DMG MORI

Management No.	17-01072-A01

Manufacturing Specifications

To: Aisin Drivetrain, Inc. Co.,Ltd.

Model	NVX5080 | 40
Serial No.	NV503170112, NV503170113

The export of the product and the accompanying technical documents described in the manufacturing specifications are subject to an authorization from the government of the exporting country. Check with the government agency for authorizaiton.

When the specifications or the coverage is changed in the meetings to be held in the future, we will make a quotation again after consultation and provide you with the new quotation.
For other requirements such as accessories, options, and safety devices, please consult with us separately.

Please sign one of the manufacturing specifications and return it to us.		
Date submitted: 2017.1.25		
Desired return date: 2017.2.1		
Signature of Recipient		
(Print Name)	(Signature)	(Date)

We are building the machine following the manufacturing specifications.

Ver.	Date created	Revision history	Approved by	Prepared by
1	2017.1.23	Newly created	Kishi	Okuno

Approved by	Checked by	Prepared by
岸		奥野

DMG MORI CO., LTD

Revision history (in detail)

Ver.	Revised item	Revision history	Date	Revised by
1	–	Newly created	2017.1.23	Okuno
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Contents

<APPENDIX>

1. PRICE/PAYMENT TERMS AND CONDITIONS

2. PROCESS

3. GENERAL SPECIFICATIONS

3.1 Foundation Work and Installation

No foundation work or remodeling of the factory shall be done by us.
As the machine is high in rigidity, no installation using foundation bolts shall be done by us.
(the installation is possible for a fee upon request)
Installation and level adjustment shall be carried out by our staff.

3.2 Electrical/Air Piping Work

3.3 Industrial Water Supply

Coolant, lubricants and greases shall be prepared by customer

3.4 Tooling

Holder :( ) Arranged by DMG MORI SEIKI (○)Arranged by the customer
Tool :( ) Arranged by DMG MORI SEIKI (○)Arranged by the customer
Cutter :( ) Arranged by DMG MORI SEIKI (○)Arranged by the customer

3.5 Machine/Electrical Specifications

All the equipment and the structures are standard specifications.

3.6 Warranty

The warranty period shall be two years for spare parts and one year for service after the acceptance of the machine.
If accidents or malfunctions occur on the customer's machine during the warranty period, DMG MORI SEIKI is responsible for repair and recovery works unless accidents or malfunctions are obviously caused by the customer

4. SERVICE / PARTS

Please feel free to contact the service center or DMG MORI SEIKI Technical Center regarding request of services after delivery and maintenance parts.

5. MECHINE AND NUMERICAL CONTROL UNIT SPECIFICATIONS

5.1 Machine Specifications

Item				NVX5080/40
Travel	X-axis travel (Longitudinal movement of table)		(mm)	800
	Y-axis travel (Cross movement of saddle)		(mm)	530
	Z-axis travel (Vertical movement of spindle head)		(mm)	510
	Distance from table surface to spindle gage plane		(mm)	~~150~660~~ 350～860 High column spec.
Table	Table working surface		(mm)	1,100 x 600
	Table loading capacity		(kg)	1,000
	Table surface configuration			T-slot 18mm x Pitch 100mm x 6 slots
Spindle	Maximum spindle speed		(min^{-1})	15,000 ~~12,000(Hihg-torque spec.) 20,000~~
	Number of spindle speed ranges		(step)	1
	Type of spindle taper hole			No.40
	Spindle bearing inner diameter		(mm)	Ø 80
Feedrate	Rapid traverse rate		(mm/min)	X,Y,Z: 30,000
	Feedrate		(mm/min)	1～6,000 (look-ahead control : 1～30,000)
	Jog feedrate		(mm/min)	0～5,000 (20 steps)
ATC	Type of tool shank*1			BT40 ~~CAT40~~ ~~DIN40~~ ~~HSK-A63~~
	Type of retention knob			~~DMG MORI SEIKI 90°~~ ~~type 45°(MAS-I) 60°(MAS-II)~~ ~~JISB633940P~~ ~~DIN HSK-A63~~ Special(Center-through)
	Tool storage capacity			30 ~~60~~ ~~90~~
	Maximum tool diameter <with adjacent tools>		(mm)	Ø 80
	Maximum tool diameter <without adjacent tools>		(mm)	Ø 160 *2
	Maximum tool length		(mm)	350
	Maximum tool mass		(kg)	8 ~~12 (Heavy tool spec.)~~
	Maximum tool mass moment <from spindle gauge line> *3		(N·m)	11
	Method of tool selection			Technical memory random
	Tool changing time (Tool-to-tool)		(sec)	1.3
Motor	Spindle drive motor	15,000 min^{-1}	(kW)	30/18.5 (25%ED/cont)
	High-torque spec.	12,000 min^{-1}	(kW)	~~30/22 (25%ED/cont)~~
		20,000 min^{-1}	(kW)	~~30/18.5 (25%ED/cont)~~
	Feed motor	X/Y axis	(kW)	3.0
		Z axis	(kW)	4.5

Power source	Electrical power supply	(kVA)	47.6 *7
	Compressed air supply	(MPa, L/min)	0.5, 300 *4 <ANR>
Tank capacity	Coolant tank capacity	(L)	~~324 (Internal chip bucket spec.)~~ 442 (Conveyor spec.*5) ~~584 (Conveyor (Drum filter type) spec.)*6),~~
Machine size		(kg)	6,510 (30-tool) ~~7,320 (60-tool)~~ ~~8,410 (90-tool)~~

*1 : a two-face contact tool and other tools cannot be used together.

*2 : Maximum tool diameter: The maximum tool diameter is limited to 100 mm or less when using the spindle at 12,000 min-1 or higher.

*3 : A tool with a mass moment greater than the maximum tool mass moment may cause problems during ATC operations even if it satisfies other conditions.

*4 : When the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required

*5 : Hinge type specification, Magnet scraper type specification

*6 : Scraper (Drum filter type + cyclone filter) specification, Hinge (Drum filter type) specification

*7 : The values differ depending on the specifications. Please contact your DMG MORI SEIKI representative for details.

- Maximum spindle speed: depending on restrictions imposed by the workpiece clamping device, fixture and tool used, it may not be possible to rotate at the maximum spindle speed.
- For the foundation condition of the installation location, refer to Chapter15,3 " Floor Strength".

5.2 Standard & Optional Features

Environment

No	Name	Specification	
1	Voltage(V)	~~200V~~	
		220V	○
		~~380V~~	
		~~415V~~	
		~~440V~~	
		~~380V~~～~~480V~~	
2	Frequency(Hz)	~~50Hz~~	
		60Hz	○
3	Setting unit	Metric	○
		~~Inch~~	
4	Standard	~~EN compatible~~	
		Not compatible to EN	○

Machine

No	Name	Specification	
1	High column		○

Table/Pallet/APC

No	Name	Specification	
1	~~Sub table~~	~~Solid~~	
		~~T-slot~~	
2	~~Pallet changer(2-station APC)~~	~~T-slot pallet~~	
		~~Tap pallet~~	

Magazine

No	Name	Specification	
1	Magazine door		○

Mesurement

No	Name	Specification		
1	~~In-machine measuring system (spindle)~~	~~Optical type touch sensor~~		
2	In-machine measuring system (table)	Touch sensor	~~tool length + tool radius~~	
			tool length (OMRON:D5A-8515)	○
		~~Laser sensor~~	~~tool length + tool radius~~	

3	~~Manual measureing function~~	~~Work setter~~		
		~~Tool setter~~	~~tool length + tool radius~~	
			~~tool length~~	
		~~W setter~~	~~tool length + tool radius~~	
			~~tool length~~	

High-precision specification

No	Name	Specification	
1	~~Direct scale feedback~~	~~X, Y, Z-axis~~	
2	~~Dia & Mold specification~~	~~Dia & Mold package (Mechanical + NC option)~~	
		~~Dia & Mold package (NC options only)~~	
3	~~Environmental thermal displacement control device(including the oil cooler and the coolant cooling system)~~		
4	Cooling system	Fan cooler type	○
		~~Oil cooler (attached to the machine)~~	
		~~Oil cooler (separate type)~~	

Chip disposal

No	Name	Specification	
1	Tool tip air blow		○
2	~~Internal chip bucket~~		
3	External Chip conveyor	~~None~~	
		Provided	○
		~~I/F~~	
4	External Chip conveyor type	Hinge type	○
		~~Drum filter type + cyclone filter~~	
		~~Magnet scraper type~~	
		~~Hinge type + drum filter type~~	
5	~~Chip bucket (for chip conveyor)~~		

Coolant

No	Name	Specification	
1	Coolant	Water solubility	○
		~~Oil-based~~	
2	~~Oil skimmer~~		
3	Coolant float switch (Lower limit detection)		○
4	~~Coolant cooling unit~~	~~Alternative for water-soluble coolant~~	
		~~Requirement for oil-based coolant (Please consult our service representative)~~	
5	~~Coolant cooling system (through-spindle coolant system)~~		

6	Coolant system (spindle coolant)	*Not available for Carbon specification and ZEROCHIP specification		○
7	~~Additional coolant system for tool tip~~			
8	~~Oil mist system~~			
9	~~Oil shot system~~			
10	~~Semi-dry unit~~			
11	~~Oil-hole drill coolant system~~			
12	Through-spindle coolant system	~~Side through~~		
		Center through		○
13	Coolant type	Coolant		○
		~~Air~~		
		~~Coolant/Air (switching specifications)~~		
		~~Coolan/semi-dry (switching specifications)~~		
14	Unit for through-spindle coolant system	Provided	1.5MPa	○
			~~7.0MPa~~	
		~~I/F only~~		
15	Through-spindle coolant system unit type	Unit on coolant tank		○
		~~Separate type~~		
16	~~Through-spindle coolant system (separate type) I/F type~~	~~OGURA CLUTCH~~		
		~~KNOLL~~		
17	~~Coolant flow switch for through-spindle coolant system~~			
18	Coolant gun			○
19	Shower coolant	~~Interlocked with spindle coolant~~		
		Separate type		○
20	Chip flushing coolant			○
21	Mist collector	~~HVS-220 of Akamatsu Electric~~		
		~~Electriparts only (For HVS-220 of Akamatsu Electric)~~		
		Duct only	~~ϕ125mm~~	
			~~ϕ150mm~~	
			ϕ200mm	○
		~~(Duct + Electric) (For HVS-220 of Akamatsu Electric)~~		

Do not use a flammable coolant or oil-based coolant because it may ignite and cause fire or machine breakage. If you have to use a flammable coolant for any reason, please consult with our sales representative.

Machining support

No	Name	Specification	
1	~~Carbon specifications~~		
2	~~Double slide seal~~		
3	~~Zerochip~~	~~Spindle vacuuming type~~	
		~~External vacuuming type~~	
		~~Spindle vacuuming type+External vacuuming type~~	
4	~~Angle head~~		

5	~~Index table I/F~~	~~M signal output from terminal block~~		
6	Additional axis I/F	Additional 1-axis (External connection)		○
		~~Additional 1-axis (Internal connection)~~		
		~~Additional 2-axis (Internal connection)~~		
7	Rotary table manufacturer's model	~~DDRT-200X~~	~~DDRT200X only~~	
			~~+ 7 inch chuck~~	
			~~+ tailstock~~	
			~~+ 7 inch chuck + tailstock~~	
		~~DDRT-260~~	~~DDRT260 only~~	
			~~+ 9 inch chuck~~	
			~~+ tailstock~~	
			~~+ 9 inch chuck + tailstock~~	
		~~DDRT-300~~	~~DDRT300 only~~	
			~~+ 12 inch chuck~~	
			~~+ tailstock~~	
			~~+ 12 inch chuck + tailstock~~	
		~~5AX-DDRT200X~~		
		Others (NIKKEN : CNC202 prepared by user)		○
8	Signal light	3 layers (green, red, yellow)		○
9	Location of signal light	Upper front		○
		~~On the ceiling~~		
10	~~Buzzer for signal light~~			
11	Automatic door			○
12	~~Additional in-machine light~~			
13	~~Fixed-point in-machine camera~~			
14	~~Spindle C-axis function~~			
15	External M-codes	~~5 external M codes~~		
		10 external M codes		○
16	Manual pulse generator (separate type)			○
17	~~Ethernet/ IP I/F~~			
18	~~Robot I/F(Ethernet IP)<EtherNet/IP I/F is necessary required separating>~~			
19	~~AC 100V Service Outlet on Control Panel~~			

Safety device

No	Name	Specification	
1	~~Danger detect device interface~~ ~~(Recommended when oil-based coolant is used or during unmanned operation)~~		
2	~~Earth leakage breaker~~		

Others

No	Name	Specification		
1	~~Air dryer~~	~~560L/min(IDFA4E-23)~~	~~Europe or Asia~~	
		~~830L/min (IDFA6E-23)~~	~~Europe or Asia~~	
		~~1510L/min (IDFA8E-23)~~	~~Europe or Asia~~	
		~~2800L/min (IDFA15E-23)~~	~~Europe or Asia~~	
		~~460L/min(IDFB4E-11N)~~	~~USA~~	
		~~780L/min(IDFB6E-11N)~~	~~USA~~	
		~~1280L/min(IDFB8E-11N)~~	~~USA~~	
		~~2450L/min(IDFB15E-11N)~~	~~USA~~	
		~~570L/min(IDF4E-20)~~	~~Domestic~~	
		~~820L/min(IDF6E-20)~~	~~Domestic~~	
		~~1320L/min(IDF8E-20)~~	~~Domestic~~	
		~~3100L/min(IDF15E-20)~~	~~Domestic~~	
2	~~Multi-dry filter~~			
3	~~Dry anchor~~			
4	Special color			○
5	~~Coupler at air supply port~~			
6	~~Storage box for manual~~			
7	~~Two-hand control starting switch~~			
8	~~Flexible rod switch~~			
9	~~Step-down Transformer~~			
10	Special name plate			○
11	Power Supply Lamp (White)			○
12	Lamp + Buzzer Check Button (in Celos Panel)			○
13	Emergency stop button (with lockout function)			○
14	Additional operation box			○
15	Additional in Electrical Cabinet Light			○
16	Work number search(1-99)			○
17	Fixture interface (3 hydraulic circuit (5 ports), Seating check:2 pneumatic circuit) (seating check switch ISA2-HE25)			○
18	Fixture interface (clamp/unclamp) (1 pneumatic circuit(2 ports))			○
19	Fixture washing coolant			○
20	Special shipment transit clamp			○
21	KEYENCE Light curtain for Auto door			○

Optional equipments

	Name	Specification	
1	~~Workpiece clamp kit~~	~~mm specification~~	
		~~mm specification (with rack)~~	
2	~~Workpiece clamp support jack set~~	~~CS1SET~~	
		~~CS2SET~~	
3	~~Vise set~~	~~Machine vise LTCV160~~	
		~~Machine vise LTCV160H~~	
		~~Machine vise LTCV160TH~~	
		~~Machine vise LTCV200~~	
		~~Machine vise LTCV200H~~	
		~~Machine vise LTCV200TH~~	
		~~Machine vise VE125LWN02~~	
		~~Machine vise VE160LN-42~~	
		~~Parallel clamping plate~~	
		~~Machine vise XMVMF110X150~~	
		~~Machine vise XMVMF110X200~~	
		~~Machine vise XMVMF110X250~~	
		~~Self cut jaw MVCL150J-ST~~	
		~~Machine vise XMCCB60X400~~	
		~~Machine vise XMCCB60X500~~	
		~~Machine vise XMCCB90X400~~	
		~~Machine vise XMCCB90X500~~	
		~~Additional moving jaw MCAC60MJ~~	
		~~Additional moving jaw MCAC90MJ~~	
		~~Clamping kit MVAC110CS18~~	
		~~Clamping kit MVAC150CS18~~	
4	~~Tool wagon~~		
5	~~Tool cabinet~~		
6	~~Basic tooling kit~~		

5.3 Control Unit Specifications(MITSUBISHI M730UM)

Controlled axis

No.	Name	Specification	
1	Controlled axis	X, Y, Z, ~~Co~~, A, ~~B~~, MG	○
2	Simultaneously controlled axes	4 axis	○
		~~5 axis (M750UM only)~~	
3	Least input increment	0.001 mm/0.0001in/0.001deg	○
4	Maximum command value	±99,999.999 mm/9999.9999 in	○
5	Inch/metric conversion	G20/G21	○
6	Machine lock		○
7	Overtravel		○
8	Load monitor function C		○
9	~~Stored stroke check 2, 3~~		
10	~~Programming resolution multiplied by 1/10~~		

Operation

No.	Name	Specification	
1	Dry run		○
2	Single block		○
3	Jog feed	0～5,000 mm/min (20 steps)	○
4	Manual reference position return		○
5	Manual pulse handle feed	Manual pulse generator1:unit ×1, ×10, ×50, ×100(per pulse)	○
6	Z-axis neglect		○
7	Synchronous peck tapping		○
8	~~Sequence number comparison and stop~~		
9	~~Program restart~~		
10	~~Manual handle interruption~~		

Interpolation functions

No	Name	Specification	
1	Nano interpolation		○
2	Positioning	G00	○
3	Single direction positioning		○
4	Exact stop mode	G61	○
5	Tapping mode	G63	○
6	Cutting mode	G64	○
7	Exact stop	G09	○
8	Helical interpolation (Optional 2 axis and other 1 axis)		○
9	Reference position return	G28	○
10	Reference position return check	G27	○

11	Return from reference position	G29	○
12	2nd,3rd,4th reference position return	G30 (used for ATC/APC)	○
13	~~Polar coordinate interpolation~~	~~G12.1, G13.1~~	
14	~~Cylindrical interpolation~~	~~G7.1~~	
15	~~Involute interpolation~~	~~G2.2/G3.2~~	
16	~~External high-speed skip~~		
17	~~Spiral/conical interpolation~~		
18	~~Smooth interpolation~~		
19	~~SSS control~~		
20	~~Threading, synchronous cutting/Feed per revolution~~		
21	~~Spindle C-axis function~~		
22	~~Orbit machining~~		
23	~~Halo machining~~		
24	~~NURBS interpolation~~		
25	~~Workpiece position compensation for rotary axis~~		
26	~~Workpiece position error compensation(M750UM only)~~		
27	~~Tool center point control~~		

Feed function

No	Name	Specification	
1	Rapid traverse rate	Max 30,000 mm/min	○
2	Cutting feedrate	0～30,000 mm/min {when using high-precision control <look-ahead control>}	○
3	Rapid traverse override	F0,1,2,3,4,5,6,7,8,10,15,20,25,30, 40,50,60,70,80,90,100 (20 steps)	○
4	Feed per minute	G94	○
5	Tangential speed constant control		○
6	Feedrate Override	0～200%(10% increments 20 steps)	○
7	Override cancel	M48, M49	○
8	High-precision control (look-ahead control)		○
9	~~Inverse time feed~~		
10	~~High-speed and high-precision control Ⅰ (AI contour control))~~		
11	~~High-speed and high-precision control Ⅱ(high-precision contour control)~~		
12	~~One-digit F code feed~~		
13	~~Normal Direction Control~~	~~G40.1,G41.1,G42.1~~	
14	~~Small-diameter deep-hole drilling cycle~~		

