DCS (Safe move) där man definierar ett mjukvarustopp så att roboten inte kan nå glasväggarna och stativet.
    - High Sensitive collision detection.
- Runt robot finns ett staket som är uppbyggd av profilrör och härdat glas.
    - Väggarna är av 8mm härdat glas och beröringsfria säkerhetsbrytare är monterade på dörrarna för att uppnå personsäkerhet.
- På sidan vid maskinpanelen monteras en ljusridå.
- Alla givare ansluts till kopplingsboxar med lysdioder samt M12 kontakter.
- På staketet vid maskinpanelen placeras en knapplåda för start och reset.
- En mekanisk brytare monteras på maskinpanelen så att den alltid är i undanflyttat läge när roboten startas.
- Kablar mellan robotskåpet och maskinen dras i staketet samt i svarta kabelskenor som monteras på maskinen.
- I robotskåpet monteras en enhet för SMS larm.
- Anläggningen levereras CE-Märkt (under förutsättning att maskinen har en egen CE-märkning och att dokumentationen finns tillgänglig).

Pris ovan angiven utrustning:		1 490 000 SEK exkl. moms.
Installation:		Ingår i priset.
Igångkörning:	Av en detalj	Ingår i priset
Utbildning:	2 dagar hos MARAB i Orsa ½ dags handhavande i samband med installation	Ingår i priset
Dokumentation:	CE-Märkning I CE märkning ingår; Manual, Elkretsschema,	Ingår i priset

Pneumatikschema, EG-försäkran.
Detta förutsätter att maskinen har en egen CE-märkning
och att dokumentationen finns tillgänglig

Era åtaganden:
- Signalutbyte från Er maskin.
- Ansluta anläggningen av Er utsedd behörig elektriker
- Ansluta tryckluft till anläggningen
- Vid installation av robotcellen skall en detalj finnas igångkörd i maskinen.
- Tillhandahålla material för programmering och provkörning.

Leveransvillkor: Fritt Marab

Leveranstid: På förfrågan

Offertens giltighetstid: 1 månad

Betalningsvillkor: 30% vid order
60% vid leverans
10% efter godkännande,

Äganderättsförbehåll: Utrustningen förblir MARABs egendom till dess full betalning erlagts.

Garanti: För robotcell inklusive robot 1 år
Garantin för roboten förlängs med ytterligare 1 år om service på roboten utförs inom 12 månader från leverans enligt manual.

Garantiåtagande innebär fria reservdelar samt kostnadsfritt arbete.
Omfattar ej förslitningsdetaljer som verktyg, filter, oljor mm.
Garantierna gäller där kunden inte orsakat skadan.

I övrigt gäller: Allmänna bestämmelser NL 09

Vi hoppas att vårt erbjudande motsvarar Era förväntningar och ser med stort intresse fram emot Ert besked.

Med vänlig hälsning
MARAB

Matilda Bastman

**** OFFERT ****

Offertnr	Datum
2012561	241122

Giltig t.o.m. 241211

Er referens: Jimmy Björklund
Vår referens: Lars Skogman
Leveranssätt: Fritt vårt lager
Transportsätt: E-mail

MF Precision
Jimmy Björklund
Norrkämstaleden 30
82731 Ljusdal

BETALNINGSVILLKOR
30 dagar netto
Efter förfallodag debiteras
dröjsmålsränta med 11.00 %

Äganderättsförbehåll: Samtliga varor förblir Fructus Data AB´s egendom tills dess full likvid erlagts.

Alla priser är exkl mvs

Art.kod	Benämning	Antal	Rabatt %	Belopp
	NÄTVERKSLÖSNING 3 STATIONER			
111401	GibbsCAM GO Network License	1		26,960.00
	- USB nyckel 60239 används för nätverkslicens (på server)			
111002 2+	GibbsCAM GO Solid Milling 2+, 3:e licens	1		97,080.00
	SERVICEAVTAL RESTERANDE 2024			
111401	GibbsCAM GO Network License	0.1		2,696.00
112002 2+	Maintenance, GibbsCAM GO Solid Milling 2+	0.1		1,602.00
804998	PAKETRABATT*	1		-10,000.00
	* Gäller odelad order			
	POSTPROCESSOR			
111502	Library Post Standard, DMGMORI CLX450 Sie	1		22,900.00
	UTBILDNING			
	Anpassad Utbildning hos kund, 13500kr/dag +resekost			
	Anpassad Fjärrutbildning, 1500kr/tim + 500kr uppstart/session			
	Info om "library Post":			
	Vi utgår från en befintlig post i vårt bibliotek.			
	Justering av postprocessor behöver oftast göras.			
	Önskemål om justeringar rapporteras in av Er till			
	support@fructus.se efter att ni fått leverans.			
804995	Gibbs Oreturnerat Hårdvarulås	1		0.00
	- Lås #42072			
	- Returneras med företagspaket till Fructus Data AB			
	- Storsätragränd 5 127 39 Skärholmen			

Summa exkl.mvs: 141,238.00

DMG MORI Sweden AB
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42102 Västra Frölunda
Sweden

T +46 771 364 667

www.dmgmori.com

MF Precision AB
Martin Fredin
Norrtjämstaleden 16
827 31 Ljusdal

Västra Frölunda, 08/11/2024

NZX 2000
Offertnr. 52408954501
Projektnr. OP1535514

Enligt överenskommelse med vår säljare Willy Karlsson har vi härmed nöjet att offerera ovanstående maskin i utförande enligt nedan specifikation.

Om du har några frågor eller önskar ytterligare information är du alltid välkommen att kontakta oss! Du når vår säljrepresentant via kontaktuppgifterna nedan och vårt övriga säljteam på tel: 031-348 98 00, menyval 3.

Med vänlig hälsning,

Ulrika Arvelin
Säljsupport

DMG MORI Sweden AB

Kontaktuppgifter:
Willy Karlsson
Säljare
+46 762 44 05 65
willy.karlsson@dmgmori.com

DMG MORI

Quote number: 52408954501

Quotation

NZX 2000

nzx-2000.dmgmori.com

Highlights

- BMT (Built-in Motor Turret) mounted on the turret
- Y-axis function available for all 3 turrets (3 turret spec.)
- Twin drive and ball screw core cooling employed for the X axis of Turret 2
- ORC (Octagonal Ram Construction) employed for the Y-axis travel of Turret 2 (Y-axis spec.)
- Y-axis travel of 110 mm for all turrets (Y-axis spec.)
- Turtleneck structure prevents chips from accumulating on the lower turret (Turret 2)
- Rapid traverse rate （X/Y/Z）：30/20/50 m/min
- New common premium design

DMG MORI
NZX 2000

Machine and Options

Basic Machine

NZX 2000	J-A01480*	1
2-turret specification	J-009844	1

Control

Control F31iB with CELOS	J-006070*	1
CELOS - ERGOline Touch It is a machine operation panel with 21.5-inch multi touch screen, which realizes comfortable operability. It documents, visualizes and centrally manages the order, process and machine data, allowing the networking with CAD/CAM and also the function extension using applications. The user-friendly, highly-productive MAPPS system is installed.	J-003261*	1

Spindle

Left Spindle through-spindle hole dia. 91 mm (spindle speed 4,000 min-1, 26/ 22 kW) (NZX2000) Enables large diameter bar stock machining by changing the Left Spindle bar stock machining capacity from Φ65 mm (standard) to Φ80 mm. When applying this specification, select the chuck matching the specification separately. For T3, T3Y2, and T3Y3 specifications machines, machining a workpiece on the Left Spindle side with the turret 1 will be restricted. Left Spindle for this specification -Output (30 min/continuous): 26/22 kW -Max. spindle speed: 4,000 min-1 ・Spindle through hole diameter: Φ91 mm ・Bar stock machining capacity: Φ80 mm	J-023247	1
Standard spindle (Right Spindle) 25/ 22 kW, 5,000 min-1 （NZX2000）	J-009850	1

* further description see attachment

Options for Spindle

Chuck high/low pressure system for Left Spindle The chuck pressure for Left Spindle can be switched between high and low. The grip force can be changed depending on machining conditions. Switch the chuck pressure by the following M codes or manual buttons. ・In automatic mode: - M83: Chucking pressure 1 (high pressure) - M84: Chucking pressure 2 (low pressure) ・In manual mode: Use the CHUCK HIGH PRESSURE/CHUCK LOW PRESSURE buttons on the operation panel. It is necessary to unclamp the chuck after switching the chucking pressure.	J-023193	1
Chuck high/low pressure system for Right Spindle The chuck pressure for Right Spindle can be switched between high and low. The grip force can be changed depending on machining conditions. Switch the chuck pressure by the following M codes or manual buttons. ・In automatic mode: - M283: Chucking pressure 1 (high pressure) - M284: Chucking pressure 2 (low pressure) ・In manual mode: Use the CHUCK HIGH PRESSURE/CHUCK LOW PRESSURE buttons on the operation panel. It is necessary to unclamp the chuck after switching the chucking pressure.	J-023251	1

* further description see attachment

Chuck for Left spindle (Main spindle)

(Left Spindle) KITAGAWA 10-inch Hollow Chuck BR10A821 Three-jaw hydraulic chuck manufactured by Kitagawa Iron Works. Chuck outer diameter: Φ254 mm (dia.10 inch.) Through-hole diameter: Φ81 mm (dia. 3.18 inch.) Gripping diameter: Max. Φ254 mm (dia.10 inch.), Min. Φ31 mm (dia.1.22 inch.) Jaw stroke (diameter): 8.8 mm (0.35 inch.) Plunger stroke: 19 mm (0.75 inch.) Max. allowable pull force: 49 kN (11.01 klbf) Max. static gripping force: 123 kN (27.64 klbf) Dynamic gripping force at max. speed: 44 kN (9.88 klbf) Max. allowable speed: 4,500 min-1 Mass: 40.9 kg (89.99 lb.) *The data above are information on the chuck body. Since it may be limited by this machine specification, please check the contents of the mounted cylinder set for details.	J-013368	1
(Left Spindle) KITAGAWA Hollow Cylinder set for KITAGAWA 10in. Hollow Chuck BR10A821 (without chuck body) Hollow cylinder and draw bar are included as a set. Chuck is not included. Please see the chuck-cylinder combination diagram for the combination with chuck and the specification.	J-013382	1

Chuck for Right spindle (Counter spindle)

(Right Spindle) KITAGAWA 8-inch Hollow Chuck BR08A621 Three-jaw hydraulic chuck manufactured by Kitagawa Iron Works. Chuck outer diameter: Φ210 mm (dia.8.27 inch.) Through-hole diameter: Φ66 mm (dia.2.6 inch.) Gripping diameter: Max. Φ210 mm (dia.8.27 inch.), Min. Φ22 mm (dia.0.87 inch.) Jaw stroke (diameter): 7.4 mm (0.29 inch.) Plunger stroke: 16 mm (0.63 inch.) Max. allowable pull force: 32 kN (7.19 klbf) Max. static gripping force: 99 kN (22.25 klbf) Dynamic gripping force at max. speed: 33 kN (7.42 klbf) Max. allowable speed: 5,000 min-1 *The data above are information on the chuck body. Since it may be limited by this machine specification, please check the contents of the mounted cylinder set for details.	J-013366	1

* further description see attachment

(Right Spindle) KITAGAWA Hollow Cylinder set for KITAGAWA 8in. Hollow Chuck BR08A621 (Bar work capacity 65 mm (2.55 inch.)) (without chuck body) Hollow cylinder and draw bar are included as a set. Chuck is not included. Please see the chuck-cylinder combination diagram for the combination with chuck and the specification.	J-013389	1

Equipment for Chucks

Chuck Cylinder Stroke Check (Linear Position Monitoring) (Left Spindle) The standard stroke end detection-type chuck opening/closing confirmation switch is changed to the linear position detection-type. The position of the chuck cylinder is read with the linear sensor and displayed as a number. The chuck clamping/unclamping position can be set on the screen for each workpiece.	J-002358	1
Chuck Cylinder Stroke Check (Linear Position Monitoring) (Right Spindle) The standard stroke end detection-type chuck opening/closing confirmation switch is changed to the linear position detection-type. The position of the chuck cylinder is read with the linear sensor and displayed as a number. The chuck clamping/unclamping position can be set on the screen for each workpiece.	J-002359	1

Options for Turret

Turret 1: Y-axis	J-009852	1
16-station bolt-tightened turret (turret 2) (standard specification) (BMT40) In-house 16 station turret with BMT (Built-In Motor Turret). Useful for the long-time operation at night and complex machining. Please refer to the axis travel diagrams and turret interference diagrams for the movable region. Number of tool stations: 16 Shank height for square tool: 20 mm (0.79 inch.) Shank diameter for boring bar: dia. 32 mm (dia. 1.25 inch.) Turret indexing time (1 station): 0.18 sec. Rotary tool machining ability: drill dia. 16 mm (dia.0.79 inch.), tap M16 Method for mounting tool on turret: Bolt-tightened BMT40	J-009856	1

* further description see attachment

16-station bolt-tightened turret (turret 1) (standard specification) (BMT40) In-house 16 station turret with BMT (Built-In Motor Turret). Useful for the long-time operation at night and complex machining. Please refer to the axis travel diagrams and turret interference diagrams for the movable region. Number of tool stations: 16 Shank height for square tool: 20 mm (0.79 inch.) Shank diameter for boring bar: dia. 32 mm (dia. 1.25 inch.) Turret indexing time (1 station): 0.18 sec. Rotary tool machining ability: drill dia. 16 mm (dia.0.79 inch.), tap M16 Method for mounting tool on turret: Bolt-tightened BMT40	J-009853*	1
High-speed rotary tool spindle 12,000 min-1, 7.5/ 5.5 kW (turret 1) The maximum spindle speed for the rotary tool spindle is boosted to 12,000 min-1 from the standard 6,000 min-1. A rotary tool holder with an allowable speed limit 12,000 min-1 is not included. Please arrange it separately. Output (30 min/continuous): 7.5/5.5 kW Maximum spindle speed: 12,000 min-1	J-009880	1
High-speed rotary tool spindle 12,000 min-1, 7.5/ 5.5 kW for turret 2	J-G01751	1

Tailstock

Right Spindle Tailstock Specification The specification to push a workpiece by the center mounted in the Right Spindle chuck. This allows you to machine the tip of the workpiece. When using Right Spindle as a tailstock, the motor equipped with a brake is installed as the spindle may be pushed back. *The center is not included. Please purchase it separately.	J-003188	1

Coolant supply / Chip removal

Applicable Coolant Type: Water-Soluble Coolant If the oil-based coolant is used with the water-soluble coolant specification, it may cause poor accuracy, machine troubles or fire. It is necessary to select the oil-based coolant specification for using the oil-based coolant.	J-G00428	1

* further description see attachment

Chip conveyor (right discharge, hinge type) Chips are transferred to outside the machine by hinge type plate. Effective in discharging long chips. This is not suitable for discharging powdery chips generated when cutting mold or gun metal. Cutting those materials may cause chip flow into the coolant tank. This is suitable to convey steel (long, short), aluminum (long), SUS (long, short), brass (long), or copper (long). Chip conveyor capacity: 470 L/h (Enomoto BeA)	J-021654	1
High-pressure coolant system (800/ 1,100 W) (for 2-turret specification) With this specification, abilities to remove the chips and to cool the tool or workpiece during cutting are higher compared to the standard coolant unit. 2 pumps which supply coolant to each turret are changed from the standard specification (output: 350/550W(50/60 Hz)) to the high-pressure specification(output: 800 / 1,100 W (50/60Hz)). Output(50 / 60 Hz) : 800 / 1,100 W [Output with standard specification: 350 / 550 W] Maximum pump pressure: 0.8 MPa [Max pump pressure with standard specification: 0.39 MPa] The number of pump : 2 High-pressure coolant system (800/ 1,100 W) LBK2-60/6-MR-e (TERAL)	J-021184	1