Program input

No	Name	Specification	
1	Optional block skip		○
2	~~Addition of optional block skip~~	~~Soft key type (2-9)~~	
3	Program number	Any 32 characters (Any 8 characters in a subprogram)	○

4	Absolute/incremental programming	G90/G91	○
5	Decimal point programming	Decimal point programming or electronic calculator type decimal point programming can be set using parameters	○
6	Diameter/radius programming		○
7	Plane selection	G17, G18, G19	○
8	Rotary axis designation		○
9	Coordinate system setting	G92	○
10	Workpiece coordinate system	G54～G59	○
11	~~Workpiece coordinate system preset~~	~~G92.1~~	
12	Additional workpiece coordinate systems	6 sets	○
		~~48 sets~~	
		~~300 sets~~	
13	Programmable data input	G10,G11	○
14	~~Optional chamfering/corner R~~		
15	Sub-program call	Up to 8 nestings	○
16	Hole machining canned cycle	G80.G89	○
17	Programmable mirror image		○
18	~~Polar coordinate command~~	~~G15,G16~~	
19	Custom macro common variables	200 variables (#100～#199、#500～#599)	○
		~~300 variables (#100～#199、#500～#699)~~	
		~~600 variables (#100～#199、#500～#999)~~	
20	~~Interruption type custom macro~~		
21	~~Scaling~~		
22	~~Coordinate system rotation~~		
23	~~Tilted working plane command~~		
24	~~3-D coordinate conversion~~		
25	~~High-speed canned cycle <MAPPS>~~		
26	~~DXF import function <MAPPS>~~		
27	~~Islands, open pockets <MAPPS>~~		
28	~~Three-dimensional tool offset~~		

Miscellaneous function/Spindle speed function

No	Name	Specification	
1	Miscellaneousfunction (M function)	4-digit M code	○
2	Auxiliary function lock		○
3	Spindle speed function (S function)	5-digit S code	○
4	Spindle speed override	50～150%(10% increments)	○
5	Spindle orientation	M19,M119	○
6	Synchronous tapping	M29	○
7	~~Multiple M code function~~		

Tool offset

No	Name	Specification	
1	Tool function (T function)	8-digit T code	○
2	Number of tool offsets	200 sets	○
		~~400 sets~~	
		~~999 sets~~	
3	Tool offset memory C	D/H code, geometry/wear	○
4	Tool length offset	G43,G44,G49	○
5	Cutter radius offset	G40～G42	○
6	Tool position offset	G45～G48	○
7	Tool management system		○
8	~~Tool diameter compensation for 5-axis machining (M750UM only)~~		

Mechanical error compensation

No.	Name	Specification	
1	Backlash compensation		○
2	Rapid traverse/cutting feed backlash compensation		○
3	Stored pitch error compensation		○
4	Interpolation type pitch error compensation		○
5	~~Bi-directional pitch error compensation~~		

Editing

No.	Name	Specification	
1	Part program edit		○
2	Program protect		○
3	Background editing		○
4	Undo/Redo function <MAPPS>		○
5	Line number display <MAPPS>		○

Operation and display

No.	Name	Specification	
1	Status display		○
2	Clock function		○
3	Current position display		○
4	Program comment display	48 letters	○
5	Parameter setting display		○
6	Alarm display		○
7	Alarm history display		○
8	Operator's message history display		○
9	Running time/Parts count display		○

10	Actual cutting feedrate display		○
11	Operating monitor screen		○
12	Guidance Input function		○
13	Self-diagnosis	Includes alarm display, I/O signal diagnosis and ladder diagram	○
14	Monitor,Display	ERGOline Touch(21.5+15.6inch)	○
15	Total counter display <MAPPS>		○
16	Work counter display <MAPPS>		○
17	~~Multi-counter display <MAPPS>~~		

I/O functions and units

No.	Name	Specification	
1	I/O interface	USB	○
		~~RS-232C~~	
2	Program storage area (for MAPPS-DNC operation function, for data backup)<MAPPS>	6GB (File editing to up to 10MB is possible.)	○
3	MAPPS-DNC operation function		○

Operation panel, Electrical cabinet

No.	Name	Specification	
1	~~Ethernet IP~~		
2	~~HUB(5 ports)~~		
3	Keyboard	Soft keyboard	○

Network

No.	Name	Specification	
1	MAPPS MTConnect Adapter		○

Service

No.	Name	Specification	
1	~~CELOS Club Service~~	~~Includes DMG MORI Messenger GE Service~~	
		~~Excludes DMG MORI Messenger GE Service~~	

6. MANUAL AND ACCESSORIES

(1) Manual related

Item	Specification	Qty. attached	Qty. added	Total
Instruction manual including parts list *1, *2	Book	1		1
	CD-ROM			
Ladder diagram *1, *2	Book			
	CD-ROM			
Electrical circuit diagram *1	Book	1		1
	CD-ROM			
NC unit instruction manual *1	Book			
	CD-ROM	1		1
Static accuracy test result chart		1		1
Warranty		1		1

*1 Documents are written in both Japanese and English.
*2 Manuals and ladder diagrams can be viewed on the screen of the machine operation panel.

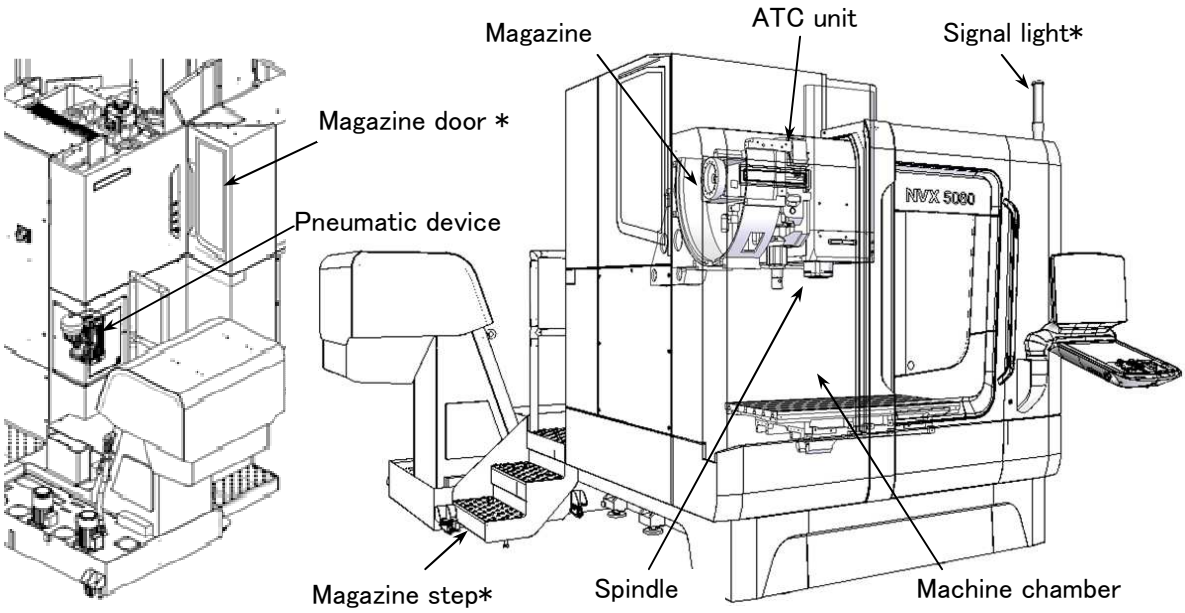
(2) Accessories

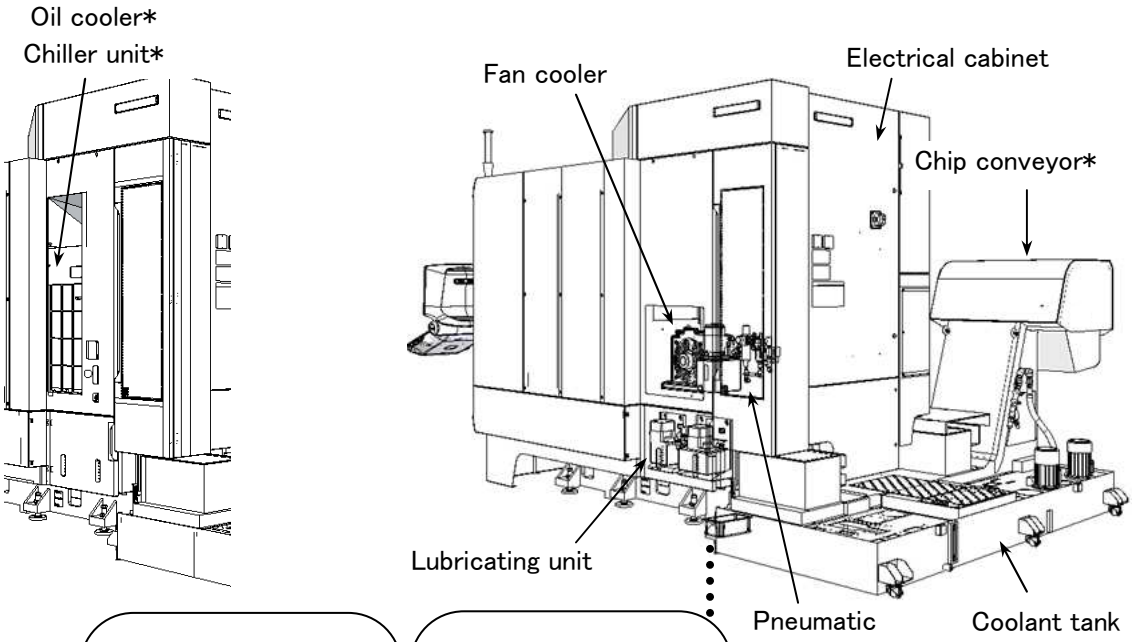
- Jack bolts 1 unit
- Lock nuts for jack bolts 1 unit
- Plate 1 unit
- Tool set 1 unit
- T-nut 1 unit
- Transit clamps 1 unit
- SMARTkey (MODE 1) 1 unit
- SMARTkey (MODE 2) 1 unit
- Dry anchor set (option) 1 unit
- Liquid gasket (option) 1 unit
- Tool extraction tool (option) 1 unit

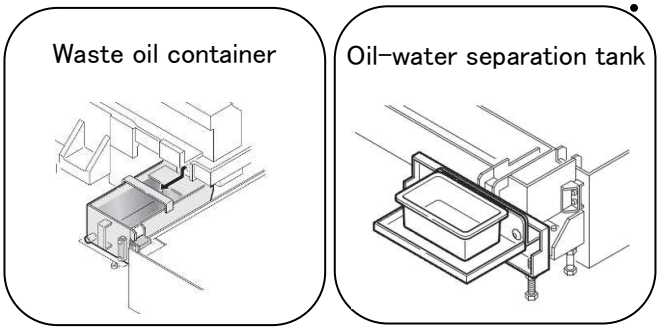
7. MACHINE SPECIFICATIONS

7.1 Configuration (Conveyor specification)

Machine structure （The figure shows 30 magazines.）







*Oil-based coolant specification

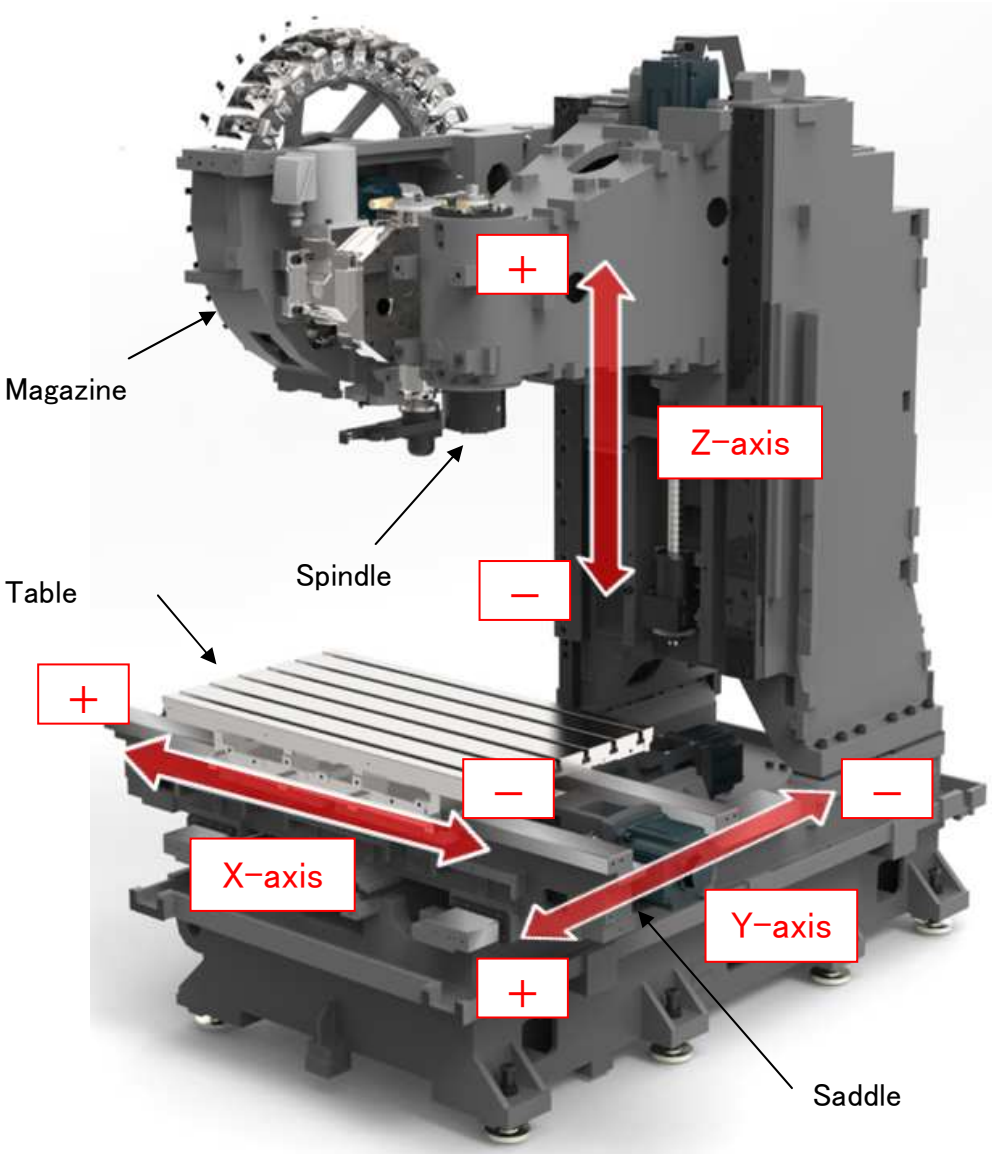
Water soluble coolant specification

* Optional

7.2 Feed Axis Configuration

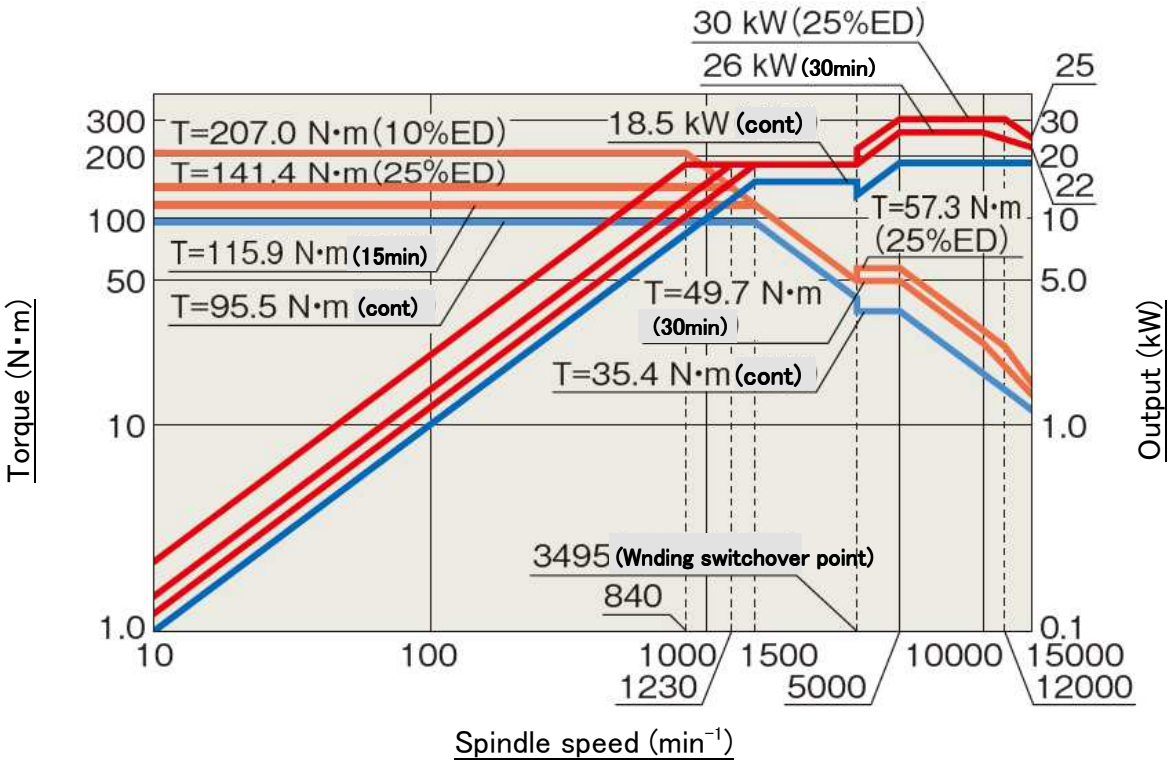
(1) Thrust force
X-axis : 6,362N
Y-axis : 6,362N
Z-axis : 17,530N

(2) Rapid traverse rate
X-axis : 30m/min
Y-axis : 30m/min
Z-axis : 30m/min



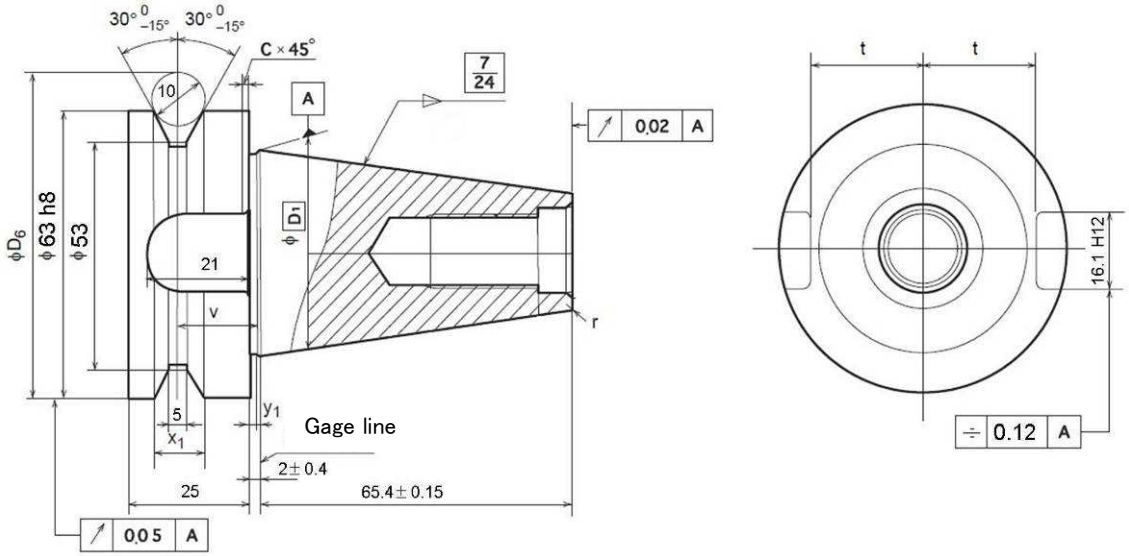
7.4 Spindle （15000min^{-1}）

(1) Output	:	30/18.5kW （25%ED/cont）
(2) Max. spindle speed	:	15000min^{-1}
(3) Max. spindle torque	:	207Nm （25%ED）
(4) Spindle bearing size	:	ϕ80
(5) Spindle cooling method	:	Fan cooler, Chiller unit (option)