* further description see attachment

Interface for Super-High-Pressure Coolant System (8 Steps Pressure) (Separate Type) (Auto-Switching from/to Standard Coolant Pump) (For 2-Turret Specifications) (1-Path System) Interface for mounting the high-pressure coolant system (separate type). By supplying the high-pressure coolant directly to the cutting point from the discharge outlet at the tool tip, chips and heat generated by cutting can be removed efficiently, effectively extending tool life. The high-pressure coolant command is issued by the M code or by pushing the button on the operation panel. The predefined 8 steps of pressure can be selected by the M-code. Max. discharge pressure: 7 MPa (1,015 psi) This specification includes the following: - Valve for switching to standard pump - Machine-side piping dedicated to the coolant system. - A set of electrical parts dedicated to the coolant system. - Pump for drawing up coolant *The coolant to be discharged from the turret is switchable between the high-pressure coolant and the standard coolant. *The high pressure coolant unit is not included. *Please prepare the power source supplied to the high pressure coolant unit separately. *When using the high-pressure coolant system, the machining accuracy may be influenced by a rise in the coolant temperature. Select the coolant chiller and mist collector to reduce the influence on the machining accuracy.	J-005194	1
Without Coolant chiller If the coolant chiller is not selected, the units (spindle, tool post) inside the machine might be heated by the coolant, and thermal displacement might cause defective machining dimensions. Please select “Coolant Chiller” which is recommended option.	J-014458	1
Coolant Gun The magnet type coolant gun is attached to the machine front. Pressing the "coolant gun" button on the operation panel activates the coolant pump, and depressing its trigger starts the coolant discharge. The coolant pump automatically stops in 2 minutes. It can be used for flushing away chips in the machining chamber.	J-003220	1

* further description see attachment

Chuck Top Coolant Unit (Left Spindle) The coolant is discharged through the coolant nozzle on the upper part of the chuck. It flushes away chips and reduces heat generated on the workpiece during cutting.	J-017936	1
Chuck Top Coolant Unit (Right Spindle) The coolant is discharged through the coolant nozzle on the upper part of the chuck. It flushes away chips and reduces heat generated on the workpiece during cutting.	J-017937	1
Air blow for tool tip (turret 1) Discharges air on the tool tip and removes chips adhering to it. Coolant discharge port on turret 1 can also discharge air with this specification. Air blow to the tool tip are effective in removing dust while measuring the tool or removing chips during dry machining. Following M-codes are used to control air blow to the tool tip. - M458: Air blow for tool tip ON - M459: Air blow for tool tip OFF * The common M codes for "air blow for tool tip" are used for all the turrets. Only the air blow for the specified turret is turned ON/OFF.	J-020978	1
Air blow for tool tip (turret 2) Discharges air on the tool tip and removes chips adhering to it. Coolant discharge port on turret 2 can also discharge air with this specification. Air blow to the tool tip are effective in removing dust while measuring the tool or removing chips during dry machining. Following M-codes are used to control air blow to the tool tip. ・M458: Air blow for tool tip ON ・M459: Air blow for tool tip OFF * The common M codes for "air blow for tool tip" are used for all the turrets. Only the air blow for the specified turret is turned ON/OFF.	J-020981	1
Air Blow for Chuck (Left Spindle) Air is blown to the chuck for removing chips adhering to it. Removing the chips prevents the gripping accuracy from being impaired by the chip pinching. The air blow nozzle is installed on the upper part of chuck.The air blow ON/OFF is controlled by the M codes. The time until the air blow OFF can be set using the timer. *The spindle can be jogged during the air blow using the parameters.	J-003300	1

* further description see attachment

Right Spindle through-spindle coolant system Discharges coolant from inside the Right Spindle through hole to remove chips and cool the workpiece. This is suitable to prevent chip intrusion to inside the spindle through hole and to remove chips from the workpiece when machining inside diameter while a hollow chuck is used. Coolant is supplied from the coolant tank using a special pump made for this specification, which is used also for other coolant units. Coolant discharge can be switched ON/OFF using following M-codes. M278 Right Spindle through spindle coolant system ON M279 Right Spindle through spindle coolant system OFF This also functions as a workpiece stopper in spindle.	J-023253	1
Right Spindle through-spindle air blow This specification is designed to remove chips generated while machining by jetting air from the center of the chuck on the Right Spindle. Mainly, this is used to remove chips that are left inside the diameter and that block cutting when machining inside diameter. Air blow can be switched ON/OFF by following M code. M252 Through spindle air blow ON M257 Through spindle air blow OFF This also functions as a workpiece stopper in spindle.	J-023252	1
Interface for Mist Collector (Duct Only, Φ200 mm (dia.7.87 inch.)) I/F for mounting the mist collector that collects, absorbs and dehydrates mist, dust particles and oily fumes generated during machining using the filter. This specification includes the duct from the duct hose outlet to the machine body only. The mist collector, duct hose, drain hose, stand, fixture and electrical components set are not included.	J-005080	1

Measuring / Monitoring

Manual in-machine tool presetter (removable type, Left Spindle and Right Spindle) (STD) Please refer to the tool presetter interference diagrams for the interference with the chuck and workpiece.	J-017113	1

* further description see attachment

Full-closed Loop Control for X-axis (Turret 1) (Direct Scale Feedback) The magnetic scale is used for the X-axis position sensing of the turret 1, instead of the axis servomotor pulse encoder. It is not susceptible to ball screw precision error or thermal displacement. The magnetic scale is mounted parallel to the X-axis of the turret 1, and the coordinates of the position are directly fed back to the NC unit. This enables the higher precision positioning. Resolution: 0.01 µm (Magnescale)	J-021570	1
Full-closed Loop Control for X-axis (Turret 2) (Direct Scale Feedback) The magnetic scale is used for the X-axis position sensing of the turret 2, instead of the axis servomotor pulse encoder. It is not susceptible to ball screw precision error or thermal displacement. The magnetic scale is mounted parallel to the X-axis of the turret 2, and the coordinates of the position are directly fed back to the NC unit. This enables the higher precision positioning. Resolution: 0.01 µm (Magnescale)	J-021573	1
Full-closed Loop Control for Z-axis (Turret 1) (Direct Scale Feedback) The magnetic scale is used for the Z-axis position sensing of the turret 1, instead of the axis servomotor pulse encoder. It is not susceptible to ball screw precision error or thermal displacement. The magnetic scale is mounted parallel to the Z-axis of the turret 1, and the coordinates of the position are directly fed back to the NC unit. This enables the higher precision positioning. Resolution: 0.01 µm (Magnescale)	J-021595	1
Full-closed Loop Control for Z-axis (Turret 2) (Direct Scale Feedback) The magnetic scale is used for the Z-axis position sensing of the turret 2, instead of the axis servomotor pulse encoder. It is not susceptible to ball screw precision error or thermal displacement. The magnetic scale is mounted parallel to the Z-axis of the turret 2, and the coordinates of the position are directly fed back to the NC unit. This enables the higher precision positioning. Resolution: 0.01 µm (Magnescale)	J-021604	1

* further description see attachment

Automation

Signal Lamp 4 Colors (Red, Yellow, Green, Blue) The machine status is indicated by the LED color. It is mounted at top front of machine so that it is visible from a distance. The power-saving, maintenance-free LEDs with a viewing angle of 360 degree is adopted. The color specification can be selected from the following two types: <Type 1> - Red: Various alarms - Yellow: Program end (M02/M30) - Green: Automatic mode operation <Type 2 (Standard)> - Red: Various alarms - Yellow: The cycle start prohibited - Green: Automatic mode operation - Blue: During Operation mode 2/3 being selected *Buzzer function is not included. Please select the "Signal Lamp Buzzer" specification separately.	J-004166	1

* further description see attachment

Workpiece unloader (Left Spindle workpiece receiver + Right Spindle single hand) + Workpiece transfer conveyor The workpiece unloader receives and discharges machined workpieces automatically, so unmanned oparation is possible. 【Workpiece unloader (Left Spindle workpiece receiver)】 The receiver on the end of the arm receives a machined workpiece or left over material from the Left Spindle and carries it to the receiving box installed at the front door. 【Workpiece unloader (Right Spindle single hand) (with workpiece transfer conveyor)】 Collects workpieces clamped on the Right Spindle chuck by the arm stored in the side face of inside machine(Right Spindle side). Collected workpieces are loaded onto the conveyor behind the side cover of inside machine and discharged from the discharge port at right side of the machine. Grips of hand specification are limited in movable range, therefore they needed to be changed depending on the workpiece diameter. Also, you have to consider the workpiece's center of gravity when deciding the position the hand holds the workpiece. Does not include external workpiece bucket. The way of commanding is either with the button on the operation screen or with the following M-signals. - M273: Workpiece unloader(Right Spindle) OUT - M274: Workpiece unloader(Right Spindle) IN 【Workpiece unloader (Left Spindle)】 Applicable workpiece maximum diameter: Φ80 mm*1 Applicable workpiece maximum length: 190 mm Max conveyable mass: 5 kg 【Workpiece unloader (Right Spindle single hand) (with workpiece transfer conveyor)】 Applicable workpiece diameter range: Φ10 to 65 mm*2*3 (Φ10 to 80 mm)*4 Applicable workpiece maximum length: 150 mm Max conveyable mass: 5 kg *1 It does not means the bar work capacity is dia. 80 mm. Please select options according to the required bar work capacity separately. *2 Φ49 to 65 mm, Φ36 to 52 mm, Φ23 to 39 mm, Φ10 to 26 mm (There are four types of jaws. The diameter range is changed depending on the mounted jaws.) *3 It does not means the bar work capacity is dia. 65 mm. Please select options according to the required bar work capacity separately. *4 When “Left Spindle through-spindle hole dia.	J-022315	1

* further description see attachment

91 mm (NZX2000)" is selected, 1 type of grips (Φ64～Φ80 mm) is added. * When the length of a workpiece is 20 mm or less, the workpiece may not be taken out. If such a workpiece is to be machined, consult with us in advance.		
Right Spindle workpiece ejector (cylinder type) (NZX2000) This is option for the Right Spindle specifications. A workpiece can be unloaded using the workpiece unloading device which is directly driven by an air cylinder.	J-023255	1
Automatic door Air cylinder opens/closes the front door Tape switch is installed on the front door. Door stops immediately when an operator get caught in the door by activating this tape switch. Door opening width will be narrower than standard by the width of the tape switch when this specification is selected. Door opening width of the automatic door specification: 845 mm (Door opening width of the standard specification: 870 mm)	J-022869	1
EtherNet/IP I/F I/F for exchanging control signals between the machine and peripheral equipment using the EtherNet/IP communication protocol. It is necessary for connecting the peripheral equipment that supports EtherNet/IP. The wiring is saved compared to normal hard wiring communication as the control signals are exchanged via the EtherNet communication. This specification includes I/F for receiving and executing emergency stop signals transmitted from peripheral equipment via separate non-LAN cable. *The LAN cable between the machine and peripheral equipment is not included. *When the machine is shipped, the circuit is short-circuited if there is no external device connected. Please make sure to remove the jumper wire when installing machine at the customer's factory.	J-015384	1

* further description see attachment

Robot I/F (EtherNet/IP), Separate EtherNet/IP I/F Required The interface signals for mounting robots are made available. The signals are exchanged with the robots using the EtherNet/IP communication protocol. The use of the robots allows the automatic loading/unloading of workpieces, implementing the long time unattended operation. *The robot and the power source of the robot (including cables) are not included. *EtherNet/IP I/F is required separately. *The automatic door is not included. *When utilizing Robot or Loader to workpiece handling, you need to select "Fixture washing coolant for setup station" for Horizontal MC, "Shower coolant" for Vertical MC, "Air blow for chuck" for Lathe. If system cannot remove chip from workpiece properly, fixture or chuck, system will stop by chip accumulation (frequent occurrence of seating alarm) or extend the cycle time by adding cleaning cycle of the Robot. *When the machine is shipped, the circuit is short-circuited if there is no external device connected. Please make sure to remove the jumper wire when installing machine at the customer's factory.	J-015385	1
Interface for Safety Fence (Electric Interface) Signal for indicating the status of the safety fence door to the machine. When the machine receives the signal indicating that the safety fence door is closed, power is supplied even if the machine front door is open. When the safety fence I/F is used with the robot I/F, the command from the robot allows execution of the spindle orientation even with the automatic door opened. If the operation panel is installed outside the safety fence, the safety fence must be opened once to OFF check when the power is turned on. (Only ALX, ALC and NLX) *The safety fence and a cable between the safety fence and machine are not included.	J-003356	1

* further description see attachment

Interface for Bar Feeder (LNS, IRCO, IEMCA, Edge Technologies) (Multiple) The Bar feeder interface is used for connection to the bar feeder which achieves higher productivity by the automatic bar stock feed. Bar feeder body is not included in this specification. To install any bar feeder other than the LNS, IRCO, IEMCA and Edge Technologies, the Interface may need to be changed. Please refer our Interface specification and discuss with Bar feeder manufacture in advance. In case of special electric design or modification of mechanical design is required, please consult DMG MORI. (Caution) It is necessary to arrange the guide bush or guide pipe by separate quotation. *Because the guide bush is solid, please machining it according to the inner diameter required by the customer. *When arranging the guide pipe, specify the pipe inner diameter in advance. *In automated machine operations using the bar feeder, the machine door or shutter is not opened or closed for long hours. As a result, a temperature inside the machine can rise, affecting machining accuracy. So the mist collector is recommended that can prevent the temperature from rising. *When using a bar feeder that cannot discharge the remaining material inside the bar feeder equipment, please arrange a workpiece unloader separately because it is necessary to discharge the remaining material into the machine. (Although DMGMORI do not recommend it, when discharging the remaining material by dropping it onto chip conveyor without a workpiece unloader, please cut down the remaining material as much as possible before dropping it onto chip conveyor. (If the remaining material is too long, it may get caught in chip conveyor and cause chip conveyor to break prematurely.) *When the machine is shipped, the circuit is short-circuited if there is no external device connected. Please make sure to remove the jumper wire when installing machine at the customer's factory.	J-009884	1

* further description see attachment

Operation panel home position confirmation switch Lower panel of the operation panel is checked whether at the home position by this switch to avoid interfere to the robot. (recommended to automation with robot operation)(Upper panel of the operation panel is not checked whether at the home position)	J-012751	1
Voltage of Bar feeder Interface : 200 V	J-056319	1

General Options

10 External M-Codes 10 M-codes are added for general purpose use by customers. The terminal blocks are provided for output/completion of the added M-codes. When the M-code is specified, the signal is output to the terminal block relayed to the relay circuit (A-contact) in the electrical cabinet. At completion of the M-code, the signal is input to the completion terminal block with dry contact. It is available for the ON/OFF control of external equipment set up by customers. *Specifications of relay contact: AC250V, Max 5A	J-015367	1
Manual Pulse Generator (Separate Type) It is a separate type hand-held handle switch, and addition of it improves the operability at the setup. The switch on the operation panel allows switching between the handle switch on the operation panel and the separate type one. The separate type handle switch is connected to the operation panel with a curled cord. It can be attached to a desired place on the machine using the magnet on the back side. The separate type handle switch equipped with the high-intensity white LED as standard can also be used as a hand-held light to illuminate the workpiece machining face or the dark area where the machine light does not reach. (For COMPACTline, handle switch on the operation panel is deleted, only a separate-type manual pulse generator is equipped)	J-003686	1
Voltage of Customer Factory 400 V This machine is shipped with voltage set to 200 V specification. Transformer is necessary. Please order on DMG MORI or make alternative arrangement. (Caution) If the setting is incompatible, there is a possibility of trouble such as operation abnormality and alarm occurrence. Be sure to check the supply voltage and frequency of the customer's factory.	J-G00953	1

* further description see attachment

Frequency 50 Hz This machine is shipped with frequency set to 50 Hz specification. (Caution) If the setting is incompatible, there is a possibility of trouble such as operation abnormality and alarm occurrence. Be sure to check the supply voltage and frequency of the customer's factory.	J-G00960	1
Setting Unit, MM The unit to be used for the screen display and program commands is set to "millimeter (mm)". Turning: "MM" specification for the turret.	J-004471	1
Three-phase autotransformer in cabinet, power 95 kVA, primary voltage 400V, secondary voltage 200V, rated frequency 50Hz, incl. main switch and mains filter, type: CLPB 50F- 1427T18001	J-EU0007	1

Technology Cycle

Alternating Speed It can suppress regenerative chattering by fluctuating spindle speed. The cycle is automatically calculated only by setting the fluctuation width in the guidance screen. *Regenerative chatter is created by excitation resulting from the fluctuation in chip thickness. In general, the spindle speed needs to be adjusted as a countermeasure for keeping the chip thickness constant. This function is not available when left and right spindles are synchronized(M34 or M35 command)	J-015571	1
Keyway broaching This function enables to program for keyway grooving with simple programming guidance. Regarding machining possibility including machining accuracy, please contact DMG MORI sales staff *Additional necessary NC option : none	J-012929	1