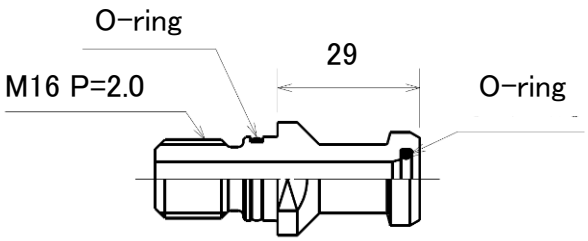
7.5 Tools (MAS, Center Through-spindle)

(1) Tool shank type : BT40



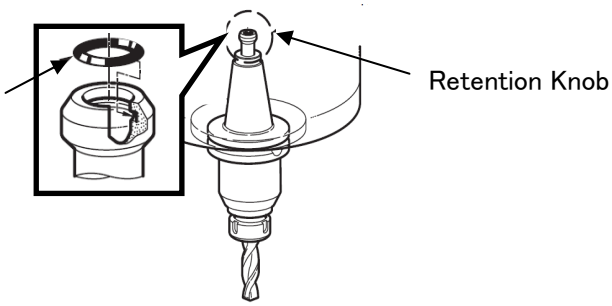
BT40	Shank		Tenon		Flange			References
	D_1	r (max.)	C (max.)	t 0 -0.2	v ±0.1	x_1 +0.1 0	y_1 0 -0.4	D6
	44.450	1	0.5	22.6	16.6	10	2	75.679

(2) Retention knob type : DMG Mori Seiki 90° type (DMG Mori Seiki part No. N29030 (BIG DAISHOWA SEIKI)、N29104 (Nikken)、N29025(NT TOOL)、N29095(MST))



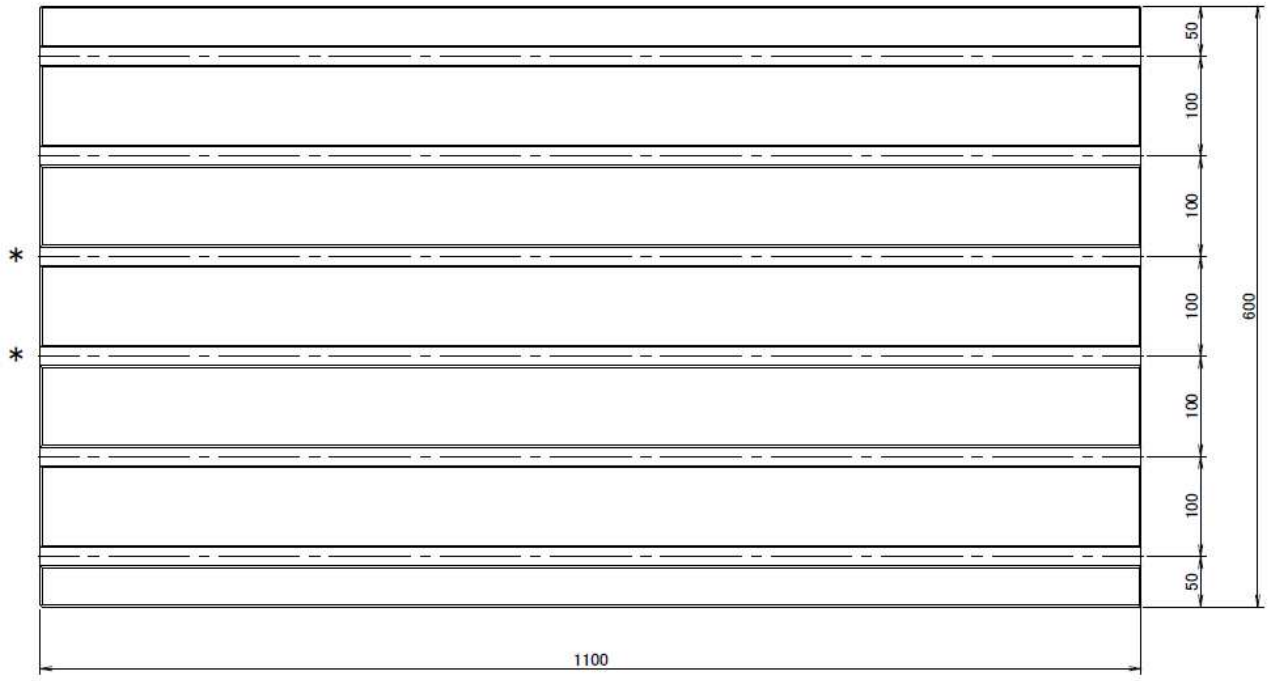
Caution: Replace the O-ring if it is worn or damaged.
Damage or wearing of the O-ring may cause coolant leakage and may result in damage to the spindle

O-Ring
JIS B2401P-9 (Type 2)
Parts No.: W06009

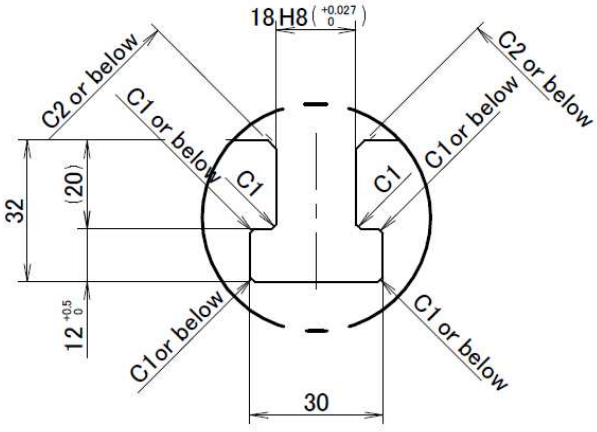


7.6 Table

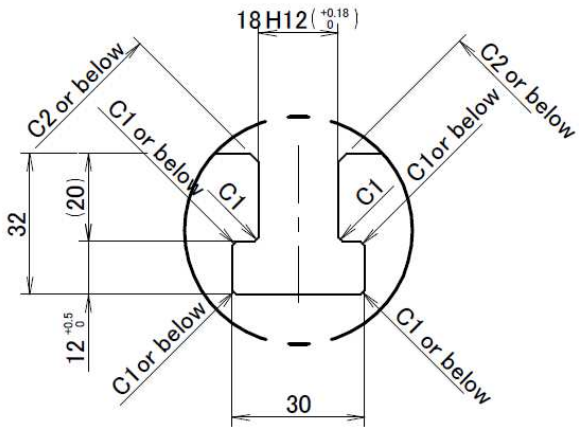
Table size : 1,100mm x 600mm



*: Reference slot (Two slots in the center)



Detail of the center reference T-slots



Detail of other T-slots

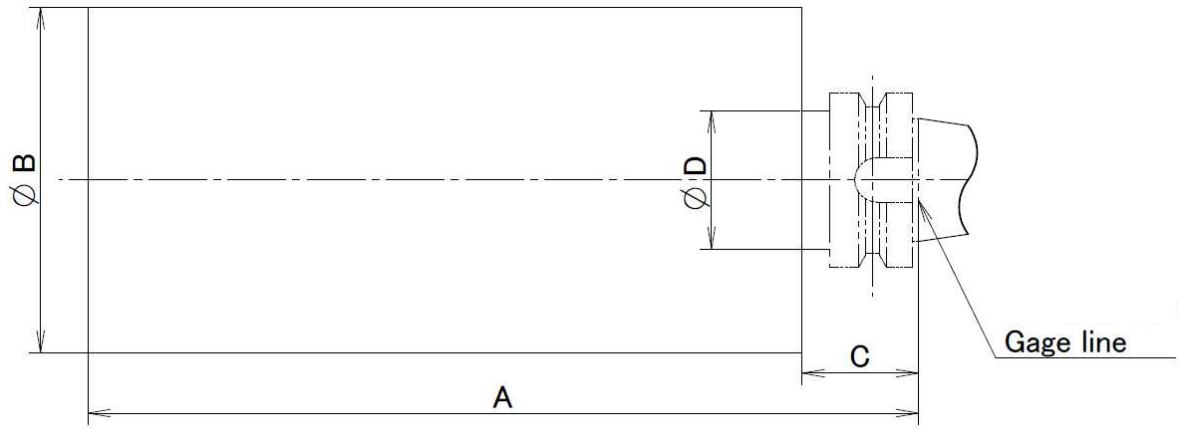
7.7 ATC (Tool Storage Capacity 30 Tools)

(1) Type	:	Double arm simultaneous changing type
(2) Tool changing time	:	1.3sec. [Tool-to-tool]*1
(3) Motor specification	:	Rated output 750W × 2 pieces
(4) Lubrication method	:	Oil bath
(5) Tool registration	:	Tools must be registered according to tool weight. [Light tools] less than 8 kg [Heavy tools] 8 kg or more and 12 kg or less

*1: For light tools

7.8 Tool Magazine (Tool Storage Capacity 30 Tools)

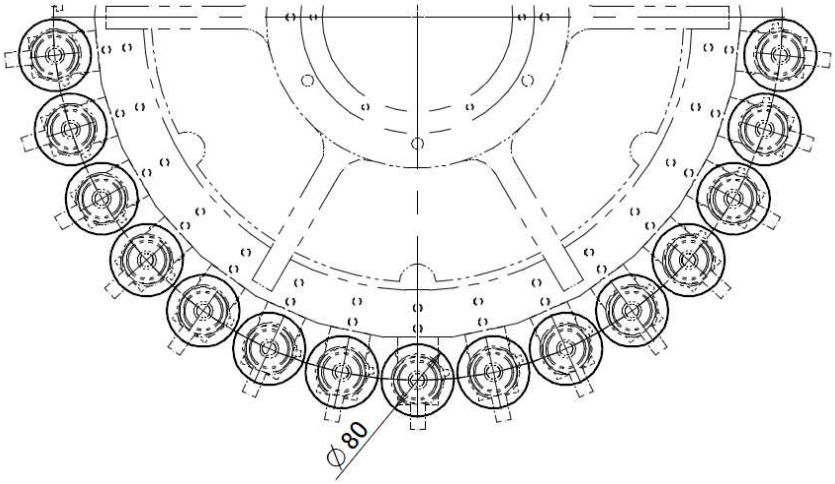
(1) Ring-type magazine : Tool storage capacity 30 tools
(2) Tool selection method : Technical memory random method
(3) Tool limitations



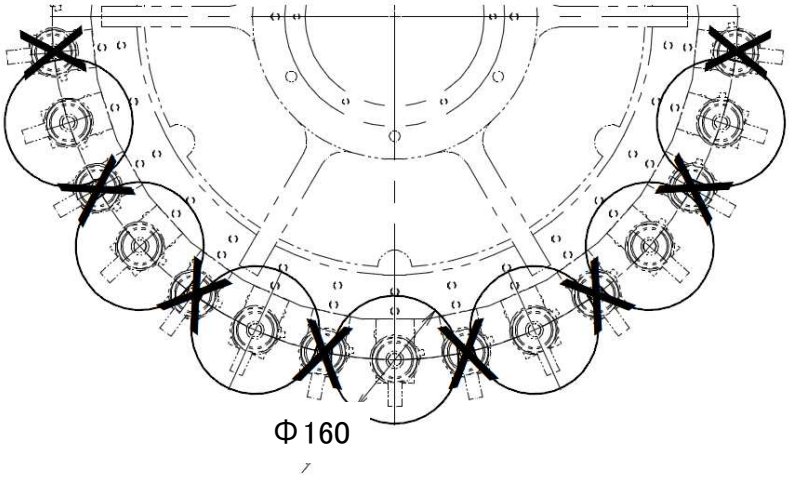
Standard		MAS	CAT	DIN	HSK
MAX. Tool length	A (mm)	350			
MAX. Tool diameter (With adjacent tools)	B (mm)	φ80			
MAX. Tool diameter (Without adjacent tools)	B (mm)	φ160 *1			
Tool limitation	C (mm)	32	34.925	35	42
Tool limitation	D (mm)	63	44.45	50	53
MAX. Tool mass	(kg)	12			
MAX. Tool moment (From gage line)	(N・m)	11 *2			

*1 : The maximum tool diameter is limited to 100 mm or less when using the spindle at 12,000 min-1 or higher.
*2 : A tool with a mass moment greater than the maximum tool mass moment may cause problems during ATC operations even if it satisfies other conditions.

1.With adjacent tools（MAX. tool Diameter.φ80）



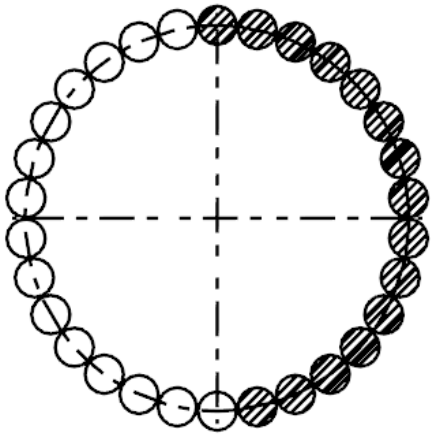
2.Without adjacent tools （MAX. tool diameter. φ160）



Note: Tools cannot be mounted in the pots marked with X due to interference

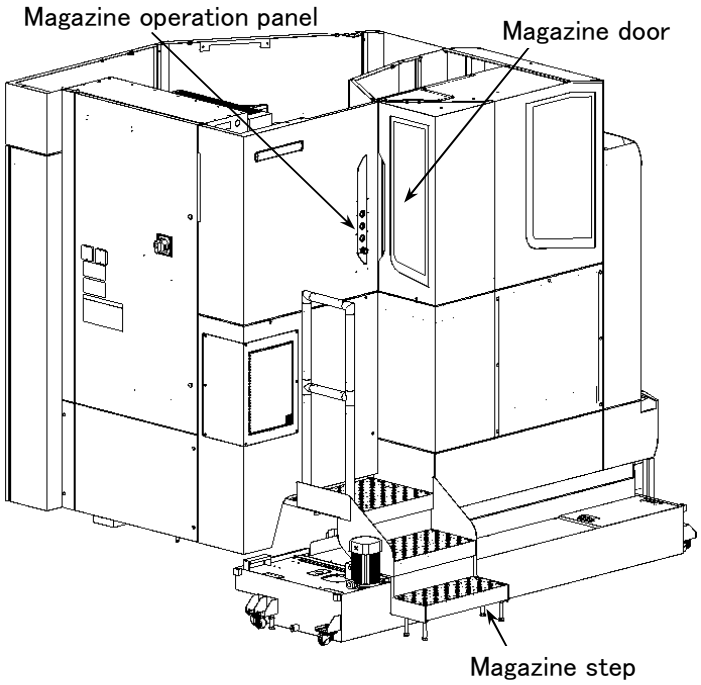
3.Maximum total weight in magazine：150kg

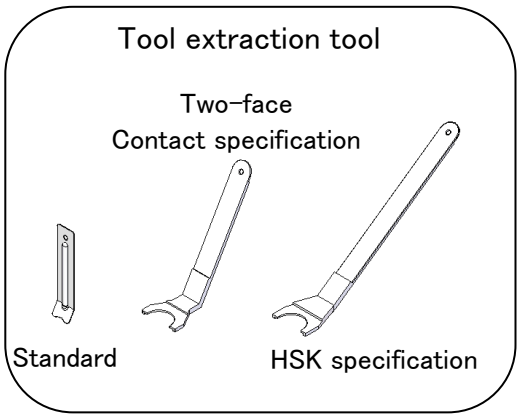
※If you stock the tools only one side like shown below, maximum total weight in magazine is 90kg.



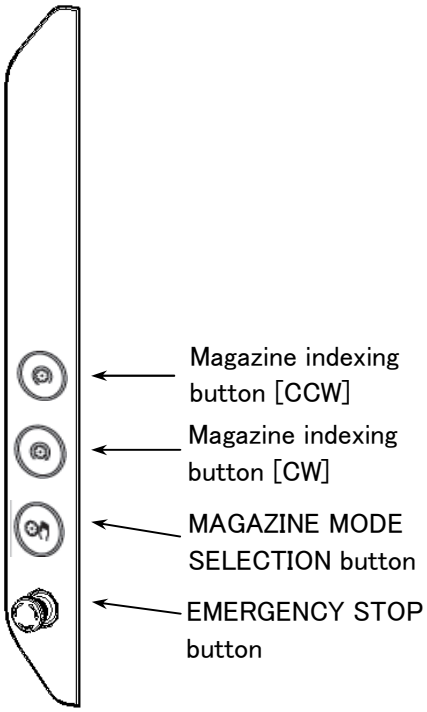
7.9 Magazine door (30-Tool Magazine with Magazine Door Specification)

(1) Appearance : No.40, 30-tool, with magazine door





(2) For magazine operation panel



・Magazine indexing button [CCW]
The magazine keeps rotating in the backward direction while this button is held down

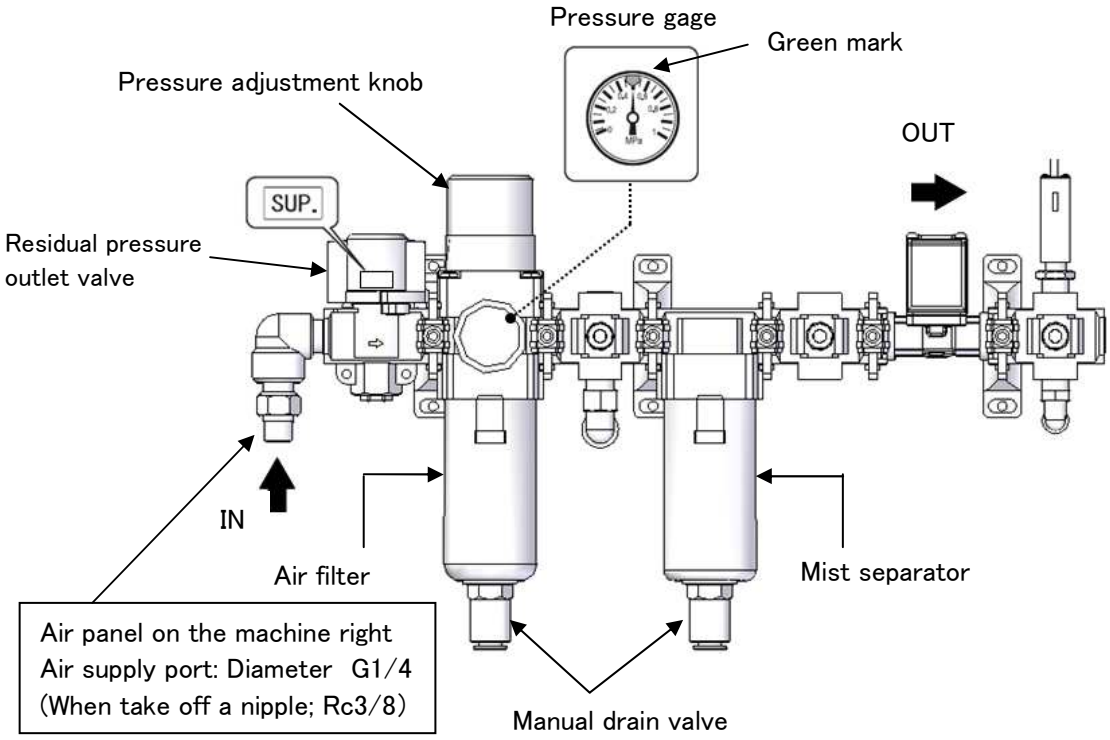
・Magazine indexing button [CW]
The magazine keeps rotating in the forward direction while this button is held down

・MAGAZINE MODE SELECTION button
When the button lamp is illuminated, the magazine can be operated manually. The magazine cannot be operated manually during automatic operation.
When the button lamp is extinguished, the magazine can be operated automatically.

・EMERGENCY STOP button
This button is used to set the machine in the emergency stop

7.10 Pneumatic Devices

The pneumatic unit is provided.
Periodically inspect and adjust it to the appropriate value.
Refer to “15.6 Air Supply” for the details of air quality.



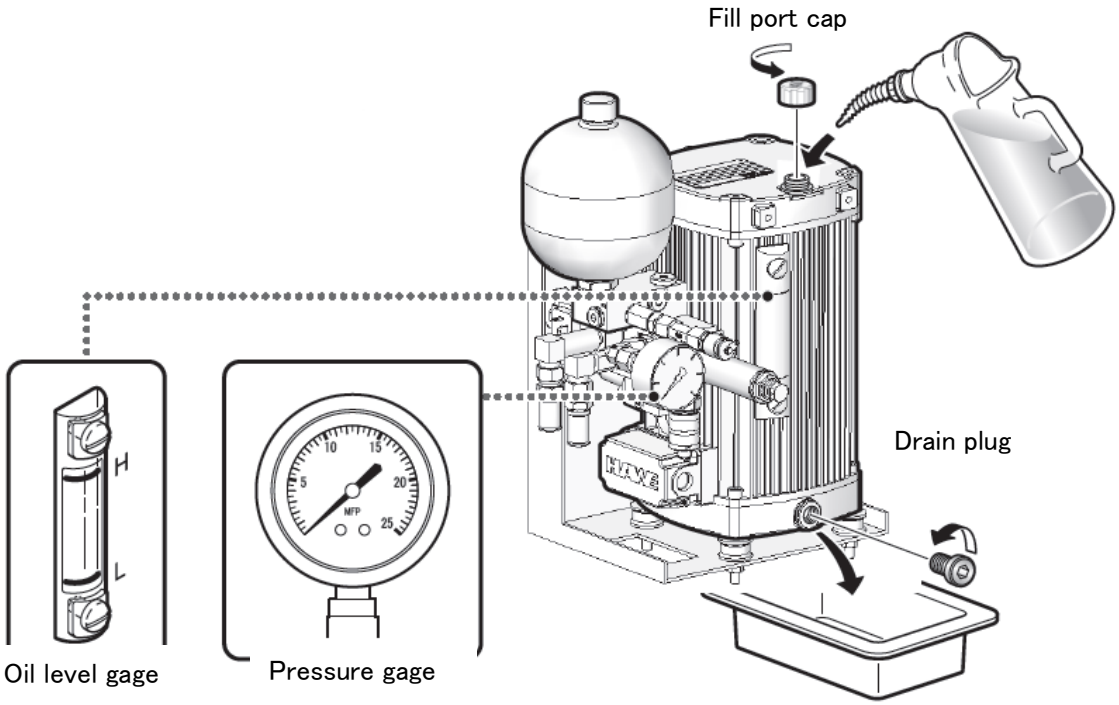
(1) The air filter is equipped with a float-type automatic drain unit, which drains automatically as required. If it does not drain automatically, or if foreign matter has accumulated at the bottom of the bowl, turn the manual drain valve counterclockwise so as to drain manually.

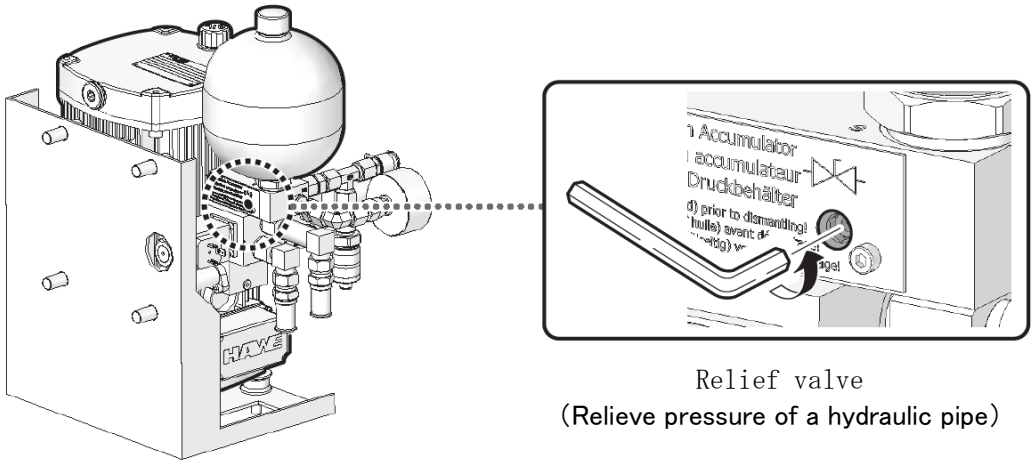
(2) Releasing Residual Pressure
1) Turn OFF the main power.
2) Turn the residual pressure release valve 90-degree CW to release the residual pressure.

7.13 Hydraulic Pressure (Hydraulic Unit for Tool Unclamp)

DMG Mori seiki Parts number : U01291

Electric power	0.75kW
Discharge pressure	13MPa
Recommended oil	Idemitsu Kosan Daphne hydraulic fluid 32 (Equivalent to ISO VG32)
Oil tank capacity	3.9L
Oil filler cap color	Red





Relief valve
(Relieve pressure of a hydraulic pipe)

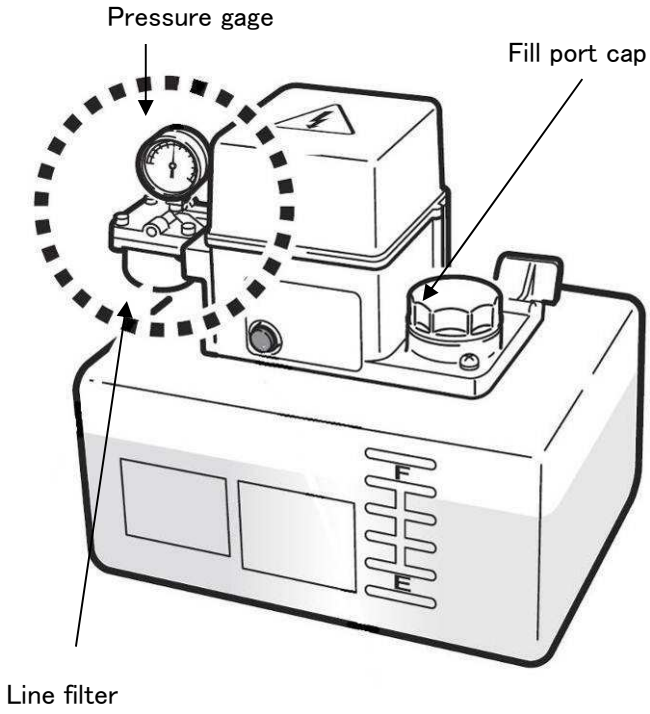
7.15 Lubricating Oil

(1) For slideway lubrication

DMG Mori Seiki Parts number : U27015

Electric power	0.017kW
Recommended oil	Shell Shell Tonna S3 M 68 (Equivalent to ISO VG68)
Oil tank capacity(Effective capacity)	4.2 L(2.8 L)
Replenishment interval (During continuous automatic operation)	Once 2 days
Oil filler cap color	Orange

- Operating temperature range : −5 ～ 40℃
- Humidity : 30 ～ 95%
- Operating viscosity range : 50 ～ 800m ㎡/s

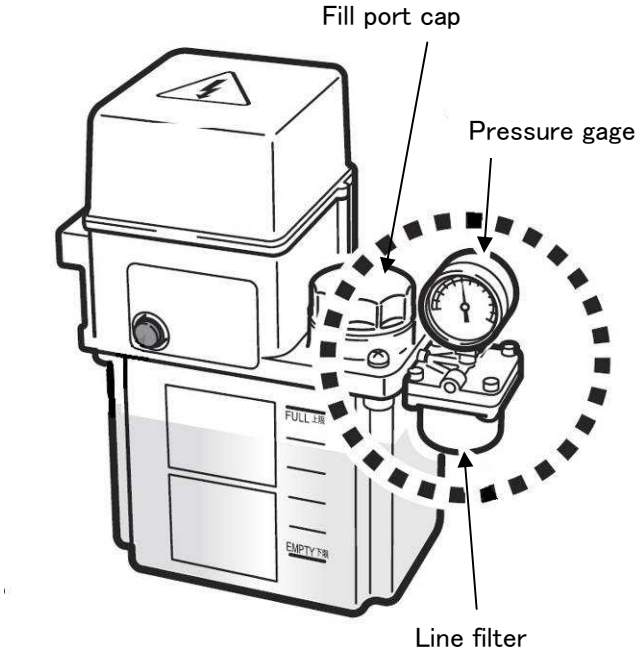


(2) For spindle lubrication

DMG Mori Seiki Parts number: U27014

Electric power	0.017kW
Recommended oil	Idemitsu Kosan Daphne mechanic oil 32 (Equivalent to ISO VG32)
Oil tank capacity (Effective capacity)	2.0 L(1.2 L)
Replenishment interval (During continuous automatic operation)	Once 140 days
Oil filler cap color	Orange

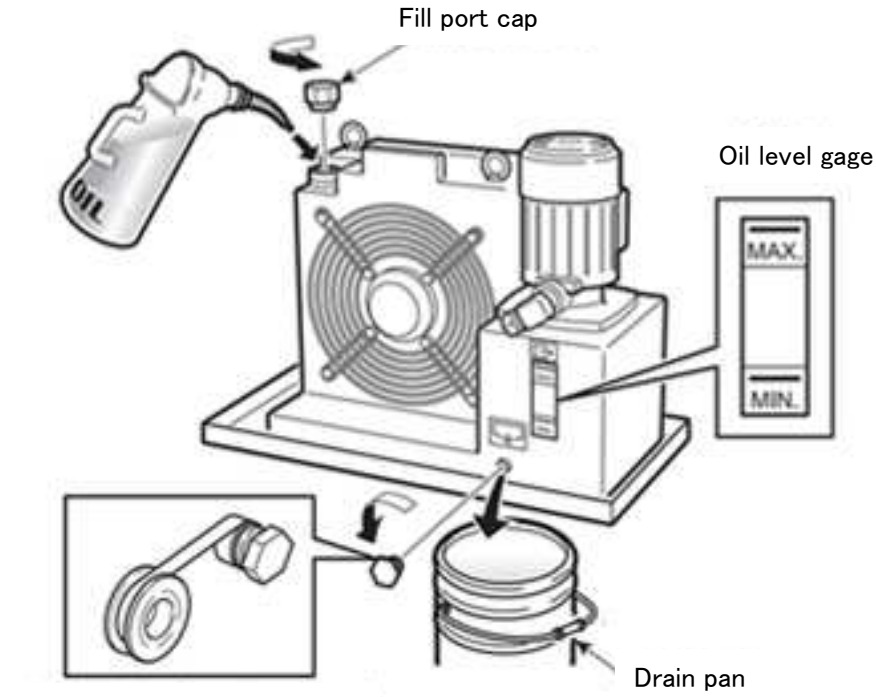
- Operating temperature range : −5 ～ 40℃
- Humidity : 30 ～ 95%
- Operating viscosity range : 50 ～ 800m ㎡/s



7.16 Cooling System (Fan Cooler)

DMG Mori seiki Parts number : U07155

	Fan	Pump
Electric power	0.12kW AC200-230 V 50Hz 0.18kW AC200-230 V 60Hz	0.17kW AC200-220 V 50Hz 0.28kW AC220-230 V 60Hz
Recommended oil	JX NIPPON OIL & ENERGY PRECISE FLUID LT	
Oil tank capacity	7.5L	
Oil filler cap color	Orange	
Refrigerant	Not used	



7.17 Safety Standard, Safety Specification (Cover), Door Interlock

(1) Safety standard

・Machine safety

EN 12417 Machine tools/Safety/Machining centers
⇒In compliance with the above standard
ANSI B11.23 Safety requirements for machining centers and automatic numerically controlled milling, drilling and boring machines
⇒In compliance with the above standard
GB 15760 Metal cutting machine tools, condition of safety protection general techniques
⇒In compliance with the above standard

・Risk assessment

ISO 12100 Safety of machinery/General principles for design
⇒In compliance with the above standard

・Safety control circuit

ISO 13849-1 Safety of machinery/Safety-related parts of control systems
Part1: General principles for design
⇒In compliance with the above standard
ISO 13849-2 Safety of machinery/Safety-related parts of control systems
Part2: Validation
⇒Validation conducted based on the above standard

・Electric power

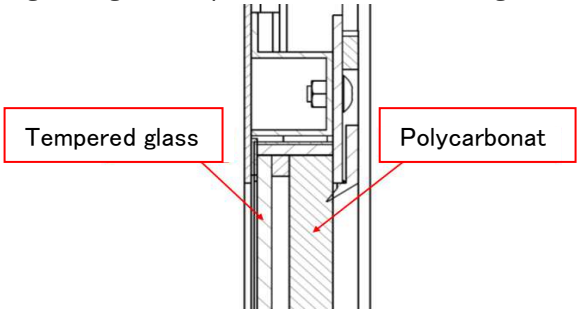
IEC 60204-1 Safety of machinery/Electrical equipment of machines
Part1: General requirements (JIS B 6015、JIS B 9960-1)
⇒In compliance with the above standard
UL 508A Industrial control panels
⇒In compliance with the above standard

・EMC

EN 50370-2 Electromagnetic compatibility (EMC)/
Product family standard for machine tools Part 2: Immunity
⇒ In compliance with the above standard

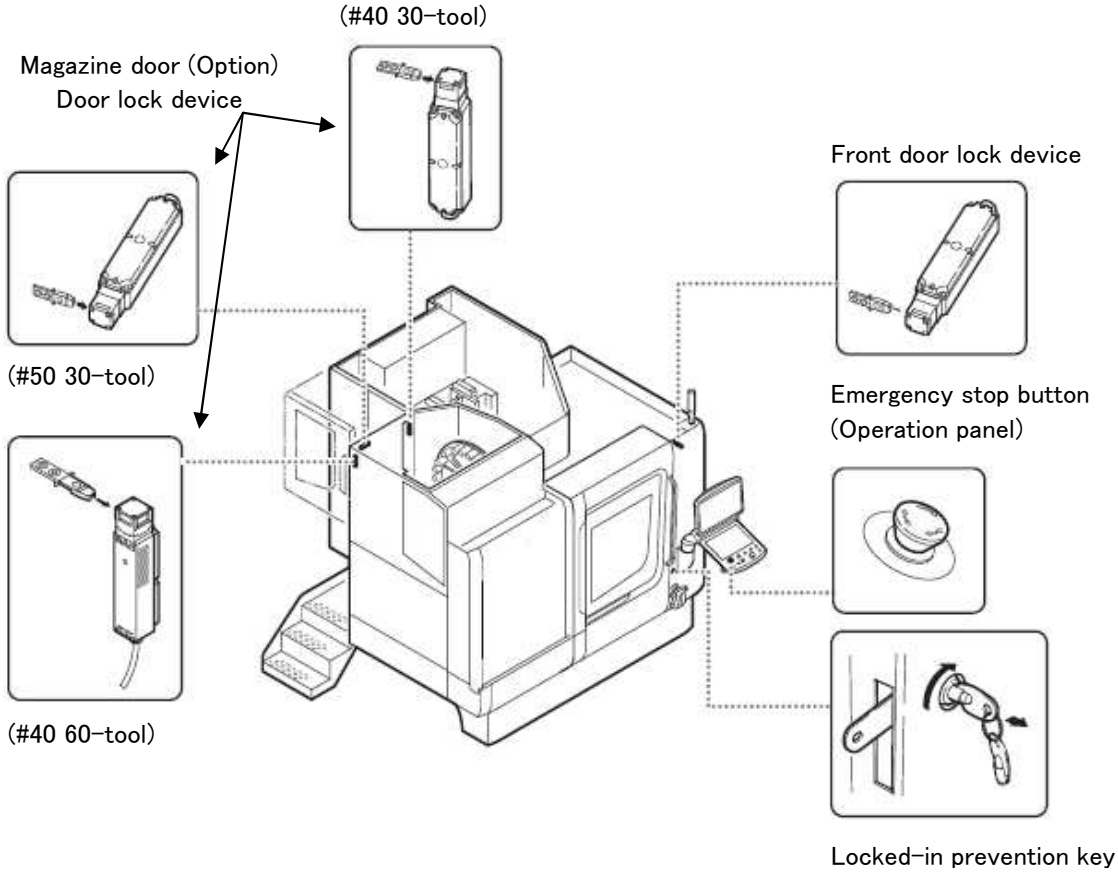
IEC	:	International standard
ISO	:	International standard
JIS	:	Japanese standard
ANSI	:	American standard
UL	:	American standard
EN	:	European standard
GB	:	Chinese standard