* further description see attachment

Options for Control

Synchronous Tapping (Turning Spindle) Highly accurate tapping is possible since the rotation of the turning spindle and the Z-axis feed are constantly synchronized. (For NT/NTX, only the rotation of left spindle and the Z1-axis feed are synchronized. N/A for right spindle) *The synchronous tapping (rotary turn-mill spindle) is a standard function. Highly accurate tapping is possible since the rotation of the rotary turn-mill spindle and the Z- and X-axis feeds are constantly synchronized. (For NT/NTX, only the rotation of Turn-mill Spindle and the Z1- and X1-axis feeds are synchronized. N/A for right spindle)	J-008016	1
Islands, Open Pockets Islands - The island shape can be defined in a pocket shape. Even complex tools path can be converted in shorter time. - Number of island shape definitions: 127 Open pocket - The island shape can be defined in an open pocket shape. Definition of the open part allows generation of optimum tool paths by eliminating paths of the parts with no cutting allowance. - The air cutting is reduced significantly, so that the cycle time can be reduced by approximately 30%. *It is available only with the milling specification.	J-007791	1
High-speed Canned Cycle The screen guidance induces input of the canned cycle arguments. The high-speed cutting can be specified in one program line. - The machining time is reduced by the high-speed machining. - The cycle that simplifies complicated programming of high speed machining programming are newly added. - The programming time is shortened. - The optimum tool paths are automatically created for the high-speed machining. - The shapes which require perplexing programs are supported. - The manual-less screen guidance method is adopted. The number of pattern: 21 patterns The number of patterns for programming from the interactive machining menu: 15 patterns	J-008657	1

* further description see attachment

Addition of Optional Block Skip (Soft Key Type 2-9) 8 optional block skip functions are added. The switches for enabling/disabling them is added on the operation panel. (How to Use) By programming a slash "/" and the number (/n (n=2 to 9)) following it at the beginning of a block and turning on the optional block skip switch with the same number as programmed on the screen or machine operation panel, the information of the block is ignored in the DNC or memory operation. Turning off the optional block skip switch n enables the information of the block with n. Namely, the block including /n can be skipped by the operator's selection.	J-008244	1
X-axis Direction, JIS/ISO-compliant The X-axis movement direction is compliant with the JIS/ISO standard.	J-G00618	1

Screen Text Language

Screen display English Language on MAPPS Screen: English Language on MAPPS Warning Screen: English Language on NC Screen: English Language on PC Screen: English	J-000080	1

Services

Options for MAPPS / SIEMENS / CELOS Control*

IoTconnector The IoTconnector allows the use of online services of DMG MORI (e.g. NETservice)	J-011731*	1
NETservice A software installed on IoTconnector for qualified support by Internet-based remote diagnostics	J-011732*	1
Machine Data Connector (MDC) A software installed on IoTconnector for uniform machine data interface as an integrated function of the DMG MORI Connectivity Hardware	J-011734*	1

* further description see attachment

Packing / Transport / Installation

Cautionary points of Port of Discharge The freight cost may vary according to the port of discharges, the estimation is calculated by the ports as follows : Barcelona, Cork, Dublin, Genoa, Gothenburg, Hamburg, Helsinki, Istanbul, Izmir, Izmit, Rotterdam, Southampton, Venice. Please note that additional costs could be charged when a port that is not included in the above list is selected. If you need further information, please contact our sales representative.	J-013853	1

Services

3D Machine Model Data The 3D model data of the machine is provided. The data can be used in the customer's CAD system for various applications such as simulation. The following two types of 3D model data can be provided: - Model for checking the outer shape of the machine (to be used to create the layout in the factory) - Model for checking interference inside the machine (to be used to check machining programs and tool paths) *The non-disclosure agreement needs to be concluded. *For preventing the technical information from being leaked, the data to be provided is simplified. Information other than the machine outer shape and interference inside the machine is not included.	J-004965	1

* further description see attachment

Sales company services

Transportation of machine and accessories, DDP customer's site (INCOTERMS 2010) Excl. unloading and transport to installation point	330TDD	1
Installation of all quoted equipment at customer's site Incl. travel and accommodation costs	330IT	1
Training 3,5 days at, customer's site Incl. travel and accommodation costs Day 1 - 08:30 to 15:15 or 12:45 to 15:15 Day 2 - 08:30 to 15:15 Day 3 - 08:30 to 15:15 Day 4 - 08:30 to 12:00 or 08:30 to 15:15 Max. 4 participants	330L06	1

Total price **446.000,00 EUR**

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* further description see attachment

Added value for your machine / alternatives

Options for Turret

Turret 2: Y-axis	J-009855	1	42.050,00
Turret 2 Tailstock Function The center attached to the tool holder on the turret 2 supports a long workpiece during the machining in the simplified manner. It is possible to push the center to not only left spindle and but also right spindle. There is no screen dedicated to thrust force setting (thrust monitoring), with only one type of thrust setting. *The center and drill socket is not included. Please order them separately by referring to the tooling system diagram. Using the live center (MT2) (part No:K41016) can prevent the interference due to the turret 2 rotation even when the center is oriented toward right spindle.	J-016705	1	2.940,00

Coolant supply / Chip removal

Chip conveyor (right discharge, hinge type with drum filter type) ・Height of drain port: 1,012 mm ・Filtration accuracy: 50 µm_approximately 90% ・Carrying amount - Long chip: 794 L/h - Short chip: 13 L/h ・Coolant discharge rate(water-soluble): maximum 162 L/min ConSep 2000 Ⅱ (TSUBAKIMOTO MAYFRAN INC.)	J-021670	1	20.200,00

* further description see attachment

Mist collector zeroFOG #2 (Built-in) The mist collector collects, coolant mist and oily fumes generated during machining using the pre-filter and final filter. Final filter is toolless and easy to replace. When the final filter reaches the replacement time, an alert is displayed on the CELOS or SLIMline screen. For FANUC or MITSUBISHI spec., the mist collector can be started/stopped by M-code command or ON/OFF button on the machine operation panel. For SIEMENS spec., the mist collector is automatically turned on and off in conjunction with the program. (factory default). The operation mode of the mist collector can be changed on the Custom screen. Refer to the operation manual for details on operation modes and how to change them. When the total operating time of zeroFOG exceeds 15 minutes, the mist suction is automatically stopped temporarily and the primary filter is cleaned by compressed air for 15 seconds to prevent clogging of the primary filter. After the cleaning operation is completed, the mist suction operation starts again. 400 L/min of air pressure source flow rate is additionally required when using zeroFOG. * When the machine is painted in a specified color, the resin cover around the outer circumference of the zeroFOG is also painted in the same color. Finishing appearance: Orange peel painting.	J-019185	1	9.550,00

Chuck for Right spindle (Counter spindle)

(Right Spindle) KITAGAWA 10-inch. Hollow Chuck BR10A621 Three-jaw hydraulic chuck manufactured by Kitagawa Iron Works. Chuck outer diameter: Φ254 mm (dia.10 inch.) Through-hole diameter: Φ81 mm (dia.3.18 inch.) Gripping diameter: Max. Φ254 mm (dia.10 inch.), Min. Φ31 mm (dia.1.22 inch.) Jaw stroke (diameter): 8.8 mm (0.35 inch.) Plunger stroke: 19 mm (0.75 inch.) Max. allowable pull force: 49 kN (11.01 klbf) Max. static gripping force: 123 kN (27.64 klbf) Dynamic gripping force at max. speed: 44 kN (9.88 klbf) Max. allowable speed: 4,500 min-1 Mass: 41.6 kg (91.5 lb.) *The data above are information on the chuck body. Since it may be limited by this machine specification, please check the contents of the mounted cylinder set for details.	J-013369	1	2.090,00

* further description see attachment

Coolant supply / Chip removal*

TMF300/980 compact filter unit; High pressure 1: 7.0 Mpa; High pressure 2: 7.0 Mpa; Shut Off Valve per 7.0MPa pump (3/2 way-valve); Shut Off Valve per 7.0MPa pump (3/2 way-valve); 0.5MPa 60l/min; Coolant chiller 8kW; lift-up pump 200VAC; Forced circulation	J-EU1139*	1	51.645,00

Service PLUS (quotation note!)

DMG MORI Full-Service 5.0 5-year all-round carefree package according to warranty standard from commissioning for your new machine! It includes: - All repairs and spare parts in the event of machine malfunctions - All ancillary costs - Protection in the event of crash - Annual maintenance - All services 'from a single source' - Term of 5 years - Automations on request	Y-FS011*	1	52.636,00

* further description see attachment

Quotation note

FINANCING DIRECTLY FROM DMG MORI!

DMG MORI Finance supports DMG MORI customers with tailored and fair financing solutions. Benefit from an excellent machine tool know-how combined with best conditions.

Get in touch with your Key Account Manager at DMG MORI Finance and ask for a personalized financing quote. We are looking forward hearing from you.

Contact:

Mr. Nicolas Straub
Tel: +49 (0) 151 / 402 47 572
Email: nicolas.straub@dmgmori-finance.com

* further description see attachment

Attachment

Technical Description

J-A01480

Basic machine NZX 2000

The specifications below apply to a basic machine without additional options. Specifications in square brackets [ ] are values or features for a machine with additional options.

Capacity

Swing over bed	mm (in.)	800 (31.5)
Swing over cross slide	mm (in.)	800 (31.5)
Max. distance between spindle large noses	mm (in.)	1,130 (44.4)
Maximum turning diameter	mm (in.)	320 (12.5) <interference with the cover>
Standard turning diameter	mm (in.)	200 (7.9)
Max. workpiece delivery diameter	mm (in.)	300 (11.8)
Max. turning length:		
- Max. length workpiece which can be machined using O.D. tool (with the workpiece supported at both ends)	mm (in.)	810 (31.9)
- Max. length workpiece which can be machined using O.D. tool	mm (in.)	[280 (11.0)]
- Max. length workpiece which can be machined using O.D. tool on Turret 2 (with the workpiece supported at both ends)	mm (in.)	[810 (31.9)]
Bar work capacity	mm (in.)	65 (2.5) [80 (3.1)]

Travel

X-axis travel:		
- X1	mm (in.)	210 (8.3)
- X2	mm (in.)	210 (8.3)
- X3	mm (in.)	[210 (8.3)]
Y-axis travel:		
- Y1	mm (in.)	[110 (4.3) <+65 (2.6), -45 (1.8)>]
- Y2	mm (in.)	[110 (4.3) <+45 (1.8), -65 (2.6)>] [110 (4.3) <+65 (2.6), -45 (1.8)>]
- Y3	mm (in.)	[110 (4.3) <+65 (2.6), -45 (1.8)>]
Z-axis travel:		
- Z1	mm (in.)	300 (11.8) <+100 (3.9)>
- Z2	mm (in.)	810 (31.9)
- Z3	mm (in.)	300 (11.8) <+100 (3.9)>
B-axis travel <Spindle 2>	mm (in.)	870 (34.3)

Spindle 1/Spindle 2

Spindle 1 speed range	min^{-1}	5,000 [4,000]
Number of spindle 1 speed ranges	Stage	2
Spindle nose		JIS A_2-6
Through spindle 1 hole diameter	mm (in.)	73 (2.8) [91 (3.5)]
Spindle 1 bearing inner diameter	mm (in.)	120 (4.7)
Minimum spindle indexing angle	°	0.001

Turret

Turret type		16-station x 2 [16-station x 3]
Number of tool stations		32 [48]
Shank height for square tool	mm (in.)	20 (0.8)
Height of boring bar shank part	mm (in.)	32 (1.3)
Turret indexing time <1 station>	sec	0.18
Max. rotary tool spindle speed	min^{-1}	6,000 [12,000]
Rotary tool machining ability	mm (in.)	Tap: M16, Drill: ∅16 (∅0.6)

Feedrate

Rapid traverse rate:		
- X1	mm/min (ipm)	30,000 (1,181.1)
- X2	mm/min (ipm)	30,000 (1,181.1)
- X3	mm/min (ipm)	[30,000 (1,181.1)]
- Y1	mm/min (ipm)	[20,000 (787.4)]
- Y2	mm/min (ipm)	[20,000 (787.4)]
- Y3	mm/min (ipm)	[20,000 (787.4)]
- Z1	mm/min (ipm)	50,000 (1,968.5)
- Z2	mm/min (ipm)	50,000 (1,968.5)
- Z3	mm/min (ipm)	[50,000 (1,968.5)]
Jog feedrate	mm/min (ipm)	0 - 5,000 (0 - 196.9)

Motors

Spindle 1 drive motor:		
- 30 min/cont	kW (HP)	25/22 (33.3/30)
- 30 min/cont <Bar work capacity ∅80 mm (3.1 in) Specifications>	kW (HP)	[26/22 (34.7/30)]
- 30 min/cont <High-torque>	kW (HP)	[25/22 (33.3/30)]
Spindle 2 drive motor:		
- 30 min/cont	kW (HP)	25/22 (33.3/30)
- 30 min/cont <High-torque>	kW (HP)	[25/22 (33.3/30)]
Rotary tool spindle drive motor <30 min./cont>	kW (HP)	7.5/5.5 (10/7.5)
Feed motor:		
- X1	kW (HP)	3.0 (4.0)
- X2	kW (HP)	1.2 (1.6) x 2 [2.5 (3.3) x 2] [3.0 (4.0)]
- X3	kW (HP)	[3.0 (4.0)]
- Y1	kW (HP)	[4.0 (5.3)]
- Y2	kW (HP)	[2.5 (3.3)] [4.0 (5.3)]
- Y3	kW (HP)	[4.0 (5.3)]
- Z1	kW (HP)	4.0 (5.3)
- Z2	kW (HP)	4.0 (5.3)
- Z3	kW (HP)	[4.0 (5.3)]
Hydraulic pump motor	kW (HP)	1.5 (2.0) or equivalent
Lubricating oil pump motor	kW (HP)	0.017 (0.02)
Coolant pump motor	kW (HP)	0.35/0.55 (0.46/0.73)
Cooling oil motor <50/60 Hz>	kW (HP)	4.2/4.7 (5.6/6.2)

Tank capacity

Hydraulic oil tank capacity	L (gal.)	10 (2.6)
Lubricating oil tank capacity	L (gal.)	4.2 (1.1)
Coolant tank capacity	L (gal.)	450 (118.8)
Oil cooler tank capacity	L (gal.)	52 (13.7)

Machine size

Machine height <From floor>	mm (in.)	2,320 (91.3)
Machine height <From floor> <Center shutter>	mm (in.)	[2,460 (96.9)]
Floor space <Width x Depth>:		
- Standard	mm (in.)	4,396 x 2,835 (173.1 x 111.6)
- Chip conveyor right disposal	mm (in.)	[4,897 x 2,835 (192.8 x 111.6)]
- Chip conveyor right disposal <EN type>	mm (in.)	[5,129 x 2,835 (201.9 x 111.6)]
Floor space <Width x Depth> <Center shutter>:		
- Standard	mm (in.)	[4,396 x 2,957 (173.1 x 116.4)]
- Chip conveyor right disposal	mm (in.)	[4,897 x 2,957 (192.8 x 116.4)]
- Chip conveyor right disposal <EN type>	mm (in.)	[5,129 x 2,957 (201.9 x 116.4)]
Mass of machine:		
- 2-turret type	kg (lb.)	8,200 (18,040)
- 2-turret type <Turret 1 Y-axis>	kg (lb.)	[8,300 (18,260)]
- 2-turret type <Turret 1 Y-axis + Turret 2 Y-axis>	kg (lb.)	[8,500 (18,700)]
- Center shutter	kg (lb.)	[8,200 (18,040)]
- Center shutter <Turret 1 Y-axis + Turret 2 Y-axis>	kg (lb.)	[8,500 (18,700)]
- 3-turret type	kg (lb.)	[9,100 (20,020)]
- 3-turret type <Turret 1 Y-axis + Turret 2 Y-axis>	kg (lb.)	[9,400 (20,680)]
- 3-turret type <Turret 1 Y-axis + Turret 2 Y-axis + Turret 3 Y-axis>	kg (lb.)	[9,500 (20,900)]

J-006070

NC Unit F31iB

Controlled axes

Controlled axes	
- Turret 1	X1, Z1, C1, T1*1, *4, *6
	X1, Z1, C1, T1, Y1*2, *3, *5, *7, *8
- Turret 2	X2-1, X2-2, Z2, C2, T2, B*1, *2, *6
	X2-1, X2-2, Z2, C2, T2, B, Y2 *3, *7, *8
	X2, Z2, C2, T2, B*4
	X2, Z2, C2, T2, B, Y2*5
- Turret 3	X3, Z3, T3*6, *7
	X3, Z3, T3, Y3*8
Simultaneously controlled axes	
- Turret 1	X1, Z1, C1*1, *4, *6
	X1, Z1, C1, Y1*2, *3, *5, *7, *8
- Turret 2	X2-1, X2-2, Z2, C2*1, *2, *6
	X2-1, X2-2, Z2, C2, Y2*3, *7, *8
	X2, Z2, C2*4
	X2, Z2, C2, Y2*5
- Turret 3	X3, Z3*6, *7
	X3, Z3, Y3*8
Least input increment	0.001mm (0.0001 in.), 0.001°
Least command increment	0.001mm (0.0001 in.), 0.001°
Max. command value	±999,999.999mm (±99,999.9999 in.)
Inch/metric conversion	
Machine lock	
Chamfering ON / OFF	
Backlash compensation	± 9,999 pulses
Rapid traverse/cutting feed backlash compensation	
Stored pitch error compensation	
Abnormal load detection function	
Cutting feedrate	

Operation

Automatic operation (memory)	
Dry run	
Single block	
Jog feedrate	0 - 5,000 mm/min (0 - 196.9 ipm) <20-stage>
Manual zero return	
Reference position shift	
Manual pulse handle feed	x1, x10, x50, x100
Manual handle retrace*6, *7, *8	

Interpolation functions

Positioning	Linear interpolation type positioning is possible
Thread cutting/Synchronized feed	
Multiple thread cutting	
Retract during thread cutting cycle	
Continuous thread cutting	
Zero return	
Zero return check	
2nd reference point return	
Polar coordinate interpolation	

Feed functions

Rapid traverse rate override	F0 - 100% <21 steps>
Feed per minute	
Feed per revolution	
Constant tangential velocity control	
Cutting feedrate clamp	
Automatic acceleration/deceleration	Rapid traverse: Linear type Cutting feed: Linear type
Feedrate override	0 - 200% (10% increments)
Override cancel	
Balance cutting <Not available for DL specifications>	

Program Input

Optional block skip	1 Programs
Max. command value	±9 digits
Program number	O digits 4 code
Sequence number	N5 digits
Absolute/incremental programming	X, Z, Y, C (B), U, W, V, H
Decimal point programming/ Electronic calculator type decimal point programming	You can change the electronic calculator's decimal point programming by changing a parameter.
Diameter/radius programming (X-axis)	Standard: Diameter
Plane selection	
Rotary axis designation	
Rotary axis roll-over	
Coordinate system setting	
Automatic coordinate system setting	
Workpiece coordinate system	
Chamfering/Corner R	
Programmable data input	
Sub-program call	Up to 10 nestings
Single canned cycle	
Multiple canned cycle	
Multiple canned cycle II	Pocket profile, zigzag thread cutting
F15 format	
Custom macro common variables	600 variables (#100 - #199, #500 - #999)
Custom macro	
Circular arc radius command	

Miscellaneous functions/Spindle speed functions

Miscellaneous function	4-digit M code
Auxiliary function lock	
Multiple miscellaneous function commands	3 commands (This function is standard for the specified M codes)
Spindle functions	5-digit S code
Constant surface speed control	
Spindle speed override	50 - 150% (10% increments)
Spindle 1 orientation	without locks
Load monitoring function	

Tool functions/Tool offset functions

Tool function	4-digit T code
Tool position offset	
Tool nose radius offset	
Tool geometry offset/Tool wear offset	
Tool life management	64 sets x 10
Tool offset measurement direct data input	
Number of tool offsets	99 sets (49 sets for each turret) *1, *2, *3, *4, *5 200 sets (66 sets for each turret) *6, *7, *8

Editing functions

Background editing	
Expanded tape editing	
Undo/Redo function <MAPPS>	
Line no. display function <MAPPS>	
Part program storage length <in total>/Registerable programs <in total>	128 KB <320 m (1,050 ft)>/250 programs*1, *2, *3, *4, *5 256 KB <640 m (2,100 ft)>/500 programs*6, *7, *8

Setting and Display

Status display	
Clock function	
Actual position display	
Program display	Comment display: 190 characters
Parameter setting display	
Self-diagnosis function	
Power consumption display	
Alarm display	
Alarm history display	
Operation history	
Help function	
Running time/Parts count display	
Actual feedrate display	
Display of actual spindle speed and T code	
Operation panel : Display section	21.5-inch + 15.6-inch TFT color LCD

Regular interval maintenance screen

Data Input/Output

I/O interface	USB
6 GB Program storage area (for DNC operation, for data backup) <MAPPS>	Files up to 10 MB in size can be edited
Ethernet	10/100/1000BASE-T Access to user memory area by Ethernet function with MORI-SERVER Software

3D interference checking function <MAPPS>

Machine model for interference checking (Customized design is required for special shape.)	Standard internal cover, spindle, turret

*1: 2-turret type
*2: 2-turret type <Turret 1 Y-axis>
*3: 2-turret type <Turret 1 Y-axis + Turret 2 Y-axis>
*4: Center shutter
*5: Center shutter <Turret 1 Y-axis + Turret 2 Y-axis>
*6: 3-turret type
*7: 3-turret type <Turret 1 Y-axis + Turret 2 Y-axis>
*8: 3-turret type
<Turret 1 Y-axis + Turret 2 Y-axis + Turret 3 Y-axis>

Standard Equipment

Spindle specification

- Spindle drive motor is 25/22 kW (33.3/30 HP) <30 min/ cont.> and max. spindle speed is 5,000 min^{-1}. <Spindle 1, Spindle 2>
- Spindle orientation <without lock>
- C-axis brake <Spindle 1, Spindle 2>

Turret

- Turret tool attachment method is 16-station bolt-tightened type and turret indexing time is 0.18 sec a station.<turret 1, turret 2, [turret 3]>
- Rotary tool spindle drive motor is 7.5/5.5 kW (10.0/7.3 HP) <30 min/ cont.> and max. rotary tool spindle speed is 6,000 min^{-1}.

Coolant

- Coolant system <350 W, 50 Hz/550 W, 60 Hz>
- Chip flow coolant <800 W, 50 Hz/1,100 W, 60 Hz>

Chip disposal

- Chip conveyor I/F, right disposal type
- Air blow for chuck <spindle 2>

Measurement

- Manual type in-machine tool presetter <spindle 1>
- Manual type in-machine tool presetter <spindle 2>

Others

- Automatic power off
- Built-in worklight
- Chuck foot switch <single> <controlled by pedal>
  Double foot switch is obliged to use with EN regulation compliance machine for security reason.
- Hand tools

J-003261

CELOS to facilitate machine operation.

Can be networked with CAD / CAM products.
Open to forward-looking CELOS APP extensions.
Uniform interface for all the new high-tech machines from DMG MORI SEIKI.
Integrated management, documentation and visualization of order, process - and machine data.

Screen / Panel:	21.5 "ERGOline Touch ® control with multi touch screen Multi touch machine control panel for pioneering operating comfort Stepless adjustment of screen and machine control panel Display of access permission
SMARTkey ®:	Personalized authorization of the operator. Customized access rights to the control and the machine. Internal USB memory
APP SELECTOR:	Central selection mask for direct access by means of intuitive touch control and access to all available applications, divided into five major groups: Production, Accessories, Support, Monitoring, Configuration

APPs "Production":

CONTROL:	MAPPS system with touch screen operation 6 function window-set for easy access to the machine information. Machine operation scene-based automatic window-set change allows users to access the necessary information for each operation easily
JOBMANAGER:	Systematic planning, managing and preparing orders Machine-related creation and configuration of new orders Structured storage of all production-relevant data and documents Simple visualization of jobs including NC programs and resources
JOB ASSISTANT:	complete jobs / processing of orders Menu driven set-up of the machine and processing of Production orders in the dialog Reliable error prevention through notes with binding acknowledgement function

APPs " accessories":

TECH CALCULATOR:	calculating of technology data, dimensions and values Material - and process-dependent calculation process optimized Data for example for speed, feed, or spindle load Standards-conforming discovery defined dimensions, Providing data/dimensions as required by the standards for example, for Fits or thread Scientific calculator
CAD-CAM-VIEW:	visualizing of workpieces and optimizing of program data Direct remote access to external CAD/CAM-computer Central master data as the basis of the part visualization Immediate change options for processing steps NC programs and CAM strategies directly to the control
DOCUMENTS:	Digital library of full-text search Clear library structure for easy and quick orientation Digital storage of all machine-relevant manuals, Documentations and customer data Full text search and bookmark feature for recurring Lookup fields
ORGANIZER:	Calendar, and memo functions User-defined messaging functions Individual messages with SMART key ® Identification

APPs " support":

NETSERVICE:	Qualified support through Web-based remote diagnosis Remote communication with the service of DMG MORI SEIKI directly at the control unit Online troubleshooting and technical support via Internet Highest data security through VPN access

MACHINE CHECK:	Controlled maintenance and repair of the machine Process-based login system for maintenance with control function Preventative service and maintenance planning
APPs "Monitoring":	
STATUS MONITOR:	Machine status in real time Visualization of machine condition (spindle load,...) Displaying job information with quantity, lot size and Term to maturity Maintenance messages and warnings Energy return feed display
APPs " configuraton":	
ENERGY SAVING:	Automated energy management Categorized balance display for different machine States (Hold, ready for operation, processing) Programmatic Shutdown, WarmUp and StandBy functions for Machine, pneumatic, screen and lighting of workroom Utilization - and time-based process analysis as base of the Consumption optimization
SETTINGS:	Individualization and personalization SMART key ® -based user and rights management Individual APP customization General system settings

J-009853

2-turret specifications

- Standard equipment holder <Except when other tool holder is selected as an option>
  Standard equipment Tool holders may change by options for Turret.
  Please check Tooling System Diagram for details.

Boring bar sleeve	T20118 [dia.16] (T20119 [dia.5/8"])	1
Boring bar sleeve	T20120 [dia.20] (T20121 [dia.3/4"])	1
Boring bar sleeve	T20122 [dia.25] (T20123 [dia.1"])	1
Throw-away drill socket	T22052 [dia.20] (T22053 [dia.3/4"])	1
Lid for turret	F75054	32
O.D. cutting tool holder	T00224 [20 X 20] (T00234 [3/4" X 3/4"])	1
O.D. cutting dual-tool holder	T00228 [20 X 20] (T00250 [3/4" X 3/4"])	1
Cut-off tool holder	T00376 [20 X 20] (T00377 [3/4" X 3/4"])	1
I.D. boring bar holder	T10115 [dia.32] (T10119 [dia.1 1/4"])	1
Boring bar holder (double)	T10117 [dia.25] (T10139 [dia.1"])	1
Throw-away drill holder	T13132 [dia.32] (T13135 [dia.1 1/4"])	1
Lid for oil hole drill	F70151	1

( ) inch specification

3-turret specification

- Standard equipment holder <Except when other tool holder is selected as an option>
  Standard equipment Tool holders may change by options for Turret.
  Please check Tooling System Diagram for details.

Boring bar sleeve	T20118 [dia.16] (T20119 [dia.5/8"])	1
Boring bar sleeve	T20120 [dia.20] (T20121 [dia.3/4"])	1
Boring bar sleeve	T20122 [dia.25] (T20123 [dia.1"])	1
Throw-away drill socket	T22052 [dia.20] (T22053 [dia.3/4"])	1
Lid for turret	F75054	48
O.D. cutting tool holder	T00224 [20 X 20] (T00234 [3/4" X 3/4"])	2
O.D. cutting dual-tool holder	T00228 [20 X 20] (T00250 [3/4" X 3/4"])	2
Cut-off tool holder	T00378 [20 X 20] (T00379 [3/4" X 3/4"])	1
I.D. boring bar holder	T10115 [dia.32] (T10119 [dia.1 1/4"])	1
Boring bar holder (double)	T10117 [dia.25] (T10139 [dia.1"])	1
Throw-away drill holder	T13132 [dia.32] (T13135 [dia.1 1/4"])	1
Lid for oil hole drill	F70151	1

( ) inch specification

Center shutter specification

- Standard equipment holder <Except when other tool holder is selected as an option>
  Standard equipment Tool holders may change by options for Turret.
  Please check Tooling System Diagram for details.

Boring bar sleeve	T20118 [dia.16] (T20119 [dia.5/8"])	1
Boring bar sleeve	T20120 [dia.20] (T20121 [dia.3/4"])	1
Boring bar sleeve	T20122 [dia.25] (T20123 [dia.1"])	1
Throw-away drill socket	T22052 [dia.20] (T22053 [dia.3/4"])	1
Lid for turret	F75054	32
O.D. cutting tool holder	T00224 [20 X 20] (T00234 [3/4" X 3/4"])	1
O.D. cutting dual-tool holder	T00228 [20 X 20] (T00250 [3/4" X 3/4"])	1
Cut-off tool holder	T00378 [20 X 20] (T00379 [3/4" X 3/4"])	1
I.D. boring bar holder	T10115 [dia.32] (T10119 [dia.1 1/4"])	1
Boring bar holder (double)	T10117 [dia.25] (T10139 [dia.1"])	1
Throw-away drill holder	T13132 [dia.32] (T13135 [dia.1 1/4"])	1
Lid for oil hole drill	F70151	1

( ) inch specification

J-011731

IoTconnector
The **IoT***connector* enables to use the DMG MORI online services (eg **NET***service*). Thanks to an integrated firewall, the machine is protected against attacks despite the online connection. In addition, the **IoT***connector* receives security updates via an integrated DEVICE MANAGEMENT.

J-011732

NETservice
The NETservice stands for a couple of new features for optimal remote service support. Besides of an interactive
remote desktop feature for a direct view on HMI and control, direct file transfer of service related files the experts
of DMG MORI can be involved in a single or multi-user-conference. A chat and whiteboard functionality complete
the conference functionality.
Your customer benefits at a glance:
- Fast support through access to CELOS, IPC and NC
- Intuitive operation
- High transparency thanks to logging of all service activities
- Deposit of individual user profiles and rights
- Chat functionality for communication between customer and service
The usage of NETservice is free of charge for the duration of the machine warranty and ends automatically. NETservice after Warranty is subject to monthly costs. The DMG MORI Service is able to create a suitable offer.
Requirements of usage:
- Requires IoTconnector
- Requires Internet connection to the machine.