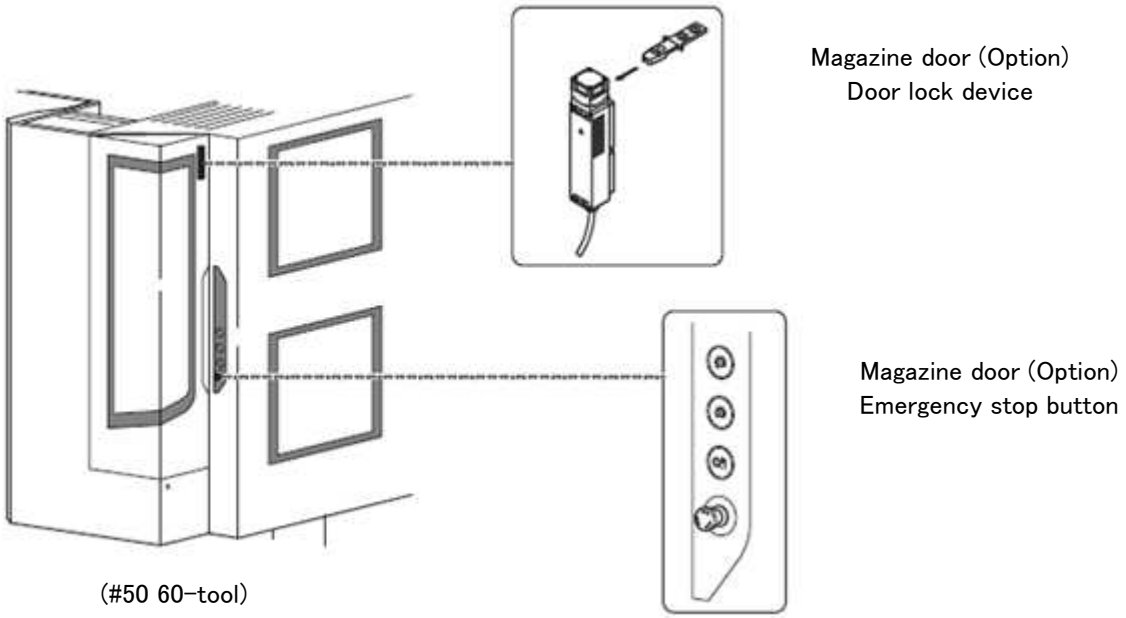
(2) Ensuring strength of impact-resistant window against flying objects (In compliance with EN12415)

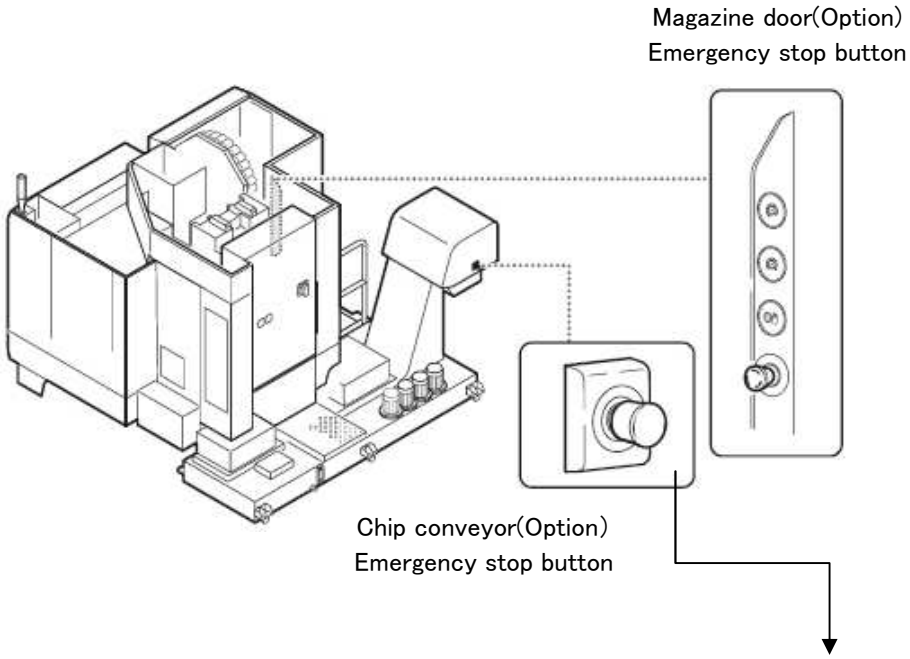


Cross section of front door

(3) Door lock device
The mechanical lock device is used for locking the door.







Chip Conveyor Type (Option)	EN	Emergency Stop Button
Hinge	Not compatible	Provided
Hinge	Compatible	Not provided
Hinge (drum filter)	—	Not provided
Magnet scraper	Not compatible	Provided
Magnet scraper	Compatible	Not provided
Scraper (cyclone filter + drum filter)	—	Not provided

(4) Operation Mode

The operation modes are the function to ensure the operator's safety during machine operation.

<Operation Mode 1>

In the operation mode 1, machine operation is related with opening/closing of the door. When and while the door is opened, all operations such as manual operation for spindle rotation and axis travel, and automatic operation (including ATC and APC) are inhibited. For daily operations, use operation mode 1.

(5) Access Level

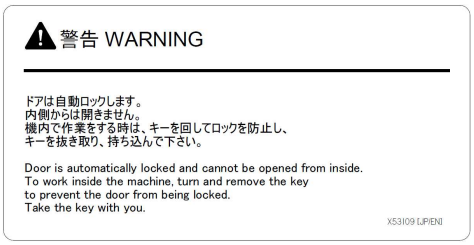
The access levels (authorization) have been registered in the machine according to the ID of the SMARTkey. Available operations of each access level are defined as shown below. When you try to perform an operation outside your authority, an error is displayed.

Access level: 1: Unskilled operators. Authorized only to start and stop programs.
Access level 2: Trained operators. Authorized to call programs.
Access level 3: Skilled operators. Authorized to handle workpiece setups.
Access level 4: Programmers/Tool setters
Access level 5: Highest level for customer. Authorized to administer machines.
Access level 6: Service level only for DMG MORI SEIKI service personnel

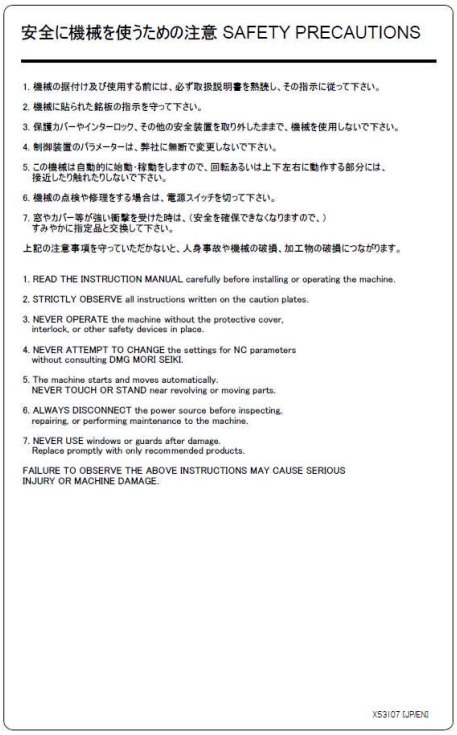
7.18 Name Plate

Follwing name plates (labels) are attached to the machine: Warning label for door interlock, Safety caution label, Label for export controls, Label for relocated machine security function, Label for electrical cabinet, Warning label, Warning label for conveyor, Label for lubricating oil,
Label for maximum spindle rate/maximum tool diameter/maximum tool mass, HSK caution plate,HSK tool holder plate, Required air pressure and flow rate name plate, Label for limit switch/SOLENOID VALVE positions, KCs mark plate, and Electric capacity label.

・Warning label for door interlock



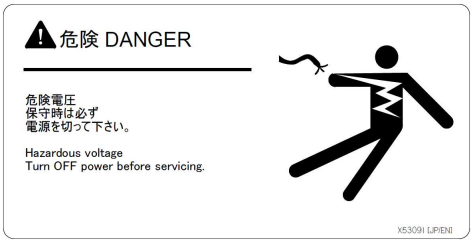
・Safety caution label



・Label for export controls

・Label for relocated machine security function

・Label for electrical cabinet

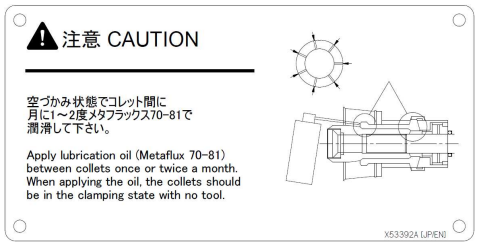


・Warning label

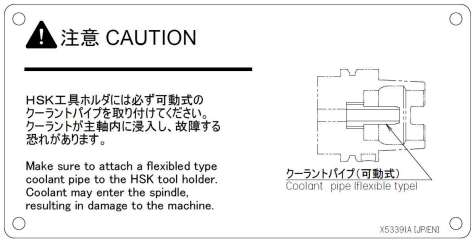
・Warning label for conveyor (option)

・Label for maximum spindle rate/maximum tool diameter /maximum tool mass

・HSK caution plate (option)



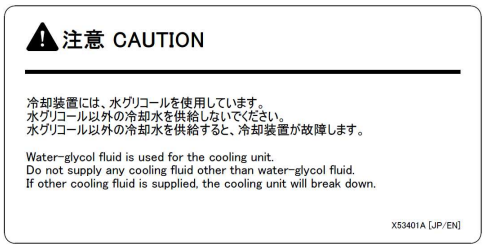
・HSK tool holder plate (option)



・Required air pressure and flow rate name plate

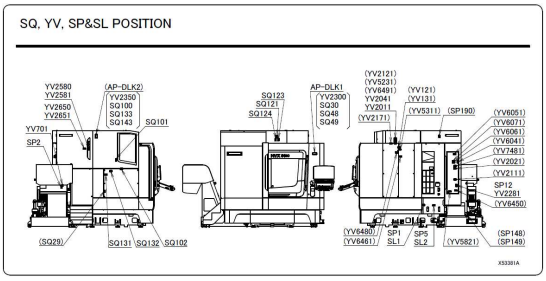
・Label for lubricating oil

・caution label for cooling fluid

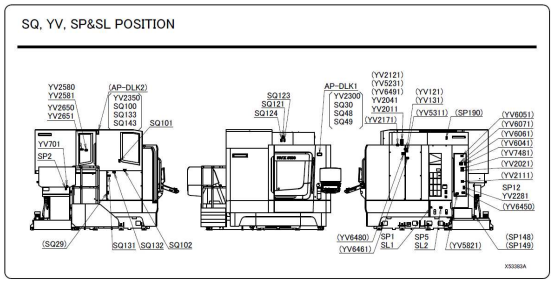


・Label for limit switch/SOLENOID VALVE positions

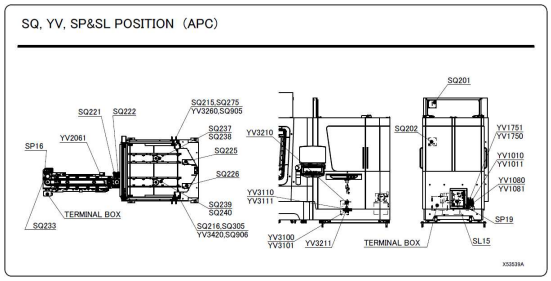
Standard



No.40 60-tool specification (option)

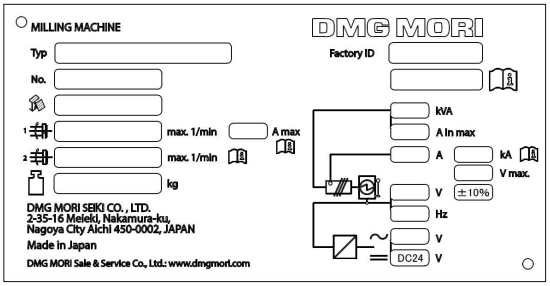


APC specification

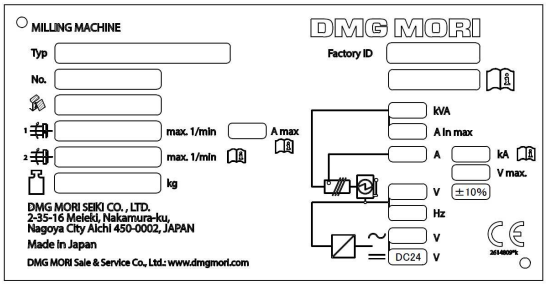


・ KCs mark plate (for machine shipped to Republic Korea)

・Electric capacity label

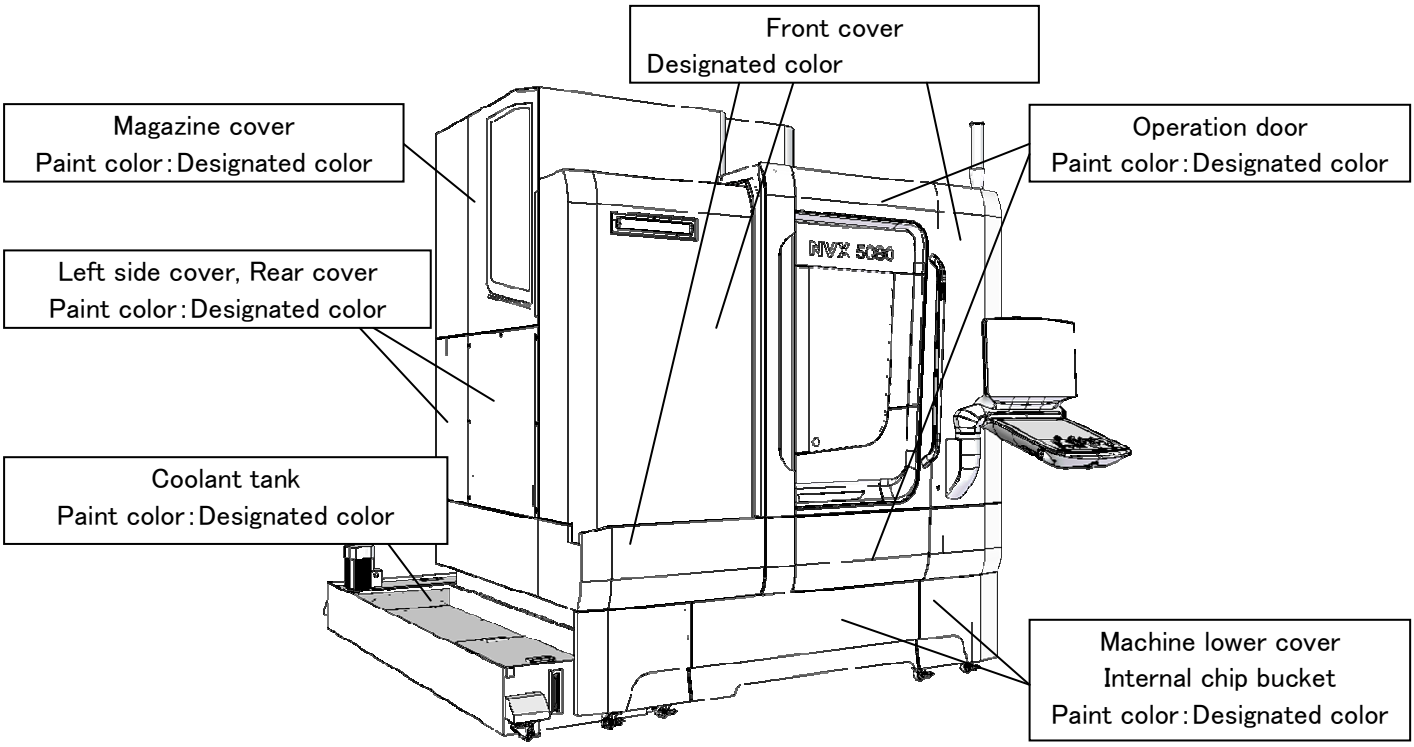


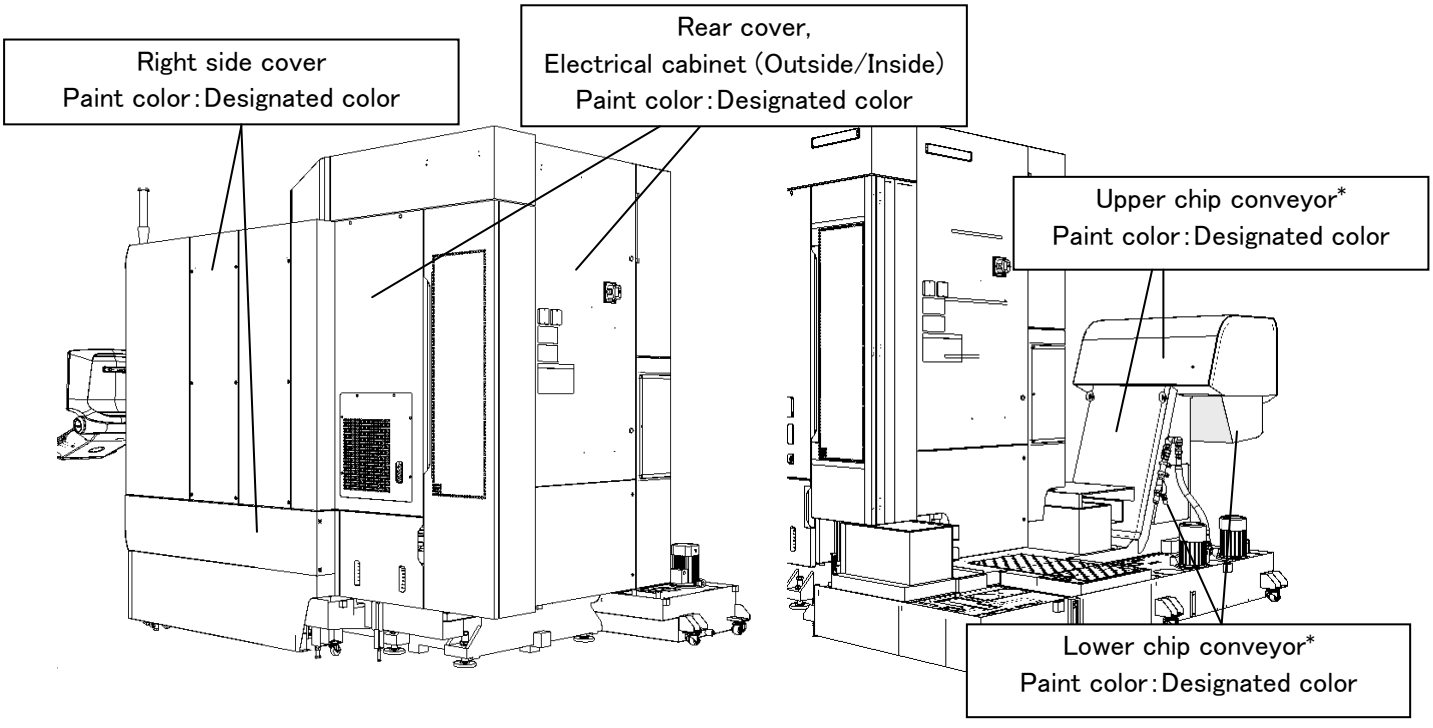
・Electric capacity label (CE compliant)



7.19 Paint Color

(1) Paint color : Designated color
(2) Finishing appearance : smooth





*Chip conveyor spec. (Option)

7.20 High Column

A liner is inserted between the column and the base to ensure machining space.
This is used when machining large workpieces or installing an APC.

Distance from table surface to spindle gauge line

Raised column 200mm	:	350～860mm
Standard	:	150～660mm

*The measuring point of the in-machine measuring system is raised for 200 mm as well.