J-011734

Machine Data Connector (MDC)
Uniform machine data interface as an integrated function of the DMG MORI Connectivity Hardware independent of the machine controller, the machine signals are available as a signal output through one of the following protocols:
+ MQTT (MQTT client)
+ MTConnect (MTConnect Agent Version 1.4.0.3)
+ OPC-UA (DMG MORI OPC-UA Server Configuration)
The used protocol is to be configured at machines with CELOS (Version 6) through the App "Connector Management"
Updates for the software function of the Machine Data Connector will be provided directly to the DMG MORI Connectivity Hardware via DMG MORI Device Management. An Internet connection of the DMG MORI Connectivity Hardware is required for this update function.
The following signals are available:
- Machine Serial Number
- Operating hours
- Power On Time
- Controller Mode
- Status Stack Light
- Number of active alarms
- Notifications (Alarm/Warnings)
- Part Program Name
- Current Program Execution Time
- Spindle Override
- Desired Parts
- Feed Override
- Number of active Tool
- Rapid Override
- Execution State
- Part Counter
- Part Counter overall
- Additive DMG MORI machines (powder nozzle or powder bed) have a different signal set because of their machine technology.
Delivery:
- Software“ Machine Data Connector“ as integrated function of DMG MORI Connectivity Hardware
- Manual

Technical Description Alternative Options

J-EU1139

Paper belt filter TMF300, tank volume 980 l; level indicator with 3 switching points, level sensor IFM LKxxxx for chip conveyor, incl. hose package and signal cable connecting machine. Connection cable designed for machine I/F ""IKZ-IF-DMQP-CO-DE-201910"". Needs separate electrical power supply.; High pressure pump 0.1 - 7 Mpa (1 -70bar) - 32L/min
Through tool spindle (MC) respectively 1. turret (lathe); High pressure pump 0.1 - 7 Mpa (1 -70bar) - 32L/min 2nd turret; Shut Off Valve per 7.0MPa pump (3/2 way-valve); Shut Off Valve per 7.0MPa pump (3/2 way-valve); Low pressure pump 0.5MPa (5bar) - 60l/min
(through sub spindle coolant); Coolant chiller 8kW (immersion cooler); separate dirt-resistant lift up pump 0,9bar 240l/min
200V (3 phase) incl. hose to filter unit
(for assembly at machine's tank; adjust immersion depth)
Forced circulation via 5bar pump into the machine tank (3/2-way valve); circulation rate 110 L/min

Y-FS011

Appendix

Notes on the DMG MORI Full Service 5.0 service contract

Scope of services and costs:
- 5-year all-round carefree package according to warranty standard from commissioning of the machine (retroactive)
- All repair costs and spare parts for machine malfunctions included
- All ancillary costs such as the costs for travelling to and from the event and overnight stays for our technicians included
- Cover for crash and other property damage (see Contractual information)
- Annual manufacturer maintenance including replacement of necessary wear parts (as required)
- All services "from a single source" in the usual DMG MORI manufacturer quality

A. General

We are your contractual partner with regard to Full-Service 5.0. You can contact us with all questions and problems relating to Full-Service 5.0. Full-Service 5.0 includes the specific machine tool and, if applicable, DMQP options as per the purchase and delivery contract (hereinafter referred to as the '**product package**'). Any contractual service is provided exclusively under these conditions.

As part of Full Service 5.0, DMG MORI provides professional services for your product package that go beyond the basic warranty of the product package or follow on from it.

The term is granted for a period of 60 months from commissioning of the product package, subject to appropriate training of the machine operator, and expires automatically after these 60 months without the need for cancellation. Full Service 5.0 does not apply before acceptance of the machine.

We offer Full-Service 5.0 against payment of a fixed fee, which is calculated on the basis of the list prices of the product package, plus the applicable VAT. If payment is made annually, we charge an instalment fee of 10% of the total amount shown. The punctual receipt of annual instalment payments is your responsibility.

The fee to be paid is due in advance and will be invoiced after the product package has been put into operation. Each payment is due within 14 days net from receipt of the invoice. In the case of annual payment, the first instalment is due immediately net and thereafter at the beginning of each contract year.

When purchasing and paying for Full-Service 5.0 in the purchase and delivery contract for the product package, Full-Service is specified in the order confirmation. By returning the order confirmation signed by you, the Full-Service 5.0 contract is bindingly concluded.

B. Servicing and repair work

Within the scope of servicing and repair work, we will rectify damage to the product package caused by operating errors, clumsiness or intent on the part of third parties; design, material or workmanship defects; short circuits, overcurrent or overvoltage; failure of measuring, control or safety equipment; lack of water, oil or lubricant; tearing due to centrifugal force; excess or low pressure; storms, frost or ice.

In the event of repairs, DMG MORI shall decide at its own discretion whether the defective part is to be repaired or replaced. This may also involve a reconditioned and fully functional used part.

In all cases covered by the purchase and delivery contract of the product package and caused by collisions caused by you, we charge a flat rate of EUR 1,000 per case of damage per completed repair order, plus the applicable VAT. The flat rate will be invoiced immediately after completion of the work.

C. Full Service 5.0 following the warranty

The warranty period is defined in the purchase and delivery contract depending on the type of product package.

Provided that all maintenance intervals are adhered to with your obligation to co-operate, Full-Service 5.0 provides you with an all-round carefree package in accordance with warranty standards from the time the product package is commissioned until the end of the Full Service 5.0 term, but in no case for longer than 60 months. This means that we will replace or repair defective parts even if the basic warranty has expired in accordance with the purchase and delivery contract. No further services are owed in addition to the repair or replacement. The repair or replacement will not be carried out if the underlying defect was caused by the machine having previously been improperly used, maintained or repaired by a third party. For the avoidance of doubt, we would like to point out that your warranty claims under the purchase and delivery contract remain unaffected by this full-service contract.

D. Your Obligation

A prerequisite for the provision of the services in accordance with sections B. and C. is that you fulfil the obligations to cooperate set out in this section.

It is your responsibility to carry out the activities listed in the maintenance matrix of the operating instructions with a maintenance interval of less than 1,000 hours for the product package yourself in accordance with the guidelines recommended by DMG MORI in the operating instructions, and to have DMG MORI carry out maintenance once a year in line with the operating hours.

It is your responsibility to ensure that any person operating the product package has been qualified by DMG MORI certified trainers or a comparable training programme. The burden of proof that alternative training programmes are comparable lies with you.

It is your obligation to (a) immediately notify your DMG MORI sales and service company of how, when and where any damage occurred, (b) document the damage with photographs, (c) submit all photographs and other documentation of the damage and the e-mail address and telephone number of the persons in your company responsible for handling the incident, to give us a reasonable opportunity to investigate the damage and examine any physical evidence that may indicate the cause of the incident and take reasonable steps to mitigate the damage, (d) provide a police report confirmation in the case of theft and vandalism damage, and (e) co-operate with us to provide proper documentation.

Replaced and / or damaged parts become the property of DMG MORI. We reserve the right to charge any costs for damaged or replaced parts that are not returned to us.

In addition, every Full Service 5.0 assignment is subject to a service report and/or an acceptance report, which must be signed by both parties.

E. Exclusions from Full Service 5.0

DMG MORI will not provide services under Full-Service 5. 0 if the incident is caused directly or indirectly by one or more of the following excluded causes or events: wilful misconduct on your part; fraud, wilful concealment or misrepresentation; war, revolution, rebellion or insurrection, civil commotion; acts of terrorism; nuclear energy, nuclear radiation or radioactive substances; earthquake; flood; water affected groundwater due to flooding; normal wear and tear due to operation, premature wear and tear due to operation; corrosive attacks or erosion; excessive build-up of scale, sludge or other deposits; burglary and robbery; the presence of and/or exposure to pathogens, pathogenic organisms, fungi, bacteria, viruses; fire, snowstorms and explosions; cyber-attacks, computer viruses, malware and other alterations of electronic data.

The following services do not fall within the scope of Full-Service 5.0:

- Application support and commissioning
- Retrofitting of machines and options
- Liquids and auxiliary materials and consumables (e.g. oils, greases, cooling lubricants, double switching filters, paper tape and paper filters as well as filters for oil/emulsion mist separators and HEPA filters, filters from the maintenance kit outside of maintenance)
- Service calls without material damage due to incorrect programming or incorrect operation by the customer
- Service calls without material damage due to insufficient qualification of the operating or programming personnel by the customer
- Simple maintenance work that does not require the qualification of a DMG MORI technician; Maintenance work on machine options whose manufacturer is not DMG MORI, such as clamping devices; Foreseeable defects for which DMG MORI cannot be held responsible (e.g. jammed parts or residual pieces in the chip conveyor); defects due to inadequate cleaning or failure to maintain the machine; defects in the machine or spare parts as a result of self-performed assembly/repair without approval by DMG MORI; machine automation, e.g. handling systems (WH/PH), robot cells, bar feeders, etc., which always require a separate agreement, which always require a separate agreement.

F. Final Provision

We are entitled to terminate the Full Service 5.0 with immediate effect if you are in arrears with the payment of the Full Service 5.0 fee. In addition, we are entitled at our own discretion to withhold our services during the period of default.

You hereby consent to the transfer of your personal data from your DMG MORI sales and service company to other companies of the DMG MORI Group.

In addition, the respective valid ‘General Terms and Conditions for Customer Services and Spare Parts Deliveries of DMG MORI’ apply, which will be made available to you separately on request and can be accessed at https://en.dmgmori.com/terms-and-conditions. However, the provisions of this agreement shall take precedence as far as provisions are made here which deviate from the ‘General Terms and Conditions for Customer Services and Spare Parts Deliveries of DMG MORI’

Fulfilment of information obligations when collecting personal data on business transactions

The regional company: DMG MORI (see address header)
(hereinafter: "we"), as the controller pursuant to Art. 4 (7) GDPR, would like to point out that we collect, store and, if necessary, pass on personal data as part of pre-contractual requirements and to fulfil our contractual obligations. The legal basis for this data processing is Art. 6 para. 1 lit. b GDPR.

For the aforementioned purposes, we transmit personal data to our parent company, DMG MORI AG, and to our internal IT service provider, GILDEMEISTER Beteiligungen GmbH. In addition, it may be necessary to transfer personal data to other persons and companies within and outside our group of companies (e.g. other DMG MORI Group companies involved in the fulfilment of the contract, DMPQ partners, suppliers, freight forwarders and subcontractors). If we disclose data to other persons and companies (processors or third parties) as part of our processing, transfer it to them or otherwise grant them access to the data, this is also only done on the basis of legal permission, consent, a legal obligation to do so or on the basis of our legitimate interests. If processors are used, this is done on the basis of Art. 28 GDPR.

If we process data in a third country, i.e. outside the European Union or the European Economic Area, or if this occurs in the context of the use of third-party services or disclosure or transfer of data to third parties, this is only done to fulfil our (pre-)contractual obligations, on the basis of consent, on the basis of a legal obligation or on the basis of our legitimate interests. Subject to legal or contractual authorisations, we also only process or have the data processed in a third country if the specific requirements of Art. 44 et seq. GDPR are met. This means, for example, that the processing takes place on the basis of special guarantees, such as the officially recognised determination of an EU-compliant level of data protection or compliance with officially recognised, special contractual obligations (so-called standard contractual clauses).

In principle, we only process personal data for as long as is necessary to fulfil the respective purpose. As a rule, this corresponds to the duration of the contract, unless there are additional statutory retention obligations or legitimate interests in longer-term processing. If the required data is not provided, this may result in the smooth fulfilment of the contract being impaired or rendered impossible.

All data subjects have the right of access (Art. 15 GDPR), rectification (Art. 16 GDPR), erasure (Art. 17 GDPR), restriction of processing (Art. 18 GDPR), data portability (Art. 20 GDPR) and objection to processing (Art. 21 GDPR). Furthermore, data subjects can complain to the data protection supervisory authority about the processing of their data by us at any time.

Finally, you can find out about all further details in connection with data processing at www.datenschutz.dmgmori.com. If you have any questions, please contact the DMG data protection officer at responsibility@dmgmori.com.

ALLMÄNNA BESTÄMMELSER
För denna offert gäller villkor enligt NL 17, dock med följande undantag;
Om köparen har rätt till vite påbörjas beräkningen av vitesbeloppet 14 kalenderdagar från den dag leverans skulle ha skett.
I stället för vad som stadgas i punkt 16 i NL 17 angående procentsatser och maximering av vite på grund av leveransförsening skall följande gälla; Vitet skall, för varje hel vecka förseningen varar, utgöra 0,5 %, dock max 5 %, av 90% av det avtalade priset för produkten.

GARANTI
18 månader efter installation, på maskin och styrsystem.
På spindlar av typen MASTER gäller 36 månaders garanti.

BETALNINGSVILLKOR
40% vid order
50% innan maskinen lämnar fabrik
10% inom en månad från godkänt övertagande
Samtliga betalningar per 10 dagar netto.
Efter förfallodagen debiteras dröjsmålsränta med gällande referensränta +8%.

OFFERTENS GILTIGHETSTID
Denna offert gäller en månad från anbudsdatum.
Offert på lagermaskin gäller med reservation för mellankommande försäljning.

LEVERANSVILLKOR
CIP enligt INCOTERMS 2020, inkl. emballage, exkl. avlyft och intransport till Er adress

LEVERANSTID
Enligt senare överenskommelse.
Leveranstiden gäller från mottagen förskottsbetalning.
I de fall finansiering av ordern kommer att ske via leasingbolag återkommer vi med en aktuell leveranstid i samband med att beställning och förskottsbetalning inkommit.

INSTALLATION
Installation av all offererad utrustning enligt ovan.
Inkoppling av huvudström samt eventuell bultning/limning i golv eller fundament ingår ej. Mottagningsinstruktioner för utrustningen översänds senast en månad innan leverans. Beakta instruktioner avseende fundament, förankring och anslutning. Tidpunkt för installation och utbildning bokas i samråd med vår installationskoordinator. Notera att installation av eventuella retrofit-optioner kan komma att utföras senare än maskininstallationen.
Leverantören ansvarar inte för installation eller sammankoppling mellan maskin och eventuell automation/robot i de fall leveransomfånget enbart omfattar automationsinterface.

RMS (Relocation Machine Security)
Exportkontroll:
För att förhindra att utrustningen placeras illegalt hos individer eller nationer som hotar den internationella säkerheten kan alla DMG MORI maskiner, från och med den 1 januari 2023, omma att utrustas med en RMS-enhet (Relocation Machine Security). RMS-enheten avaktiverar maskinen automatiskt vid flytt eller demontering. Avaktiveringen sker inte under normal användning eller vid underhåll.
Om utrustningen avaktiverats kan den endast aktiveras igen av en auktoriserad representant från DMG MORI. Återaktivering kan beställas från DMG MORI Service. Om avaktiveringen beror på en omfattande serviceinsats återaktiveras den utan kostnad.
DMG MORI har rätt att neka återaktivering om det bekräftas att en sådan åtgärd skulle innebära otillåten teknologiexport eller på annat sätt strida mot gällande exportrestriktioner. DMG MORI har i dessa fall ingen skyldighet att återaktivera maskinen och skall inte hållas ansvarig för konsekvenserna av en sådan handling.

DMG MORI Sweden AB
Box 2105
42102 Västra Frölunda
Sweden

T +46 771 364 667

www.dmgmori.com

MF Precision AB
Martin Fredin
Norrtjämstaleden 16
827 31 Ljusdal

Västra Frölunda, 05/11/2024

CLX 450 TC – serial number: 10000002602
Offertnr. 52408862602
Projektnr. 1175210 / OP1535013

Enligt överenskommelse med vår säljare Willy Karlsson har vi härmed nöjet att offerera ovanstående maskin i utförande enligt nedan specifikation.

Om du har några frågor eller önskar ytterligare information är du alltid välkommen att kontakta oss! Du når vår säljrepresentant via kontaktuppgifterna nedan och vårt övriga säljteam på tel: 031-348 98 00, menyval 3.

Med vänlig hälsning,

Anders af Trampe
Säljsupport

DMG MORI Sweden AB

Kontaktuppgifter:
Willy Karlsson
Säljare
+46 762 44 05 65
willy.karlsson@dmgmori.com

Quotation

for

MF Precision AB

CLX 450 TC
Serial Number: 10000002602

Highlights

The added value compared to any universal turning machine!

_Chain magazine with 30 or 60 tools for highest flexibility
_Minimal setup and idle times thanks to multitools and sister tools
_Eccentric turning and milling with the Y-axis as standard
_Linear scales in X- and Y-axis for high machine accuracy (Z1-axis optional)
_Maximum usability of the working area through compactMASTER
_Interpolation of the B-axis with a resolution of 0.001 °.
_Optimally coordinated working area for components up to Ø400 mm x 1,100 mm

DMG MORI
CLX 450 TC

Machine and Options

Promotion package

COMPLETE PLUS, consisting of:	B-ACLX02	1
Universal turning-/milling center CLX 450 TC with turning length 1100 mm (43.3 in)	B-A7290*	1

- Main spindle as integrated spindle motor, ISM 65, A2-8", drive power 14/17 kW (18.7/22.7 hp) (S1-100%d.c. / S3-40%d.c.), torque 275/345 Nm (202.8/354.4 lb*ft) (S1-100%d.c. / S3-40%d.c.), speed range 0-5.000 rpm
- Hollow clamping device Ø67 mm (2.6 in)
- Turning-/ milling spindle compactMASTER, drive power 8,8/10,5 kW (11.8/14 hp) (S1-100%d.c. / S3-40%d.c.-2min), torque 73/90 Nm (53.8/66.3 lb*ft) (S1-100%d.c. / S3-40%d.c.-2min), speed range 0-12.000 rpm, reception HSK-A 63 DIN 69893
- B-axis ±120°
- Y-axis ±100 mm (±3.9 in)
- 30-fold chain magazine
- Absolute, direct measuring systems in X- and Y-axis
- Tailstock hydraulically operated with foot control pedal
- DMG MORI IoT connector
- Ergonomic control panel DMG MORI SLIMline
- Siemens 840D sl

* further description see attachment

Counter spindle as integrated spindle motor, ISM 65, A2-8" - Drive power 14/17 kW (18.7/22.7 hp) (S1-100%d.c. / S3-40%d.c.), - Torque 275/345 Nm (202.8/354.4 lb*ft) (S1-100%d.c. / S3-40%d.c.), - Speed range 0-5.000 rpm - Partial hollow clamping device Ø67 mm (2.6 in) - C-axis and spindle brake (hydr.) - Slide (Z3), AC servo motor with ball screw, absolute encoder	B-E7220	1
Dynamic two-pressure clamping at the control for the main spindle With the dynamic two-pressure clamping function, the clamping pressure in the dynamic movement can be regulated down to 5 bar. The force or pressure adjustment is set via the control, so that an adjustment via manually operated valves is not necessary.	B-B0036*	1
Dynamic two-pressure clamping at the control for the counter spindle With the dynamic two-pressure clamping function, the clamping pressure in the dynamic movement can be regulated down to 5 bar. The force or pressure adjustment is set via the control, so that an adjustment via manually operated valves is not necessary.	B-B0036G*	1
Tailstock function for the counter spindle incl. foot switch. Mechatronic control of the supporting force, selectable per program Thrust force: CTX 2500, CTX beta, CTX beta TC, CLX TC: 2.5 - 6 kN CTX beta 2000 TC: 2,5 - 17 kN	B-D7020	1
Chain magazine 60fold, instead of chain magazine 30fold	B-H7034	1

* further description see attachment

Hinged type chip conveyor incl. coolant tank	B-F7002	1
Chuck rinsing device for main spindle, outside	B-B0012	1
Chuck rinsing device for counter spindle, outside	B-B0012G	1
Coolant supply through the counter spindle	B-B0045G	1
Coolant spray gun	B-Z0400	1
Window cleaning of the security window of the working area door by compressed air (Remark: The employment of coolant can limit the view on the workpiece at machining)	B-Z0262	1
Inputs / outputs programmable via M-functions, consisting of: 8 inputs 4 outputs, 2 amperes 4 outputs, potential-free	B-A0130	1
Extended number of tool data and tool offsets to 3000 tool offsets at max. 1500 available tool data (max. 8 cutting edges)	B-A0135	1
Excentric turning and milling operation (only with Siemens control and Y-axis)	B-A0326*	1
Technology cycle for the application of an alternating speed for vibration sensitive set-ups (Only in conjunction with Siemens control)	B-A0335*	1
Multi-thread cycle 2.0 Cycle to create position orientated threads with free contours, pitches and free number of threads, e.g. for big transmission or special threads. Targeted overlapping of threads with cross-holes, e.g. redirection systems with ball screw nuts are possible. (Available with Siemens Operate starting with version 4.5)	B-A0374	1

* further description see attachment

Package for tropical climate for ambient temperature of max. 50ºC, consisting of cooling system for control cabinet (until 50º) and machine	B-Z0076	1
Signal provision for production data acquisition. Extended interface. There are 8 of > 40 signals potential-free contacts provided. If an order is placed, the corresponding form must be requested from the factory.	B-Z0302*	1
Electronic handwheel	B-Z0140	1
Automation package, consisting of:	B-ACLX12	1
Signal lamp, 4-fold, coloured	B-Z0205*	1
Automatic door, electrical	B-H7050	1
Electrical interface standard Profibus for Robo2Go Incl. - Additional compressed air supply - Additional Ethernet interface - Power supply of the robot by the machine - User interface integrated into CELOS* (Powertool with CELOS 4 as App) The Powertool / App will be installed with integration of the Robo2Go to the machine. Note: - Special operating mode 3 / operating mode grinding is not feasible in connection with the electrical interface - *Except CLX 450 TC	B-L7208	1
3D data model of the working area of the specified machine in Step and IGES data format. The 3D data model is delivered on a data carrier.	B-Z0908	1

* further description see attachment

Measuring package, consisting of:	B-ACLX13	1
Workpiece touch probe RMP40, Renishaw	B-H7017	1

- Dimensions base body (excl. stylus): Ø40x50 mm
- Repeatability in one direction: 1 µm
- Interchangeable in the turning/milling spindle
- Probe reception and tracer point with data transfer between probe and receiver by radio signals
- Incl. Inspection Plus measuring cycle package

Note:
Customer-specific measuring cycles are not included

Tool measuring device RP1, Renishaw	B-H7018	1

Automatic 5-way tool measurement in the machine by means of touch cubes to avoid measuring and transmission errors. Precise measurement of tool length and tool diameter for stationary tools (turning tools).
The measurement takes place below the tool changer, protected behind the tool loading hatch.

Measuring system for Z1-axis	B-C7227	1

Control

CNC-control with Siemens 840D sl Operate inclusive 19“ SLIMline® control with multi-touch-monitor	B-A7080*	1

Chucks for main spindle

3-jaw power clamping chuck with through-hole and fine serration	B-S0634*	1

Type BBD 210-66, SMW, with one set of base and hard top jaws, incl. connecting elements

- Max. speed 5000 rpm
- Max. clamping force 108 kN
- Max. actuating force 38 kN
- Serration 1/16" x 90°

* further description see attachment

Chucks for counter spindle

3-jaw power clamping chuck with through-hole and fine serration Type BBD 210-66, SMW, with one set of base and hard top jaws, incl. connecting elements - Max. speed 5000 rpm - Max. clamping force 108 kN - Max. actuating force 38 kN - Serration 1/16" x 90°	B-S0634G*	1

Coolant supply / Chip removal

Compact coolant system, consisting of: - coolant tank, 600 litre/158.5 gal - 8 bar/20 litre/min (CTX beta 2000 TC, CTX gamma TC 2nd: 8 bar/80 l/min /116 psi/ 21.1 gal/min) and 20 bar/25 litre/min (theoretical pump performance) (116.psi/5.2 gal/min and 290 psi/6.6 gal/min) programmable via M-functions coolant supply turning/milling spindle - band filtration unit, grade of filtration 40 µm/1,57 µ inch - level controlled pump	B-F01421	1
Preparation for oil mist extractor incl. electrical interface Connection diameter: Ø 198 mm (7.79 in) Exceptions: NEF 400, CTX2500, CTV 3rd: Ø 147 mm (5.78 in)	B-H0010	1

Measuring / Monitoring

Calibration device for the workpiece touch probe Scope: magnetic base holder and a polished ground calibration ball (Ø 25 mm), packed in a carrying case Note: Only in connection with workpiece touch probe	B-H701K	1

Measure

Measure mm	B-Z0110	1

* further description see attachment

Options for Siemens control with CELOS / Siemens

Technology cycle with dialog-guided programming for the production of any keyways according to DIN6885 or driving grooves according to DIN138 with standard tools. This option contains the technology cycle with the corresponding input mask.	B-A0349*	1
A package of measuring cycles from Gildemeister Drehmaschinen GmbH for in-process measurement on turning/milling machines with probes from Renishaw or BLUM. The package includes cycles for calibration or for fast and reliable measurement on turning and turning-milling components.	B-A0382	1

Documentation

Technical documentation	B-A0095	1

Special constructions

Tool package from Haimer corresponding to a value of 10.000 EUR according to gross price list. To be called off within six months from delivery of machine.	SK002	1

Digitalization Products

DMG MORI Connectivity

Digital Manufacturing Package **(1) IoT*connector*** Allows the use of the Online services from DMG MORI **(2) Machine Data Connector (MDC)** Standardized machine data interface Protocols: OPCUA, MTConnect, MQTT **(3) NETservice** Qualified support through internet-based remote diagnosis	D-CO200*	1

* further description see attachment

TDM Toolmanagement

DMG MORI Toolmanagement - 60 days trial licence	D-TD0001*	1

Software for the acquisition, management of tool components, complete tools and tool lists with transfer in several CAM-Systems

The following functions are supported:

- Scanning of individual components
- Multiple methods for tool selection
- Automatic 2D complete tool assembly
- Display of 2D graphics, photos and text files
- Generation of tool lists
- Interface for several CAM-Systens

Services

Packing / Transport / Installation

Packing cost for road transport, means of transport and transport locks	B-Y0005	1

Special constructions services

Retrofit option	SK004	1

Documents and signs in Swedish

Please note: this retrofit option will be delivered and installed separately.

* further description see attachment

Sales company services

Installation of all quoted equipment at customer's site Incl. travel and accommodation costs	330IT	1
Training 3,5 days at, customer's site Incl. travel and accommodation costs Day 1 - 08:30 to 15:15 or 12:45 to 15:15 Day 2 - 08:30 to 15:15 Day 3 - 08:30 to 15:15 Day 4 - 08:30 to 12:00 or 08:30 to 15:15 Max. 4 participants	330L06	1
Transportation of machine and accessories, CIP customer's site (INCOTERMS 2010) Excl. unloading and transport to installation point	330TD	1

Special price **393.000,00 EUR**

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* further description see attachment

Quotation note

FINANCING DIRECTLY FROM DMG MORI!

DMG MORI Finance supports DMG MORI customers with tailored and fair financing solutions. Benefit from an excellent machine tool know-how combined with best conditions.

Get in touch with your Key Account Manager at DMG MORI Finance and ask for a personalized financing quote. We are looking forward hearing from you.

Contact:

Mr. Nicolas Straub
Tel: +49 (0) 151 / 402 47 572
Email: nicolas.straub@dmgmori-finance.com

* further description see attachment

Attachment

Technical Description

B-A7290

Technical description CLX 450 TC Subject to changes

Machine bed
The rigid 4-guide machine bed made of high-quality machine casting with screwed-on linear slide ways ensures free chip fall.

Headstock left, fixed
The headstock is designed as an integrated spindle motor with C-axis and hydr. actuated spindle brake. The spindle motor including the motor console is water cooled and is characterized by high dynamics, high torque, high thermal stability and low noise level.

Clamping device, spindle left
Hydraulic clamp 1-pressure, full clamping cylinder with safety device and stroke control, hollow clamping device Ø 67 mm, foot switch with electric/hydraulic control, completely assembled.

Upper slide
4-axis slide with X1-, Z1-, Y1- and B-axis. Additionally with low-friction, pre-loaded linear guiding elements and rotary, freely interpolatable B-axis.

Tool carrier on top as turning- and milling spindle
The turning- and milling spindle is designed as a motor spindle with direct drive, supplemented by a hydraulic clamp for frictional locking for turning operations. It includes a function for internal switching between coolant and compressed air. The tool holder is HSK 63A according to DIN 69893. The tool changer has HSK-T standard so that HSK-T tools can be used.
The tool clamping device is released hydraulically and clamped mechanically by disc springs.
Integrated motor spindle compactMASTER® with 36 months warranty period for the component spindle without restriction of spindle hours.

Feed drives with digital drive control
Feed drive longitudinal, transversal and vertical with highly dynamic synchronous drives and ball screws. High-torque torque motor for the rotary axis (B-axis).

Measuring systems
The linear axes of the upper slide in X-, Y- and Z-axis* are equipped with absolute direct linear scales and are pressurized with compressed air. The B-axis has an incremental inductive rotary encoder.

Tool magazine
Chain magazine with 30 tool places at the front on the left side with ergonomic front loading for optimum operating comfort. (More service friendly for access for maintenance work in the magazine area).

Tailstock
The automatically moving tailstock with a live center MT5 is guided on low-friction, preloaded linear rolling guide elements and positioned hydraulically via M command or foot switch. The setting force is adjusted via pressure control valves. The displacement measurement is incremental.

Control system
CNC control with SLIMline control panel, manufacturer and type see control description.

Electrical data
Operating voltage: 400 V, (L1, L2, L3) ±10%, N, PE, 50 Hz, ±1%

Control voltage:	Contactors 24 V DC
Machine light:	Protection class IP 67, 24 V DC
Electrical equipment:	DIN EN 60204 T1, switch cabinet in protection class IP 54 with filter fan

Protective measures
This turning machine is designed for the protective measure protective line system (protective earthing).
It must not be operated on networks with residual current protection devices.

Lubrication
Central lubrication system with impulse lubrication and electrical monitoring.

Coolant system
Coolant unit with separate circuits, selectable via M-function.
Coolant circuit for tool carrier top and chuck jaw rinsing device.

Chip tray
Chip tray with coolant tank, 165 l.

Hydraulic power unit
Frequency-controlled hydraulic unit complete with control pump and micro filtering in the pressure line.

Cover
Closed machine cover with sliding doors on the operating side, with electrical monitoring and electro-magnetic locking in accordance with accident prevention regulations All machine assemblies are covered in a chip- and splash-proof manner against the chip compartment.

Color
Painting (design variant "Black")

Machine cover:	Calcite-white (RAL 9010, pure white)
Protection door:	Deep black, smooth, high gloss (RAL 9005)
Front panel:	Deep black, smooth, high-gloss (RAL 9005)
Front windscreen frame:	Deep black, smooth, high-gloss (RAL 9005)
Control cabinet:	Titanium grey (RAL 7016, anthracite grey)
Chip conveyor:	Titanium grey (RAL 7016, anthracite grey)

Machine installation elements
with 10 plates and 10 heavy duty anchors

Scope of delivery documentation:
Operating Instructions:
Germany and German speaking countries: German
Europe (without German-speaking countries) German + national language
USA, Korea English
China, Japan, Russia: English + local language
Technical Documentation Mechanical Systems available in DE, EN, FR, IT
Technical Documentation Programming:
Germany and German speaking countries: German
Europe (without German-speaking countries) German + national language,
(depending on the availability of the control manufacturer)
USA: English
China (simplified) English + local language
Japan, Korea, Russia: English + national language
(depending on the availability of the control manufacturer)
Technical Documentation Electrics (incl. electrical circuit diagram with fluid diagram): available in DE, EN, FR, IT
The required languages must be ordered according to the country-specific legislation in consultation with the

supplier plant.

Note
Cooling lubricant is not supplied with the machine.

Options
Counter spindle
Counter spindle for back-machining of the workpiece (integrated spindle motor) on separate slide instead of the tailstock.

Chip conveyor
Hinged plate chip conveyor with electrical running control, including transport rollers for easy installation and removal from the front, attachments and electrical control.
Discharge height approx. 1200 mm.