7.23 In-machine measuring system (table) touch sensor (Tool length Only)

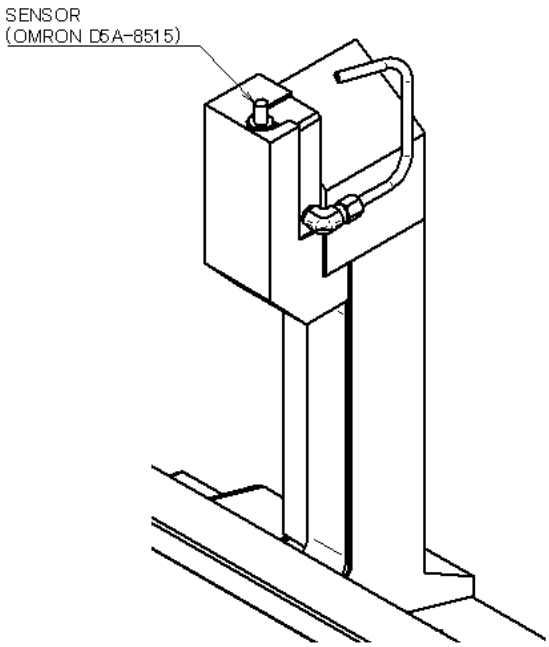
(1) The touch sensor mounted on the upper surface of the table enables automatic and manual measurement of tool length and tool breakage detection.
By manually setting an error between the programmed tool length and the actual value, the tool length is automatically offset thereafter.
Ditect air blow to the sensor prevents measurementof tools with chips or coolant.

Caution!
This sensor does not have over travel detection, so if you have mistake in operation, machine could be broken.

DMG Mori Seiki Parts number : 2E6602279 (cable: 5m) OMRON:D5A-8515

Waterproof performance	IP67
Repeatability	Within 3 μ m
Measuring force	3.92N

(2)Function
The tool end moves toward the sensor and make a contact with the probe sensor to detect the tool breakage.
The followings are included in the function.



Function	Program code
Automatic tool length measurement	G324
Automatic tool breakage detection	G325

7.27 Chip Disposal (Chip Conveyor (Hinge Type))

(1) Internal chip conveyor

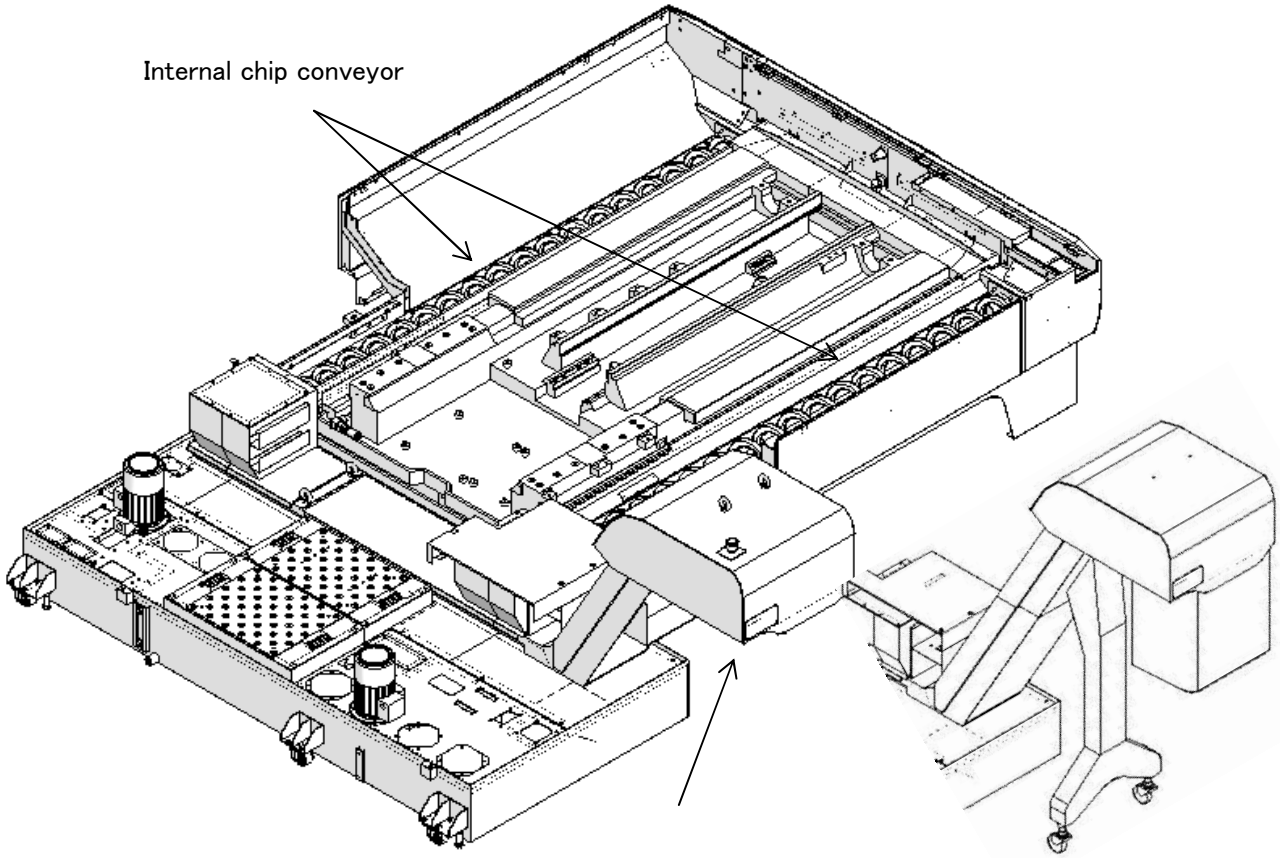
Spiral conveyors are installed on the machine bed to discharge chips from the machine.
On NVX5080, two spiral conveyors are installed on the right and left sides.

(2) External chip conveyor (hinge type)

Hinge-type chip conveyor to discharge chips is installed on the machine rear.
Discharge direction is left.
The rear chip conveyor is designed for discharging steel or aluminum chips with a length of 50 mm or more, and chip bundles with a diameter of ϕ 40 mm or more.
Do not use this rear chip conveyor to discharge short chips and casting chips because short chips will flow out to the tank, causing a tank-cleaning burden.

DMG Mori Seiki Parts number : 2U1003254

Electric power	0.1kW
Conveying amount	690L/h (Mainly curled chips)
Discharge height	979mm from floor (Not compatible to EN)
	1,034mm from floor (EN compatible)



External chip conveyor
(hinge type・Not compatible to EN)

External chip conveyor
(hinge type・EN compatible)

◎: Ideal ○: Suitable ×: Not suitable

Specifications	Workpiece material and chip size						
	Steel			Cast iron	Aluminum/non-ferous metal		
	Long	Short	Powdery	Short	Long	Short	Powdery
Drum filter type+cyclone filter	○	◎	○*1	○	○	◎	○*1
Hinge type+drum filter type	◎	◎	○*1	○	◎	◎	○*1
Magnet scraper type	×	○	◎	◎	×	×	×
Hinge type*2	○	×	×	×	○	×	×

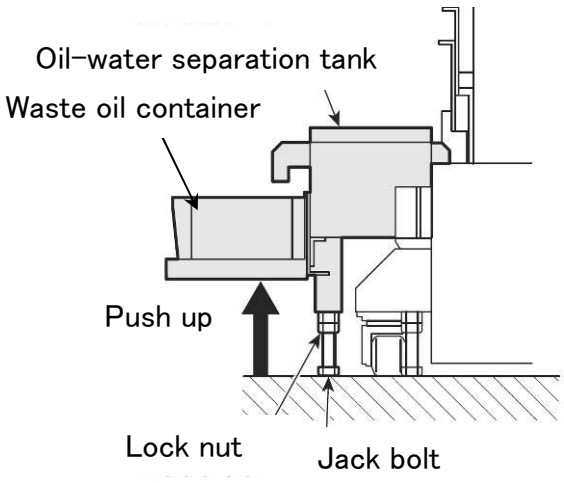
*1 Please contact our sales representative for detail.
*2 Short or dust-like chips may flow into the tank, causing frequent cleaning.

- Chip size guidelines
  Short: chips 50 mm (2.0 in.) or less in length, bundles of chips ϕ40 mm (ϕ1.6 in.) or less
  Long: bigger than above
- The options table below the general options when using coolant. Changes may be necessary if you are not using coolant, or depending on the amount of coolant, compatibility with machine, or the specifications required.
- Please select a chip conveyor to suit the shape of your chips. When using special or difficult-to-cut material (chip hardness HRC45 or higher), please consult with our sales representative.
- Chip conveyors are available in various types for handling chips of different shape and material. For details, please consult with our sales representative.

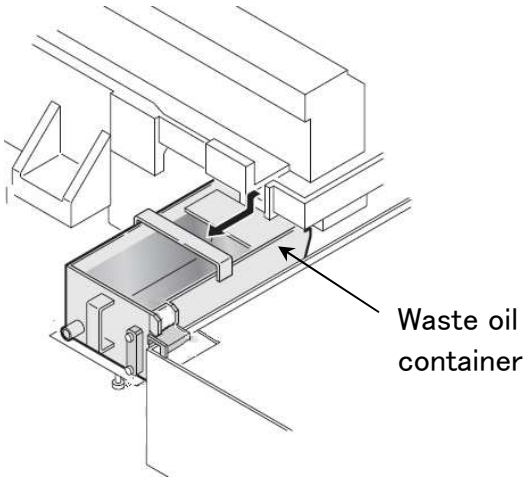
(3) Adjusting oil-water separation tank

For the water-soluble coolant specification, a oil-water separation tank is provided.
When coolant is contained in waste oil in the waste oil container, push up the oil-water separation tank with jack bolts until it becomes level. If the coolant flow into the waste oil container even if the oil-water separation tank is level, jack it up until the coolant stops entering the waste oil container.

For the oil-based coolant specification, a waste oil container is provided instead of an oil-water separation tank. Check the oil level gage on the waste oil container periodically and dispose of the waste oil when the oil exceeds the upper limit (yellow line).



Water soluble coolant specification
Oil-water separation tank



Oil-based coolant specification
Waste oil container

7.29 Coolant System (Water-soluble Coolant)

(1) For water-soluble coolant

Please consult our representative if you wish to perform dry machining or use oil-based coolant because there may be considerable adverse effects relating to the accumulation of chips, thermal displacement due to coolant temperature rise, or dimensional accuracy of machined workpieces.

(2) Coolant pumps

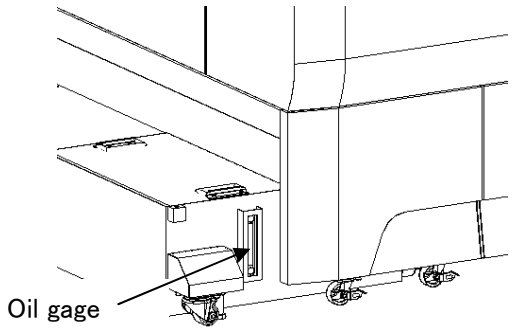
Spindle coolant: Coolant discharged toward the cutting point lubricates and cools the cutting tool and flushes chips.

Name	Parts number	Electric power(kW) (50Hz/60HZ)
Pump for spindle coolant	E55437	0.8/1.1

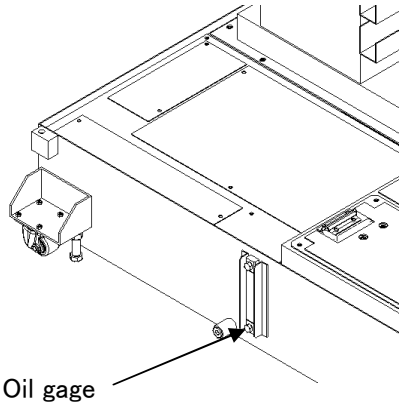
(3) Coolant tank

An oil level gauge is provided on the side face of the tank (at the rear of the machine).

・Internal chip bucket specification



・External chip conveyor specification (option)



Caution: Coolant to be used

i) Obtain the MSDS (MATERIAL SAFETY DATA SHEET) from the coolant manufacturer directly by yourself as the customer and use coolant without any chemical effects on the machine. Please be sure to pay careful attention to the effects on the human body described in the MSDS.

ii) Use coolant that satisfies the following conditions.

- Coolant must be free of constituents with adverse affects on human beings such as offensive smells or those that cause skin irritation.
- Coolant must not deteriorate during storage.
- Coolant must not include constituents that adversely affect machining accuracy.
- Coolant must be free of constituents forming a dry film which deteriorates electric conductivity.
- Coolant must not corrode the machine.
- Coolant must not peel off machine coating.
- Coolant must not cause hardening or swelling of chemical parts (rubber parts, synthetic resin parts, etc.).
- Coolant must not have electric conductivity equivalent to metal.
- Coolant must not be of high viscosity.

iii) Be sure to dilute coolant before supplying it to the coolant tank.

iiii) For the diluting water, use water of a quality that satisfies the conditions (pH, hardness, etc.) specified by the coolant manufacturer. Otherwise, there may be a significant adverse effect on the service lives of the component parts..

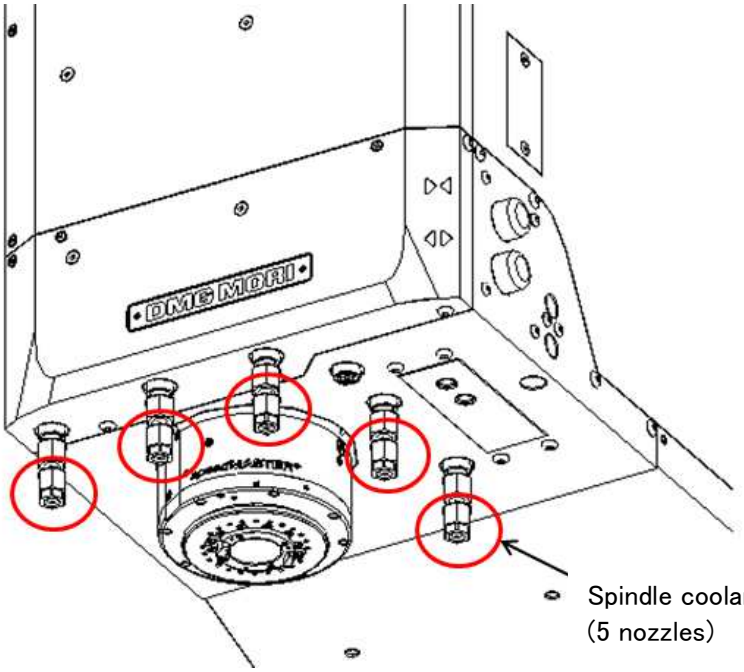
7.32 Spindle Coolant (Shower Coolant Pump Separate Type)

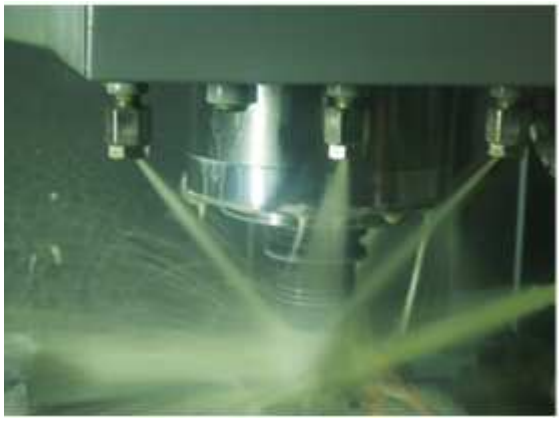
・Spindle coolant pump

Name	Parts number	Electric power(kW) (50Hz/60HZ)
Pump for spindle coolant	E55437	0.8/1.1

The pump for shower coolant is installed separately.

・Location of nozzles

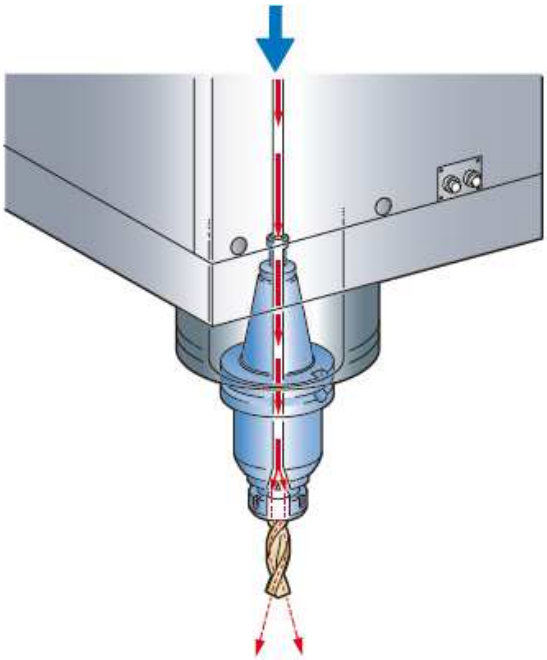




7.38 Through-spindle Coolant System

7.38.1 Center through coolant

With this specification, coolant is supplied through the center of the spindle and is discharged from the tool via the center of the tool holder.
This coolant is effective in removing chips, cooling the cutting point and enhancing the tool life.
When this specification is selected, magazine with magazine door is required.



Center through

For the shape of the retention knob, refer to the figure in “7.5 Tool”.
Use the retention knobs suitable to the machine specifications.

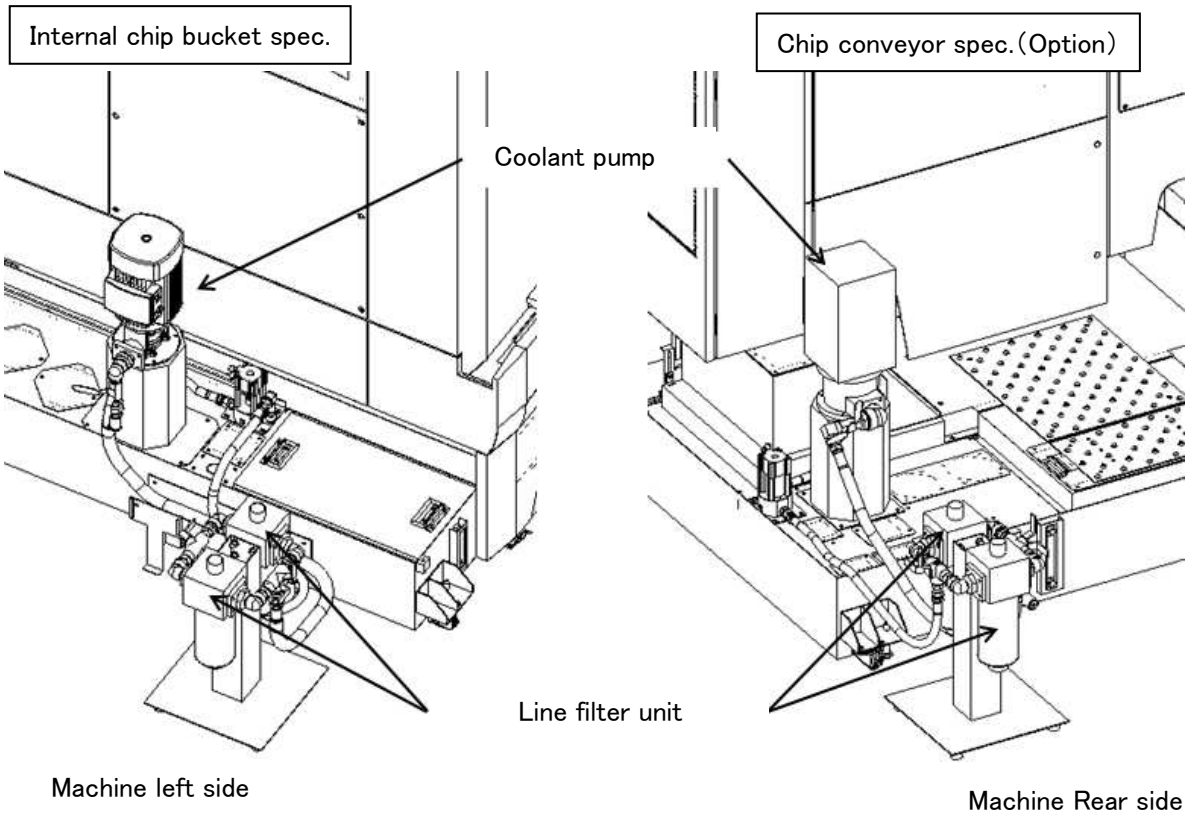
7.39 Unit for Through-spindle Coolant System 1.5MPa

Mounting type, 1.5 MPa, through-spindle coolant system is provided.
It can use high pressure coolant without changing installation space.