Technical data — Subject to technical modifications

Working area	
Swing diameter	500 mm 19.6 in
Max. turning diameter	400 mm 15.7 in
Max. turning length	1100 mm 43.3 in
Center distance for tailstock machine	1472,5 mm 57.9 in
Spindle distance for counter spindle machine	1435 mm 56.4 in
Spindle 1 Main spindle, left	
Spindle head (short taper)	A2-8
Chuck diameter	210-325 mm 8.2-12.7 in
Max. bar diameter	65 mm 2.5 in
Spindle bore diameter	87 mm 3.4 in
Draw tube inner diameter	67 mm 2.6 in
Diameter in front bearing	130 mm 5.1 in
Drive power, S1-100%d.c. / S3-40%d.c.	14/17 kW 18.7/22.7 hp
Max. Speed	5000 rpm
Power knee	485 rpm
Torque, S1-100%d.c. / S3-40%d.c.	275/345 Nm 202/254 lb*ft
Drive type, number of ranges	AC/1
Design	ISM 65
C-axis resolution	0.001 degrees
Slide 1, top	
Slide traverse X1 (below center)	750 mm 29.5 in
Slide traverse Y1	±100 mm ±3.9 in
Slide traverse Z1	1100 mm 43.3 in
Rapid traverse speed X/Y/Z	40/40/40 m/min 131/131/131 ft/min
Feed force 100% X/Y/Z	5,6/5,5/7,5 kN 1258/1236/1686 lbf
Feed force 40% X/Y/Z	8,5/7,5/10 kN 1910/1686/2248 lbf
Travel resolution X/Y/Z	0,001 mm 0.00003937 in
Ball screws -X/-Y/-Z, d x h	Ø40x10 mm Ø1.57x0.39 in
Turning-/milling spindle	
Tool holder	HSK-A 63

Max. Speed	12000 rpm
Diameter front and rear bearing	70/75 mm 2.7/2.9 in
Drive power, S1-100%ED / S3-40%ED-2min	8,8/10,5 kW 11.8/14 hp
Torque, S1-100%ED / S3-40%ED-2min	73/90 Nm 53/66 lb*ft
Drive type, number of ranges	AC/1
Indexing angle	0.001 degrees
Holding torque, locked	850 Nm 626 lb*ft

B-axis

Swivel range	±120 degrees
Torque, S6-40% d.c.	614 Nm 452 lb*ft
Measuring system	Incremental
Angular resolution	0.001 degrees
Clamping torque	2800 Nm 2065 lb*ft

Tool magazine

Magazine type	chain
Max. tool places	30
Max. tool weight	8 kg 17.6 lbs
Max. total load	120 kg 264.5 lbs
Max. eccentric load	48 kg 105.8 lbs
Max. tool length HSK-A/T 63	300 mm 11.8 in
Max. tool length Capto C6	295 mm 11.6 in
Tool diameter	78 mm 3 in
Tool diameter with free space	125 mm 4.9 in
Tilting moment tool	10 Nm 7.3 lb*ft
Tool change time	1.6 s

Tailstock

Travel	1200 mm 47.2 in
Adjustment force	8,8 kN 1978 lbf
Center punch holder	5 MT
Drive type	hydraulic
Rapid traverse speed Z	5 m/min 16.4 ft/min

Cooling unit

Cooling: tool spindle, B-axis torque motor, main spindle, hydraulics

Motor flanges X1&Y1

Capacity	19,5 l 5.1 gal
Cooling capacity	2,7 kW 3.6 hp
Delivery rate	8 l/min 2.1 gal/min
Delivery pressure	0,75 bar 10.8 psi
Number of cooling circuits	1

Coolant unit

Pressure	6 bar 87 psi
Delivery rate	20 l/min 5.28 gal/min
Filter type	Strainer + Insert filter
Filter fineness	50 µm

Chip tray

Coolant capacity	165 l 43.5 gal

Chip conveyor*

Coolant capacity	245 l 64.6 gal
Chip conveying capacity	150 kg/h 330 lbs/h

Hydraulics	
Capacity	20 l 5.28 gal
Power pump (frequency controlled)	4 kW 5.36 hp
Pressure pump	100 bar 1450 psi
Delivery rate pump	24 l/min 6.3 gal/min
Pneumatics	
Pressure	5-8 bar 72-116 psi
Air consumption	10 m³/h 353 ft3 /h
Electrical energy demand	
Connected load	40 kVA
Operating voltage	400 (L1, L2, L3) V ±10%, N, PE
Frequency	50 Hz
Fuse protection (slow blow, permissible)	VDE 0100 63 A
Environmental conditions	
Permissible ambient temperature from +15 to +35ºC	
Max. relative humidity	75%
Max. Installation altitude	1000 m above sea level
Accuracy according to VDI ISO 230-2 (at T=20 ± 2º C)	
Two-sided position uncertainty A in X1/Y1/Z1/Z3	5/5/12/12 µm
Two-sided position uncertainty A in C3/C4	18/18 arcsec
One-sided systematic position deviation E in X1/Y1/Z1/Z3	4/4/10/12 µm
One-sided systematic position deviation E in C3/C4	15/15 arcsec
One-sided repeatability of positioning R in X1/Y1/Z1/Z3	2/2/8/6 µm
One-sided repeatability of positioning R in C3/C4	10/10 arcsec
Reversal span B in X1/Y1/Z1/Z3	2/2/4/4 µm
Reversal margin B in C3/C4	6/6 arcsec
Dimensions and Weights	
Installation - Dimensions L/W/H	5187.5/2107/2462 mm 204.2/82.9/96.9 in
Max. Weight of the machine incl. switch cabinet	11200 kg 24691 lbs
Emission sound pressure level	
Emission sound pressure level LpA max.	75 dB(A)

*Option

B-B0036

Operating principle:
The chuck closes with a high pressure up to a freely definable changeover point (overcoming stick slip effects / time reduction during clamping).
The piston surface of the clamping cylinder is subjected to a reduced pressure from the defined switchover point. The chuck closes with a reduced clamping force.

Attention:
The minimum clamping force of the clamping cylinder results from the minimum adjustable clamping pressure and the respective piston surface of the clamping cylinder used and can be read off by the operator in the control. In the dynamic movement, the clamping pressure can be adjusted down to 5 bar.

B-B0036G

Operating principle:
The chuck closes with a high pressure up to a freely definable changeover point (overcoming stick slip effects / time reduction during clamping).
The piston surface of the clamping cylinder is subjected to a reduced pressure from the defined switchover point. The chuck closes with a reduced clamping force.

Attention:
The minimum clamping force of the clamping cylinder results from the minimum adjustable clamping pressure and the respective piston surface of the clamping cylinder used and can be read off by the operator in the control. In the dynamic movement, the clamping pressure can be adjusted down to 5 bar.

B-A0326

The rotation movement of the workpiece, additional movements in the X and Y are superimposed. This results in a shift of the rotation center (eccentric). Limitations in the eccentricity are resulting from the workpiece geometry, machine working space and technology.

Applicable to DIN programming and programming with ShopTurn 3G Version 4.4

B-A0335

With this cycle, either the workpiece or the tool spindle speed can be brought into alternate speed.
By entering the parameter differential speed (amplitude) and time (frequency), the spindle speed oscillates harmonically along the programmed set speed. Excitation frequencies are absorbed and vibration of the tool at the workpiece can be avoided.

B-Z0302

In this option are 8 out of > 40 selected internal signals available on an interface. The transfer is potential free on a terminal strip.

Specification of potential free contacts:
Permissible switching current range: 10 mA - 500 mA
Permissible switching voltage: 12 V - 30 V DC

Permissible loads:
- Purely resistive load
- Inductive load with appropriate interference suppression (suppressor diode, varistor, etc.)
- Capacitive load only when I < 500 mA is always observed

These data serve only as information for project planning, valid is always the machine documentation.

Note: For diverging function of the 4-fold signal lamp from Gildemeister Standard the specifications above are no longer valid.

In case of order, the appropriate form has to be filled out and has to be send to the plant.

ODA extended interface (8 from X) This document is intended as feedback about sales and customers.
With reference to the machine project, the required signals are to be selected here.

This system is installed on the following machine:
Machine type: Project No.:
Machine No.:
Function description:

This option offers 8 available signals on an interface from a selection of more than 40 internal signals.
The transfer is potential-free on a terminal strip.
Max. 8 signals are possible.
This option is only available in conjunction with a new machine.

Signal	Beschreibung
O_ODI_Signal_00	NCKready (NCK ready for operation)
O_ODI_Signal_01	Feed speed override >= 80
O_ODI_Signal_02	Machine in production (spindle is turning and at least one axis is moving)
O_ODI_Signal_03	Feed speed override >= 100 and program is running in automatic mode and at least one spindle or axis is moving
O_ODI_Signal_04	V Feed speed override < 100 and feed speed override > 0 and program is running in automatic mode, not in MDA, and at least one spindle or axis is moving
O_ODI_Signal_05	Handling interface is On ein, lathe signals that the machining compartment is free (hood open), machine and robot in automatic mode and program is running. **
O_ODI_Signal_06	Machine is in automatic mode and a tool has been requested which could not be found in the magazine or the service life of which has elapsed, meaning it is locked (alarm NCK22067) (Only in conjunction with chain/plate magazine)**
O_ODI_Signal_07	M00 occurred (set in case of occurrence, deleted again in case of a reset and cycle start)
O_ODI_Signal_08	Machine is ON (drives, hydraulics) and an error is pending
O_ODI_Signal_09	Feed speed override > 0, machine in MDA and at least one spindle or axis is moving
O_ODI_Signal_10	Program running ** Only available in conjunction with the option.
O_ODI_Signal_11	Red signal: identical to the red light of the 4-sectional signal light General malfunction requiring immediate action, hazardous status, high priority error which immediately stops the machine, e. g. Emergency Stop or stop at the stopping point Note: Red is always lit up on its own. A combination with other colours is undefined.
O_ODI_Signal_12	Yellow signal: identical to the yellow light of the 4-sectional signal light Machine intervention by the maintenance personnel required, as a low priority error message is pending; e.g. advance warnings for lack of water, advance warnings for soiled filters. Note: Yellow is lit regardless of the machine operating mode. * Combination with green and blue possible
O_ODI_Signal_13	Lack of material for the bar loader (only if the bar loader signals this bar supply)**
O_ODI_Signal_14	Green signal: identical to the green light of the 4 sectional signal light Machine is in "automatic" or "MDA" mode, regardless of the advance override. Note: The green light is not lit when operating mode 2 (set up mode) or operating mode 3/4 (special modes) are selected. *Combination with blue and yellow possible.

O_ODI_Signal_15	Blue signal: identical to the blue light of the 4-sectional signal light An operator action is required. - Blue steady light: The operating mode "Automatic" or "MDA" is selected and an intervention by the operator is required, e.g. "Cycle start" required, workpiece magazine empty or completely processed, lack of material on the bar pusher, or operating mode 2 (set-up mode) or 3/4 (special modes) are selected.. - Blue flashing: The special mode is active. Note: *Combination with green and yellow possible. ** Only available in conjunction with the option.
O_ODI_Signal_16	At least one spindle is turning
O_ODI_Signal_17	Cycle start pulse (100msec)
O_ODI_Signal_18	Cycle stop/end pulse (100msec)
O_ODI_Signal_19	Program active (running or interrupted)
O_ODI_Signal_20	Debounced signal of min. level clean water tank **
O_ODI_Signal_21	Watchdog signal pulse/pause 1 sec.
O_ODI_Signal_22	AUTOMATIC operating mode and not MDA
O_ODI_Signal_23	Axis and spindle moving, min. axis override definable with deactivation delay and operating modes independent.
O_ODI_Signal_24	Tool monitoring signals tool breakage. Signal is not deleted until the reset button has been pressed. **
O_ODI_Signal_25	Utilization time (axis override is definable)
O_ODI_Signal_26	Program interrupted or M00/M01 programmed (not in single block)
O_ODI_Signal_27	M30/M02 program end pulse (500msec) ** Only available in conjunction with the option.
O_ODI_Signal_28	Machines (drives) are ON
O_ODI_Signal_29	Signal switches to 1 when: Machine (drives) ON Automatic operating mode All axes referenced Handling active (selection via mask) Bar loader active (selection via mask) **
O_ODI_Signal_30	M99 program end pulse (100msec)
O_ODI_Signal_31	All channels in RESET mode
O_ODI_Signal_32	Protective hood is locked
O_ODI_Signal_33	Override larger than; equals 100 %
O_ODI_Signal_34	Override less than 100 %
O_ODI_Signal_35	Machine in production (spindle must turn or steady rest/tailstock approached or IP_measurement active) Feed is set so that the green signal light is "ON"
O_ODI_Signal_36	Bar change release (M65)**
O_ODI_Signal_37	NC error or PLC error is pending
O_ODI_Signal_38	Cycle stop by the operator ** Only available in conjunction with the option.
O_ODI_Signal_39	Quantity pulse (approx. 500 ms)
O_ODI_Signal_40	No axis is moving
O_ODI_Signal_41	No spindle is moving

B-Z0205

Signal lamp mounted above the machine cover on a vertical pipe. The following operating states of the machine are displayed via the control lamp:

Red (static) - General malfunction
Requiring immediate action. Hazardous status, high priority error which immediately stops the machine, e. g. Emergency Stop or stop at the stopping point.

Yellow (static) - Machine intervention by maintenance personnel required.
Low-priority error message pending, for instance preliminary warnings for lack of liquid, soiled filter.

Green (static) - Machine is in automatic or MDA mode

Blue (static) - Operator action required.
The automatic or MDA mode is selected and requires an intervention by the operator, e.g. Cycle start, workpiece magazine empty or completely processed, lack of material on the bar pusher, or operating mode 2 (set-up mode) or 3/4 (special modes) are selected.

Blue (flashing) - Operating mode 3/4 (special mode) is selected (option).
The machine always requires an action by the operator, if operating mode 3/4 (special mode) is active.

B-A7080

Siemens 840D sl Operate

CONTROL DATA

Scope of delivery
ShopTurn 3G includes ShopTurn and DIN programming.

Control type
Contouring control for all axes, spindles, tool changer, tool magazine, turrets and tool drives.

Metric system of measurement

Input system metric or inch

Dimension input chain dimension/reference dimension

Input unit 0.001 mm (0.0001 inch)

Interpolation type and range linear ±99999.999 mm
circular ±99999.999 mm

Feed input directly in mm/rev or mm/min.

Feed rate superimposition 0 - 120

Feed range
- 0.001 mm/rev to rapid traverse rate

External servo handwheel
For fine adjustment of the slides, selectable ranges on the handwheel: 0.1 mm, 0.01 mm and 0.001 mm.

Thread cutting
- 0.001 to 500.000 mm/rev, longitudinal, plane and taper threads
- Single or multiple pass with constant or variable pitch
- Thread with inclined inlet and outlet

Rapid traverse limitation by parameter input

Spindle speed Input in rpm.

Spindle speed superimposition from 50 to 150%.

Spindle speed limitation
Programmable and adjustable via parameters.

* Machine dependent

Spindle stop via C-axis

Coordinate system
- Cartesian, polar and cylindrical coordinates

Constant cutting speed Input in m/min.

Tool programming

Tool name with tool data

Number of tool data / tool offsets
1500 tool cutting edges with a maximum of 600 tools available

- Tool types displayed as icons
- Tool name Alphanumeric 24 characters
- Multitool with max. 64 tools

Cutter radius compensation
- Programmable via G40, G41 and G42

Tool life monitoring
- Monitoring of tool life with automatic activation of replacement tools

Tool list
- Uniform tool list for all modes
- Firm compound of multitools
- Sort, filter and search within the list

Real-time clock
- Time is retained even after switching off.

Processing time
- Measurement of the elapsed machining time between the start and end of the program

Limit switch
- Software limit switch per axis direction

Spindle pitch compensation for all axes

Reverse play compensation available

Zero offset
- 4 pieces can be permanently called up via G54 - G57 and others can be programmed additively

Working memory

CNC working memory internal to NCU
- Up to 16 MB (for NCU710.3B depending on memory partitioning)
- Up to 22 MB (for NCU720.3B depending on memory partitioning)

Additional memory on CF Card NC-Extend 6GB

Program management
- Program name max. 24 characters

C-axis machining of lateral surfaces

Face machining
- With C-axis in Cartesian programming

Helical interpolation available

Program management
- Program name max. 24 characters

- Max. 1000 programs in NC memory with max. 512 files per directory-
Max. 250 workpieces, in total 256 directories

Subroutines 16 nesting levels

Subprogram repetition Repetition cycle 1 - 9999 times

Program format
- Program input based on DIN 66 025 with variable block length and
High-level language extension

Programming support for cycles
- Masks and animated auxiliary images
- Technological cycles for drilling / milling and turning

Simulation
- Traversing simulation line graphics or solid model with dynamic material removal
- Parallel simulation for machining (not with NCU710.3)
- Simulation of multi-channel machining (depending on machine configuration)

Program input/output
USB, on-screen keyboard for alphanumeric input, work from external data storage via network connection (Ethernet)

Ethernet interface available

USB interface in the control panel

Program editor
- Select, copy, delete areas
- Uniform editor for all programming functions
 -ASCII
- ProgramGuide
- ShopTurn
- Multichannel editor*

Cycles
- Clamping cycles for longitudinal, plane (rising contours), recesses, undercuts, threads and drilling cycles

Sentence search
- By machining status or block in the active program

Parameter
- Machine, setup and work parameters, editable on the control system

Reference point driving
- Not required, since axes with absolute encoder
- With B-axis available with independent retract from reference switch*.

Variable programming
- 500 global and 200 local variables for programming families of parts; trigonometric -.
 arithmetic functions, Boolean operations

Chamfers and radii
- Chamfer and radius programming at contour transitions

Drawing dimension direct programming available

Jump function absolute and conditional jump

Real time clock Power failure proof with battery

Diagnosis (automatic)
- Constant condition monitoring through the integrated diagnostic system
- Display of the current error states

Soft keys for special functions
- Create screenshots
- Language switching
- Copy, Paste, Cut, Select
- Backing up log files to USB or CF card
- Entry program start and end

Diagnosis after selection Display of:
- Internal memory contents
- Income and expenses
- The last error texts with time and date

MACHINEcheck
- Maintenance reminder application
- Optional: Maintenance training for your DMG MORI machine
- Optional: DMG Service Agent with the functions
 Notification, guidance and support for spare parts ordering

AUTOshutdown
Intelligent standby control to avoid unnecessary energy consumption by time-controlled shutdown of unused units.
The times and shutdown conditions can be individually adapted by the customer to his production for each machine in an easy-to-use NC mask.