Supplies coolant to the tool tip through the hole in the spindle and tool, which is effective for removing chips, cooling the machining point, and prolonging tool life.

DMG Mori Seiki parts number: E55440

Maximum discharge amount	30L/min
Motor output	2.2 kW
Filter	Line filter unit (Separate type)
Filtration accuracy	32 μm
Coolant (Machining oil)	Water-soluble Coolant



7.41 Coolant Gun

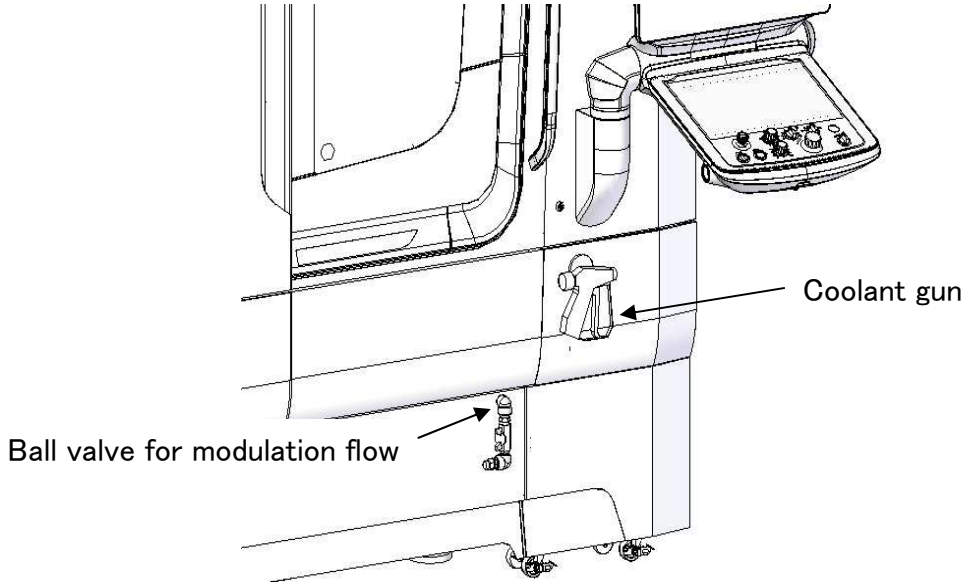
Standard coolant gun

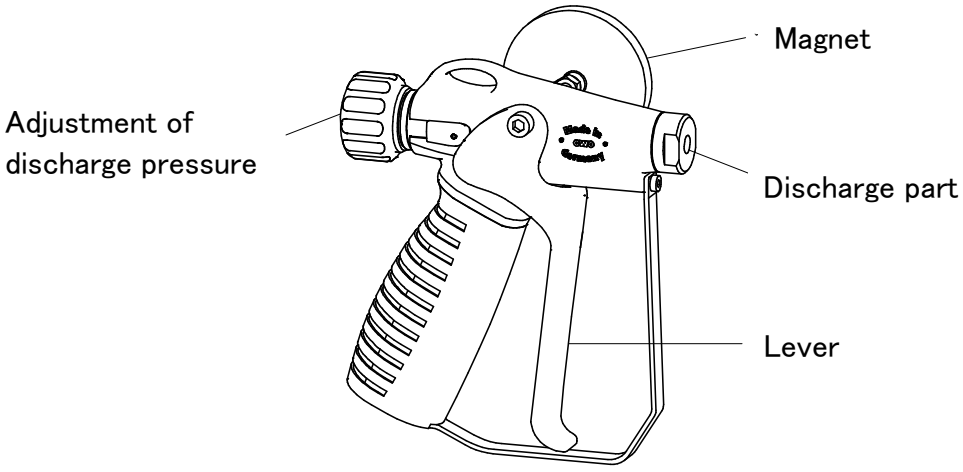
A coolant gun is equipped on the front side of the machine for cleaning chips accumulated inside the machine or adhering to the workpiece or the fixtures.

This coolant gun is equipped with magnets, and can be attached to any part of the machine.

Name	Coolant	Parts number	Electric power(Kw) (50Hz/60HZ)
Pump for coolant gun	Water-soluble	E55436	0.35/0.55
Pump for coolant gun	Oil-based	E55437	0.8/1.1

Oil-based coolant with a viscosity of up to10cSt can be filtered. If oil-based coolant with the higher viscosity is used, the coolant discharge pressure and amount are reduced by 25%. When oil-based coolant with a viscosity higher than 10sSt is used, we recommend that the customer purchase a larger coolant pump (special option).



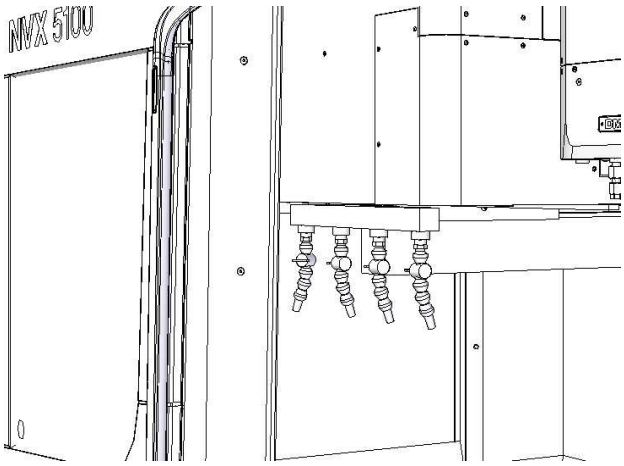


7.42 Shower Coolant (Separate Type)

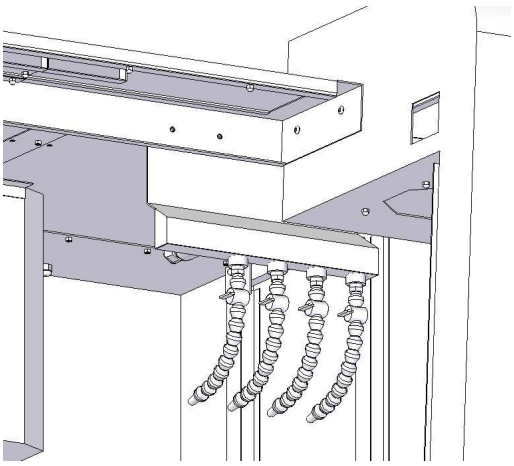
Coolant is discharged through eight nozzles attached to the two opposite interior walls of machine, preventing chips from accumlating on the table or inside the machine. Each nozzle direction can be adjusted. The coolant pump is dedicated for shower coolant.

・Shower coolant pump

Name	Parts number	Electric power(kW) (50Hz/60HZ)
Pump for shower coolant	E55438	0.8/1.1



In-machine left-side



In-machine right side

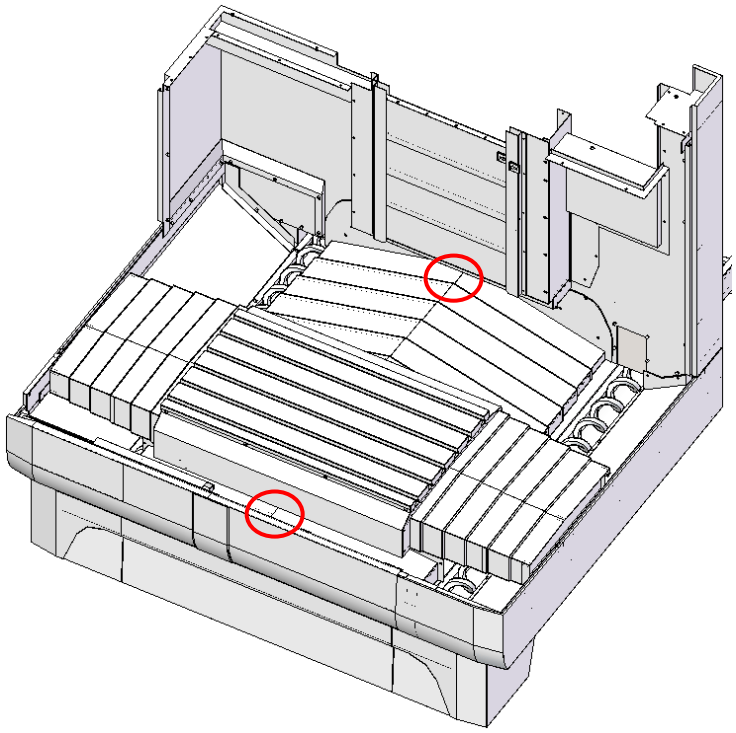
When using oil-based coolant, select the separate type shower coolant.

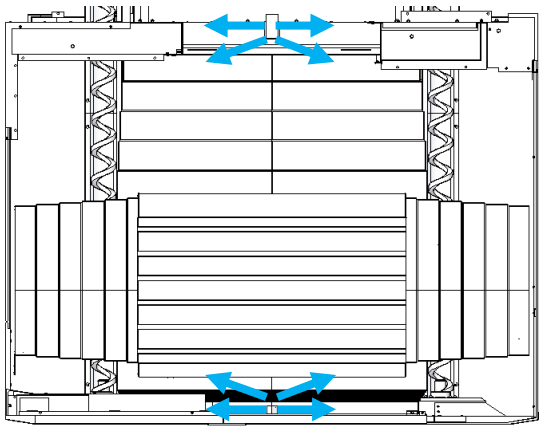
7.43 Chip flushing coolant system (conveyor specification)

Coolant is discharged from the front and rear sides of the Y-axis protector covers to prevent chips from accumulating on the Y-axis protector covers.
When the internal conveyor specification is selected, this coolant system is provided as standard.

・Chip flushing coolant pump

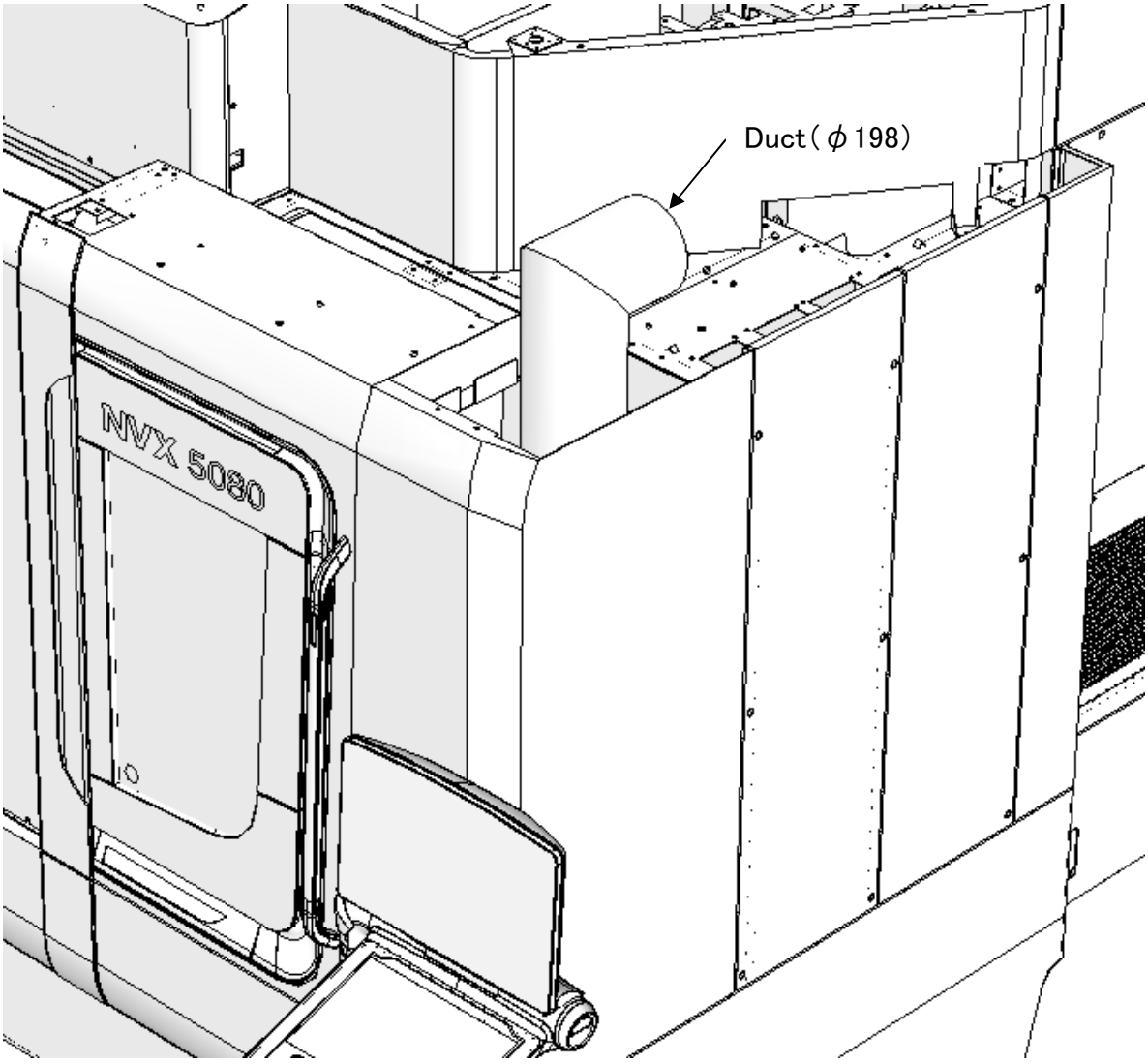
Name	Parts number	Electric power (kW) (50Hz/60HZ)
Pump for chip flushing coolant	E55438	0.8/1.1





7.44 Mist Collector (ϕ200mm Duct Only)

If you select this specification, an L-shaped duct for the mist collector will be installed on the right side of the ceiling of the machine.
The mist collector, the duct and the frame for the mist collector need to be provided by the customer.



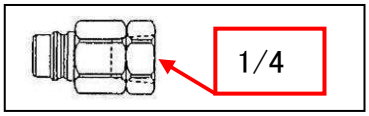
7.50 Additional Axis I/F (External Connection)

External connection

With this specification, wiring and piping necessary to install additional axis (rotary table) are provided from the electrical cabinet to the right side of the machine ceiling. Inside the machine, wiring holder is provided as well.This specification does not include a rotary table.

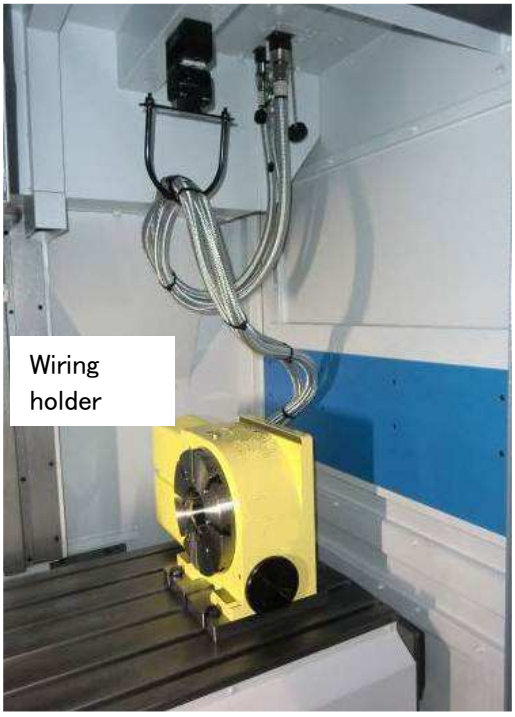
Followings are the interface types.
The interface may vary depending on the specification of the rotary table.

<Air piping coupler shipped with the machine>
Manuracturer: NITTO KOHKI
Type: 20PF
Size: 1/4



＜Specification of the standard connector＞
Power: JL04V-2A28-11SE (Manuractured by Japan Aviation Electronics Industry)
Signal: MS3102A20-29SW (Manuractured by Japan Aviation Electronics Industry)

Connectors on the left side of the machine ceiling



Installation example

7.51 Rotary Table Manufacturer' s Model (Others)

This specification is to use rotary table other than DDRT.
With this specification, the following items need to be specified.

(1) Manufacturer and the type of the rotary table.
NIKKEN:CNC202

(2) Arrangement of the motor
The driving motor of the rotary table is prepared by the customer.
The driving motor of the rotary table is HF54T/A48 : MITSUBISHI

7.52 Signal light (Upper Front)

The machine is equipped with a 4-layer signal light to indicate its operating status.
The buzzer does not sound.