Screen layout
- Display of the actual values of all axes (position, speed) in the operating modes manual control and Automatic
- Display of block number, feed rate, tool number and tool offset of the respective selected slide
- Actual value display for path dimensions, feed rate, speed, tool, vertical and horizontal soft keys
- Multi-channel display*

Plain text display
- Program text, block text, diagnostic text

Possible languages
- German
- English
- French
- Italian
- Spanish
- (other languages on request)

Functional scope of ShopTurn 3G control software on Operate user interface

Programming options

Scope of functions
Summary of the different programming interfaces for production and job store in a system.

DIN/ISO
Programming in plain text format or edit external programs.

programGuide
Creating DIN - programs with graphical support.

ShopTurn
Work step programming with graphic support and automatic generation of approach and departure paths.

programsync
Programming in programmGuide, ShopTurn or also mixed possible.
Block formation to summarize work steps in programGuide or ShopTurn.

Programming programGuide

Cycle programming
- Convenient cycles with graphically animated support
- Uniform look and feel between all programming types

Manual functions/setup functions

Measure workpiece
- Workpiece scratching in Z axis

Measure tool
- Measure mold with probe or tooleye (option)
- Measure tool by scratching

Automatic functions
- Block scan (also on individual holes of a hole pattern)
- Block sequence (automatic mode)
- Work plan test (dry run)
 (Limitations of the function possible depending on the machine equipment)
- Returning to the contour, block search run

More functions

Help functions
- Context sensitive online help
- Tooltips on each input dialog
- Syntax check with value control and color feedback

Simulation display
- Raw contour (cylinder, hollow cylinder, polygon)
- Material removal in real time or in fast forward mode
- Top or side views
- Display in variable magnification (zoom)
- Real-time simulation in parallel with machining

Programming ShopTurn

Contour basic elements
You can call up the basic elements that describe a contour, parameterize them, start them immediately, save them or include them in a working plan. A contour is thus created quickly and conveniently. The following basic elements are available:
- Straight X/Y*/Z also with C axis
- Bevel in X/Z or under angle, also with C-axis
- Circle parameterizable by radius/endpoint or center point

Cycles

Abspanzyklen
- Clamping cycle with adjusted B axis against any contours Axis- and contour-parallel
 Roughing and finishing
- Front side, back side
- Residual material detection
- Any blank specification

Drilling cycles
- Center deep hole drilling
- Bolt circle on face, on lateral surface with C-axis
- Tapping
- Position pattern

Thread cycles
- External and internal thread
- Face and taper thread
- Machining of multiple threads
- Thread reworking
- Linear or degressive infeed
- Constant or variable slope

Grooving / undercutting cycles
- Infeed cycles for straight lines and on slopes
- Undercut Form E, Form F, DIN thread

Milling cycles
- Line milling (C/X, C/Z)
- Grooves (straight and circular) on lateral and end faces
- Pockets (also with islands) on front face
- Cones on the star surface
- Path milling, also displacement in the machine coordinate system possible
- Engraving text
- Block sequence (automatic mode)
- Work plan test (dry run)
 (Limitations of the function possible depending on the machine equipment)
- Returning to the contour, block search run

More functions

Step-by-step routing allows:
- Characterize each step with easy to understand symbols
- Work plan creation without DIN/ISO knowledge
- Easily change, insert and remove
- Special commands (e.g. M-functions)
- Inserting transition elements, processing block by block (single step)

Additional options
- Easy to understand help screens for each cycle
 (Animation are only a schematic representation of the function)
- Scaled graphic for input support
- Graphical work plan test (test run)
- Creation/reading and processing of complete DIN/ISO programs

Technology input
- Tool definition per routing step possible
- Tool and wear data for up to 900 tools

DMG Mori technology cycles as an option depending on machine equipment
- Simple programming of complex technologies
 (Depending on the function, a simulation may not be possible).

Functions for multi-channel editing - programSync*.

Time display
- Display of machining times in the program per channel (after first simulation)

Wait mark analysis (only for multi-channel machines)
- Graphic display of the synchronization points

Setting up programs on the machine
- Channel or spindle dependent mode

B-S0634

3-jaw power clamping chuck with tooth serration and through-hole Ø66 mm (Ø2.59 in), complete with one set each of base jaws and hard top jaws, incl. connecting elements, type BBD 210/66, make SMW
(max. speed = 5000 rpm, max. operating force = 38 kN / 8542 lbf)

B-S0634G

3-jaw power clamping chuck with tooth serration and through-hole Ø66 mm (Ø2.59 in), complete with one set each of base jaws and hard top jaws, incl. connecting elements, type BBD 210/66, make SMW
(max. speed = 5000 rpm, max. operating force = 38 kN / 8542 lbf)

B-A0349

Technology cycle with dialog-guided programming for the production of straight grooves in bores or on the lateral surface in the Z direction of the workpiece. Inner and outer grooves in any position and number freely adjustable. If the groove to be created is wider or higher than the impact tool, the cycle automatically calculates the necessary displacements. Easy compensation of tool displacement.
Calculation of residual strokes based on selected machining strategy.

This option contains the technology cycle with the corresponding input mask.

D-CO200

Digital Manufacturing Package

1) IoT*connector*
The integrated IoT*connector* enables to use the DMG MORI online services (eg NET*service*). With the integrated firewall, the machine is protected against attacks despite the online connection. In addition, the IoT*connector* receives security updates via an integrated Device Management.

Notes:
For the secure operation of a machine tool within a network, DMG MORI recommends orientation on IEC62443 IT-security for industrial automation systems.

2) Machine Data Connector
Uniform machine data interface as an integrated function of the DMG MORI Connectivity Hardware independent of the machine controller, the machine signals are available as a signal output through one of the following protocols:

- MQTT (MQTT Client)
- MTConnect (MTConnect Agent Version 1.4.0.3)
- OPC-UA (DMG MORI OPC-UA Server Konfiguration)

The used protocol is to be configured at machines with CELOS (Version 5) through the App "Connector

Management" or through the Windows application “Connector Management” which is directly installed to an external PC (recommended) operated within the same network than the DMG MORI Connectivity Hardware.

CELOS Connector Management is included in CELOS or/ and is provided as a separate software for standalone usage.

Updates for the software function of the Machine Data Connector will be provided directly to the DMG MORI Connectivity Hardware via DMG MORI Device Management. An Internet connection of the DMG MORI Connectivity Hardware is required for this update function.

The following signals are available*:

- Machine Serial Number
- Operating hours
- Power On Time
- Controller Mode
- Status Stack Light
- Number of active alarms
- Notifications (Alarm/Warnings)
- Part Program Name
- Current Program Execution Time
- Spindle Override
- Desired Parts
- Feed Override
- Number of active Tool
- Rapid Override
- Execution State
- Part Counter
- Part Counter overall

*Additive DMG MORI machines (powder nozzle or powder bed) have a different signal set because of their machine technology.

3) NETservice

The NET*service* stands for a couple of new features for optimal remote service support. Besides of an interactive remote desktop feature for a direct view on HMI and control, direct file transfer of service related files the experts of DMG MORI can be involved in a single or multi-user-conference. A chat and whiteboard functionality complete the conference functionality. To use the DMG MORI NET*service* the supplied software DMG MORI NETservice Customer Application has to be installed on a PC/notebook.

Your customer benefits at a glance:

- Fast support through access to CELOS, IPC and NC
- Intuitive operation
- High transparency thanks to logging of all service activities
- Deposit of individual user profiles and rights
- Chat functionality for communication between customer and service

The usage of NET*service* is free of charge for the duration of the machine warranty and ends automatically. NETservice after Warranty is subject to monthly costs. The DMG MORI Service is able to create a suitable offer.

Requirements of usage:

- Requires IoT*connector*
- Requires Internet connection to the machine

D-TD0001

DMG MORI Toolmanagement - 60 days Trial licence

Software module for the management of tool components, complete tools and tool lists. Architecture and compressed data transfer lead to maximum system performance.
The main functions are the simple creation, search and management of tools. In detail, the versatile scann possibilities for tool component acquisition as well as the versatile tool selection procedures, the automatic 2D / 3D complete tool assembly, the integrated CAD kernel for displaying 2D / 3D graphics, photos and text files as well as the generation of tool lists are to be mentioned. In addition, the catalogues of the most important tool manufacturers are integrated.
Interfaces for several CAM - systems are integrated.

ALLMÄNNA BESTÄMMELSER
För denna offert gäller villkor enligt NL 17, dock med följande undantag;
Om köparen har rätt till vite påbörjas beräkningen av vitesbeloppet 14 kalenderdagar från den dag leverans skulle ha skett.
I stället för vad som stadgas i punkt 16 i NL 17 angående procentsatser och maximering av vite på grund av leveransförsening skall följande gälla; Vitet skall, för varje hel vecka förseningen varar, utgöra 0,5 %, dock max 5 %, av 90% av det avtalade priset för produkten.

GARANTI
18 månader efter installation, på maskin och styrsystem.
På spindlar av typen MASTER gäller 36 månaders garanti.

BETALNINGSVILLKOR
40% vid order
50% innan maskinen lämnar fabrik
10% inom en månad från godkänt övertagande
Samtliga betalningar per 10 dagar netto.
Efter förfallodagen debiteras dröjsmålsränta med gällande referensränta +8%.

OFFERTENS GILTIGHETSTID
Denna offert gäller en månad från anbudsdatum.
Offert på lagermaskin gäller med reservation för mellankommande försäljning.

LEVERANSVILLKOR
CIP enligt INCOTERMS 2020, inkl. emballage, exkl. avlyft och intransport till Er adress

LEVERANSTID
Enligt senare överenskommelse.
Leveranstiden gäller från mottagen förskottsbetalning.
I de fall finansiering av ordern kommer att ske via leasingbolag återkommer vi med en aktuell leveranstid i samband med att beställning och förskottsbetalning inkommit.

INSTALLATION
Installation av all offererad utrustning enligt ovan.
Inkoppling av huvudström samt eventuell bultning/limning i golv eller fundament ingår ej. Mottagningsinstruktioner för utrustningen översänds senast en månad innan leverans. Beakta instruktioner avseende fundament, förankring och anslutning. Tidpunkt för installation och utbildning bokas i samråd med vår installationskoordinator. Notera att installation av eventuella retrofit-optioner kan komma att utföras senare än maskininstallationen.
Leverantören ansvarar inte för installation eller sammankoppling mellan maskin och eventuell automation/robot i de fall leveransomfånget enbart omfattar automationsinterface.

RMS (Relocation Machine Security)
Exportkontroll:
För att förhindra att utrustningen placeras illegalt hos individer eller nationer som hotar den internationella säkerheten kan alla DMG MORI maskiner, från och med den 1 januari 2023, omma att utrustas med en RMS-enhet (Relocation Machine Security). RMS-enheten avaktiverar maskinen automatiskt vid flytt eller demontering. Avaktiveringen sker inte under normal användning eller vid underhåll.
Om utrustningen avaktiverats kan den endast aktiveras igen av en auktoriserad representant från DMG MORI. Återaktivering kan beställas från DMG MORI Service. Om avaktiveringen beror på en omfattande serviceinsats återaktiveras den utan kostnad.
DMG MORI har rätt att neka återaktivering om det bekräftas att en sådan åtgärd skulle innebära otillåten teknologiexport eller på annat sätt strida mot gällande exportrestriktioner. DMG MORI har i dessa fall ingen skyldighet att återaktivera maskinen och skall inte hållas ansvarig för konsekvenserna av en sådan handling.

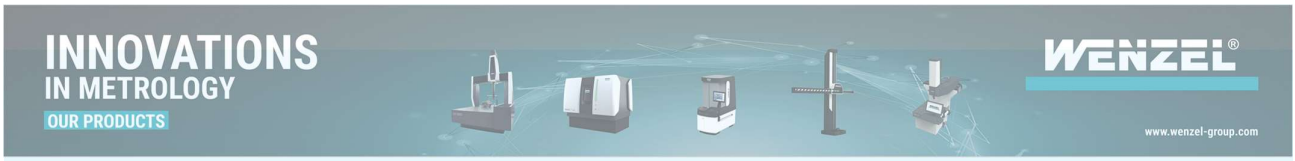
OFFERT-Nr 24005013

Datum
2024-05-08

Martin Fredin Precision AB
Norrkämstaleden 16
827 31 Ljusdal

Vår Kontaktman
Per Olofsson

Referens



Vi tackar för Er förfrågan och offererar:

I huvudsakligt utförande enligt bifogade prospekt och maskinspecifikation.

Pris
958 200 SEK
exkl. moms enligt bifogat prisblad.

Ravema AB
Box 423, SE-331 24 Värnamo
Margretelundsvägen 1, SE-331 34 Värnamo
Tel +46 370-488 00 | Fax +46 370-150 01
Org.nr: 556044-9786 VAT. No SE556044978601
info@ravema.se www.ravema.se

Leveranstid
Ca 8 veckor efter signerat ordererkännande.

Betalning
30 % vid order, 30 dagar
60 % vid leverans, 30 dagar
10 % efter godkänd leverans, 30 dagar

Allmänna bestämmelser
Om inget annat framgår av denna offert, gäller i övrigt Allmänna leveransbestämmelser NL 01.

Valutaändring:
Offererade priser är baserade på en kurs av 100 EUR = 1163 SEK. Kursklausul enligt SVMF:s Växelkurs

Giltigheten av erbjudande:
1 månad, med reservation för tekniska ändringar från leverantör.

Garanti
6 månader efter leverans från fabrik.

Offertens giltighetstid
1 månad

Bilagor
1. Prisblad

Ravema AB
Box 423, SE-331 24 Värnamo
Margretelundsvägen 1, SE-331 34 Värnamo
Tel +46 370-488 00 | Fax +46 370-150 01
Org.nr: 556044-9786 VAT. No SE556044978601
info@ravema.se www.ravema.se

POS	Artnr	Antal	Beskrivning	Pris SEK
100	680.00000	1	Used coordinate measuring machine LH87 2000 (LH0224) Including: • Active damping • PH10M-Plus • SP25M • 1x SM25-1 • 2x SH25-1 • 1x FCR25 (changing rack) • 1x MRS 400 (modul for FCR25) Measuring range • X-axis 800mm • Y-axis 1000mm • Z-axis 700mm	958 200
200	W5102002011	1	Table rack with WPC + HTC400	Inkl.
300	W5100001062	1	Wenzel PC-standard 4x RS232	Inkl.
400	W7070000079-SW	1	USB Keyboard, black	Inkl.
500	W7070000174	1	LED screen 23.8" Fujitsu	Inkl.
600	670.00066	1	Metrokey USB (Dongle)	Inkl.
700	W7060000798	1	WM Quartis GEO "License	Inkl.
800	W7060000802	1	WM Quartis EMD	Inkl.
900	W7060000803	1	WM Quartis IMPEX-ELEM	Inkl.
1000	W7060000815	1	WM Quartis IPH	Inkl.
1100	W7060000816	1	WM Quartis PRC	Inkl.
1200	W7060000817	1	WM Quartis SCAN	Inkl.
1300	W7060000818	1	WM Quartis SURF	Inkl.
1400	W7060000819	1	WM Quartis CURVE	Inkl.
1500	W7060000804	1	WM Quartis VDA	Inkl.
1600	W7060000805	1	WM Quartis IGES	Inkl.
1700	W7060000810	1	WM Quartis STEP	Inkl.
1800	W7060002250	1	WM SYS Analyzer – Monitoring	Inkl.
1900	620.20028	1	M3 styli, 18 pcs with case	Inkl.
2000	W7100000500	1	Reference ball Ø=25mm with extension	Inkl.
2000	4466998	1	Installation 4 dagar	Inkl.
2100	4466998	1	Utbildning 2 dagar	Inkl.
			Summa	**958 200**

Freight cost will be charged per actual

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