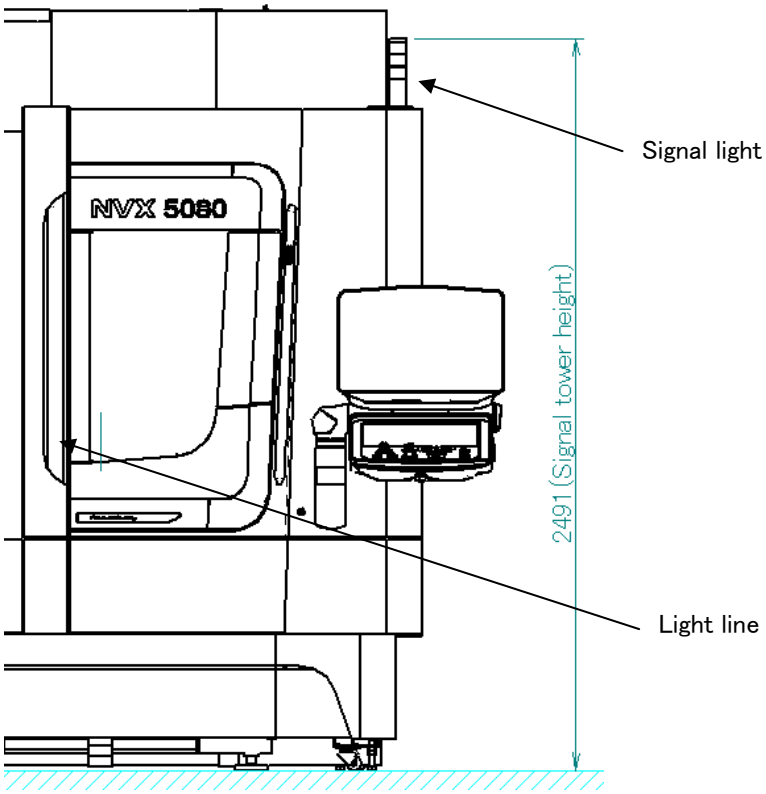
3 Light(Patlite LME-302FBW-GRY)

Light color on signal light and light line

Right line			
Alarm	●		
In automatic operation		●	
Home position			●

○: Signal light is ON., □: Light line is ON

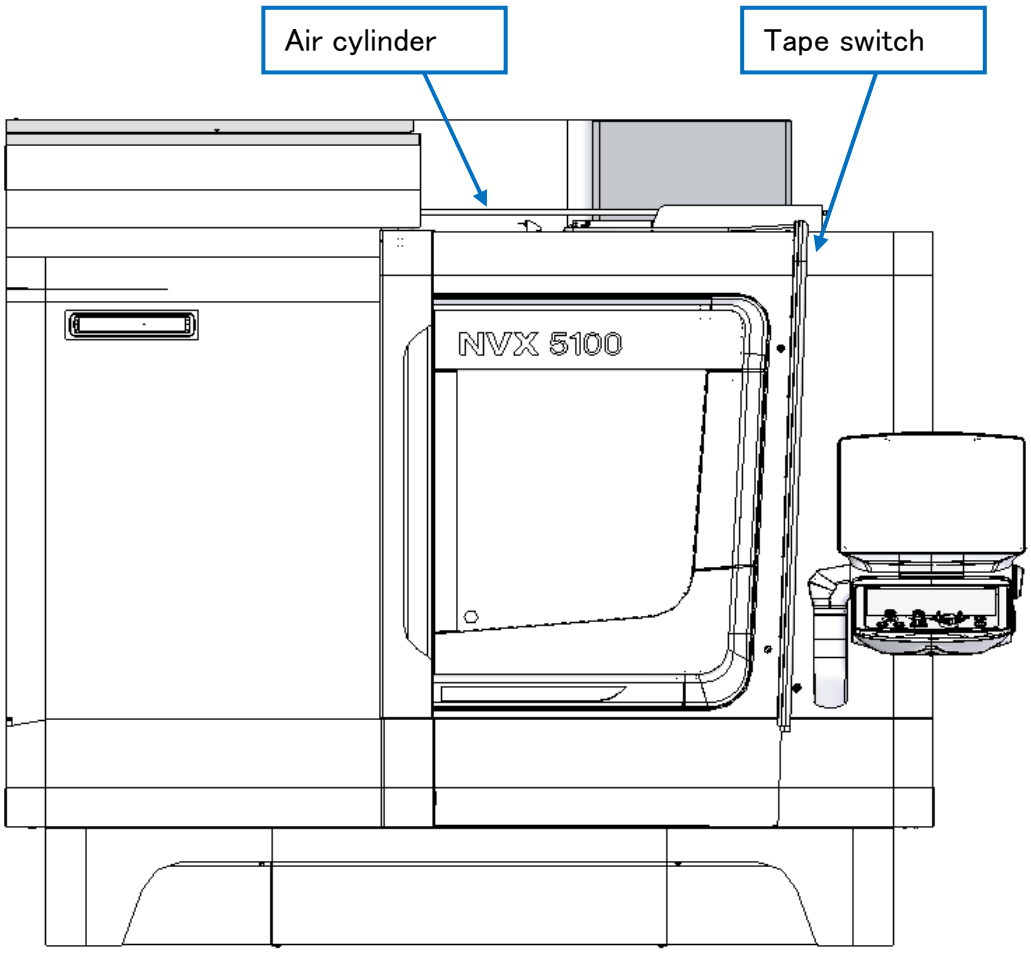
・Upper front
The signal light is installed above the operation panel on the machine front.



7.54 Automatic Door

The door on the setup station side opens/closes automatically.
The door is opened and closed using the buttons on the automatic door panel of the setup station.
To prevent accidents, door open/close operation stops when the tape switch attached to the door is touched.
When the door open/close operation stops by the tape switch or emergency stop, the door can be moved manually.

Size of the opening: 798 mm



※The figure shows NVX5100.

7.57 External M Codes (10 external M codes)

This function can be controlled by M-code the external device. The relay receives the M code output in the control panel in (MTX base), is served to MTX based on the A contact of the relay. Please enter the dry contact signal and common of 24V because it provides the same base on the input signal 10 to signal completion. M code outputs the 10 alone.
M21～M28, M70, M77 or M21～M28, M120, M121 （Setting by parameters）
※M70 is also used for work counter and total counter.

7.58 Separate Type Manual Pulse Handle

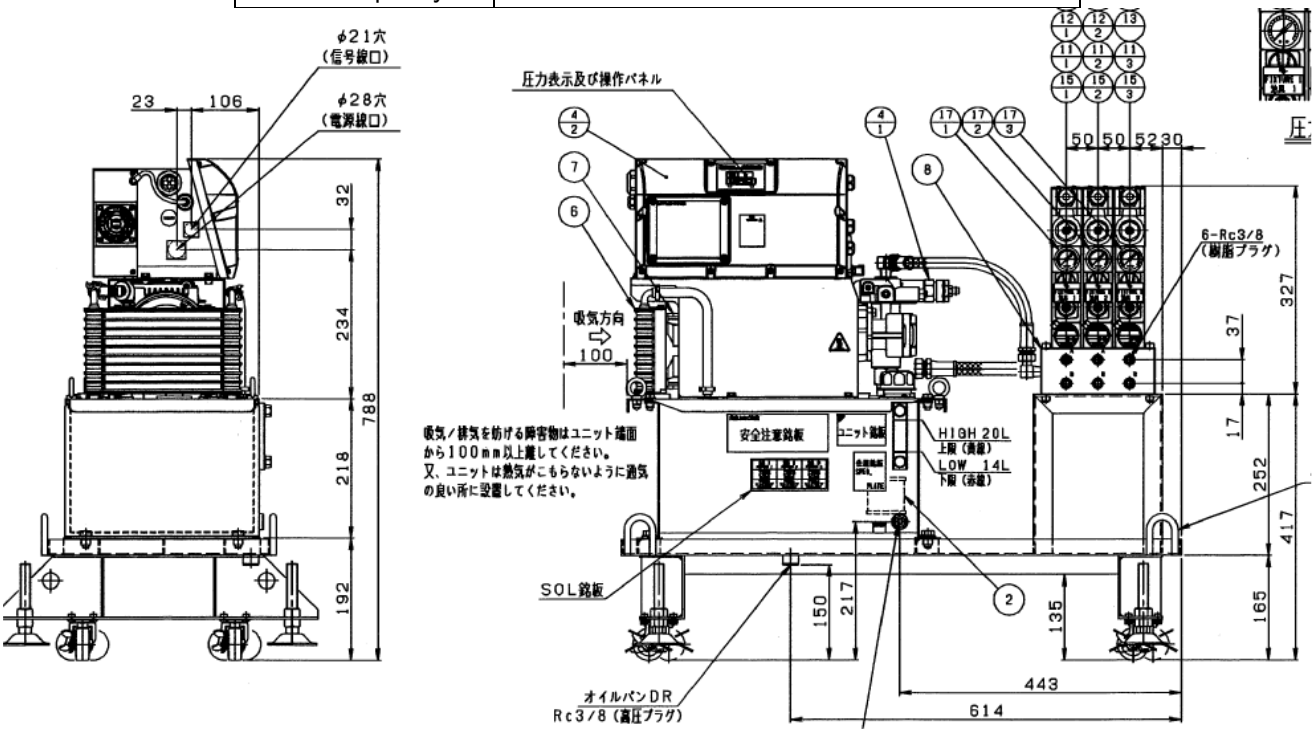
By adding the pulse handle handy type, to improve the operation of the setup time. You can switch the operation of the panel board, to switch to every side or another operation panel side pulse handle used. Pulse handle another place to be added in this specification, are connected by a coiled cord to the control panel. You can paste in place of any of the machine body by the magnet on the back. The high brightness white LED are standard on this device pulse handle every different, it is available as a handy light to illuminate the place to be in the shadow of the machine light and machined surface of the workpiece.

7.59 Hydraulic fixture I/F

Hydraulic unit

DMG Mori seiki Parts number : 2U0002461(DAIKIN)

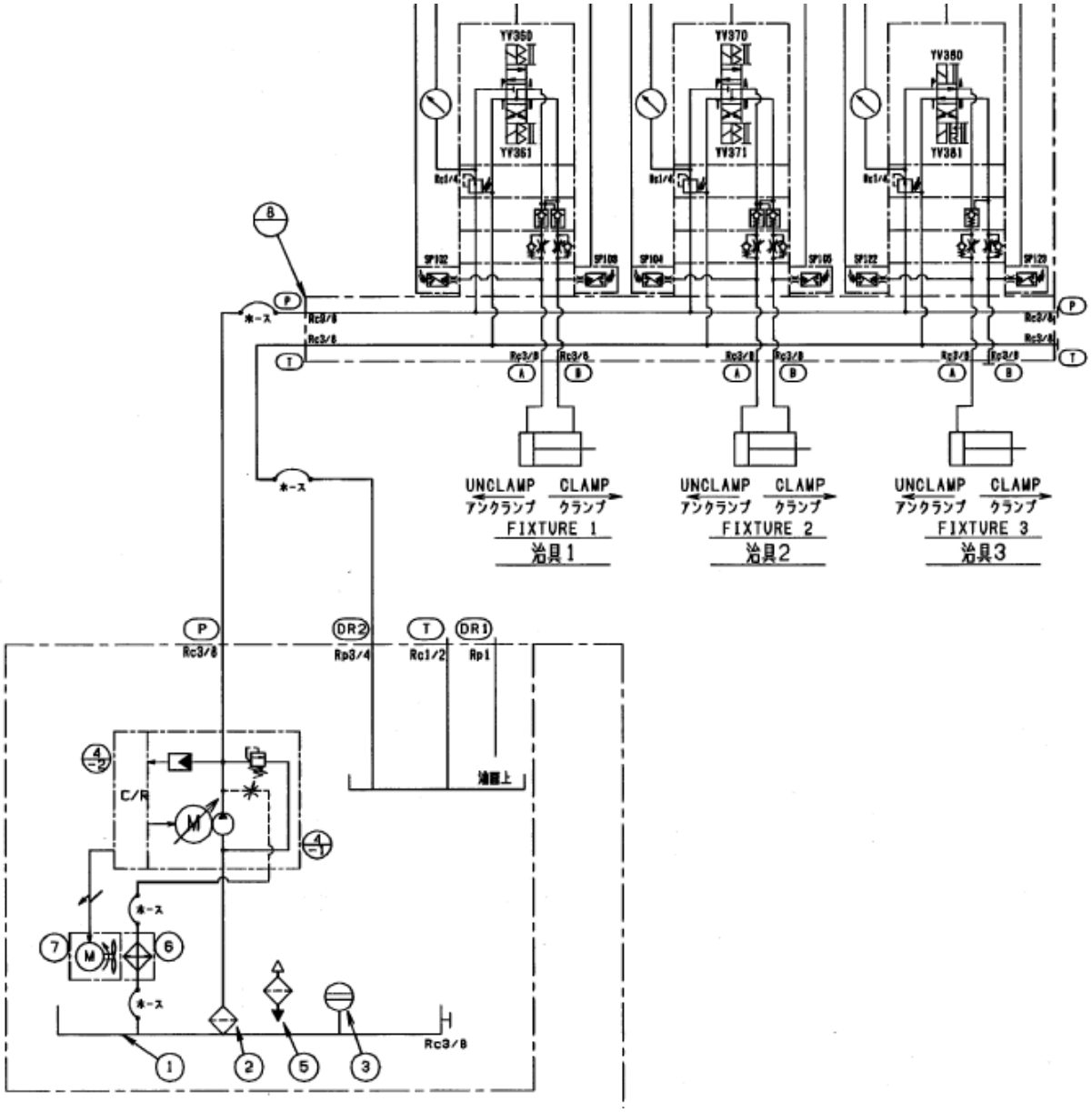
Discharge pressure	7.0MPa
Recommended oil	Idemitsu Kosan Daphne hydraulic fluid 32 (Equivalent to ISO VG32)
Oil tank capacity	20 L



Hydraulic circuit

The number of cirecuit： 3

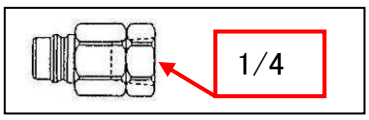
Hydraulic unit has regulator, pressure switch, flow regulaor, pilot check.



External connection

With this specification, piping is provided from the hydraulic unit to right side machine ceiling.
Hydraulic piping couplers are attached to right side machine ceiling.
The hose and joint used inside machine are not included.

Followings are the interface types.
<Hydraulic piping coupler shipped with the machine>
Manuracturer: NITTA
Type: VHN4-4F
Size: 1/4



Operation

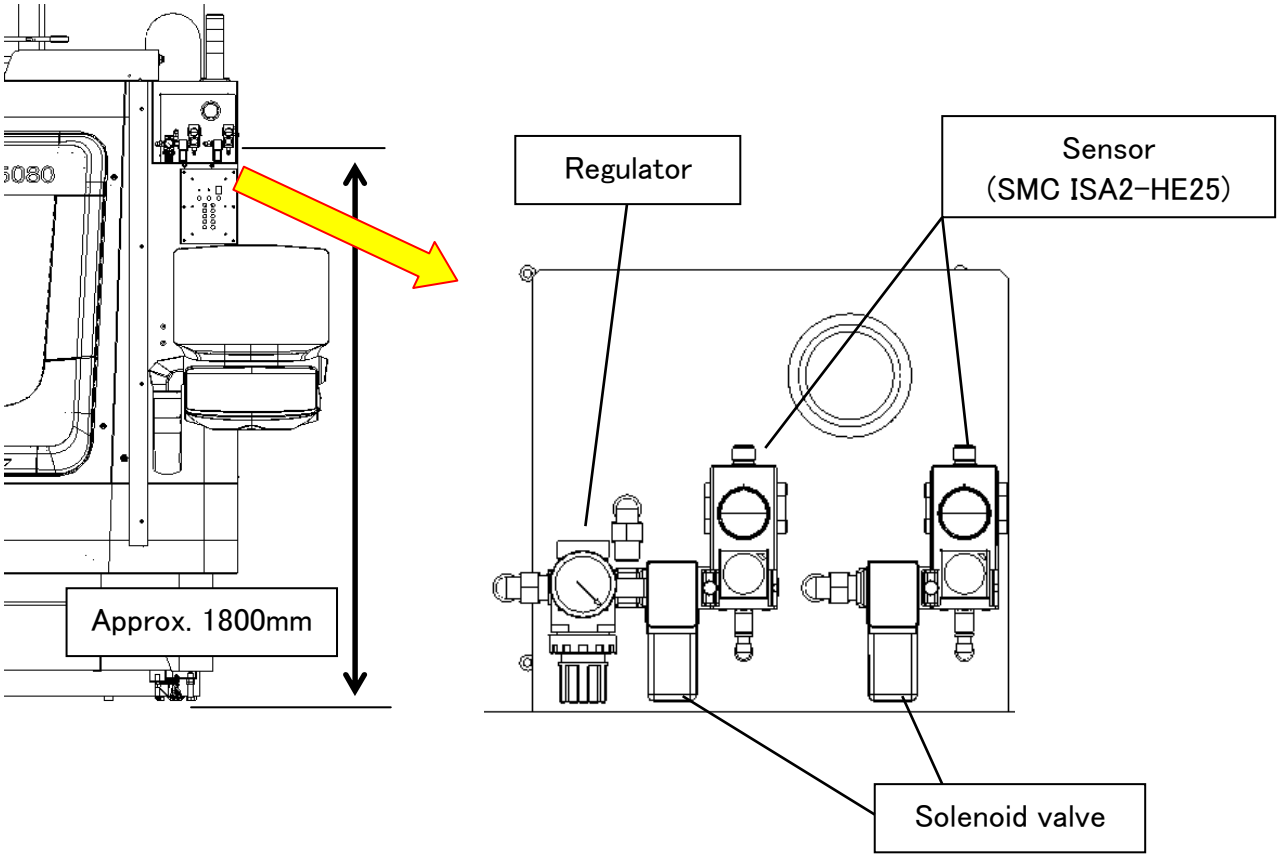
Operation buttons in the Celos and the M code is valid.

7.60 Workpiece holding detection

Install workpiece holding detection sensor at the front right panel. (Above the operation panel)
The position of sensor is referring to below drawing.

DMG Mori Seiki Parts number : 2U4903096A
(Pneumatic unit set. Regulator, solenoid valve, sensors are inclueded)
SMC:ISA2-HE25

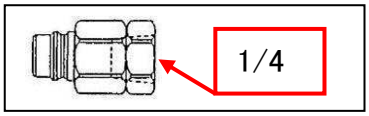
The number of circuit: 2



External connection

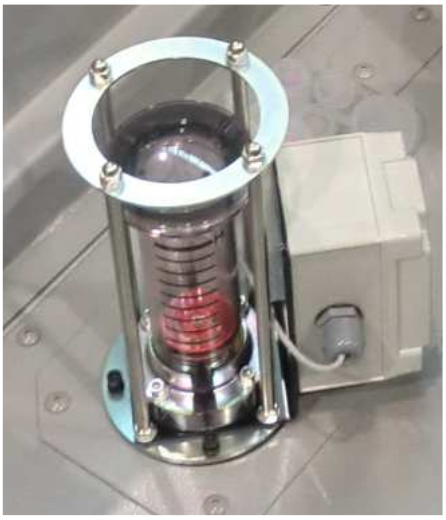
With this specification, piping is provided from the sensor to right side machine ceiling.
Air piping couplers are attached to right side machine ceiling.
The hose and joint used inside machine are not included.

Followings are the interface types.
<Air piping coupler shipped with the machine>
Manuracturer: NITTO KOHKI
Type: 20PF
Size: 1/4



7.61 Coolant float switch (Lower limit detection)

Attach the coolant float switch to detect coolant lower limit.
It will manage the coolant level. (Lower limit detection)
It is a control detection switch that detects the liquid level at the setting position by the float installed in the tank and notifies it by alarm.



Alarm handling
Lower limit detection: An alarm occurs and the machine stops immediately.

7.62 Name plate for Aisin Drivetrain. Inc.

Follwing name plates (labels) are attached to the machine
- Name plate (weight)
- Name plate (tank capacity)
- Name plate (electric capacity)
- Name plate (pressure setting)
- Name plate (Oil level indication)
- Name plate (lubrication instructions)
- Name plate (flow direction)
- Name plate (axis direction)
- Name plate (proximity switch, limit switch)
- Name plate (directions of motor rotation)
- Name plate (machine center) : indicate center of gravity of the machine.
- Name Opening and shutting of valve
- Machine SN Stickers (Blue) : attached at machine body and coolant tank
  NV503170112 : CMC3012、NV503170113 : CMC3013
- Supplier Name plate
- Meter Display Range Green/Red

7.63 Power supply lamp (white)

The lamp lights up when the factory side power is turned on.

7.64 Lamp + Buzzer Check Button

All the lamps and buzzer turn on when the lamp/buzzer check button is pushed.
※Except emergency stop button

7.65 Emergency stop button (with lockout function)

Change emergency stop button.
The lamp inside the emergency stop button lights up when the emergency stop button is pressed.

7.66 Additional in Electrical Cabinet Light

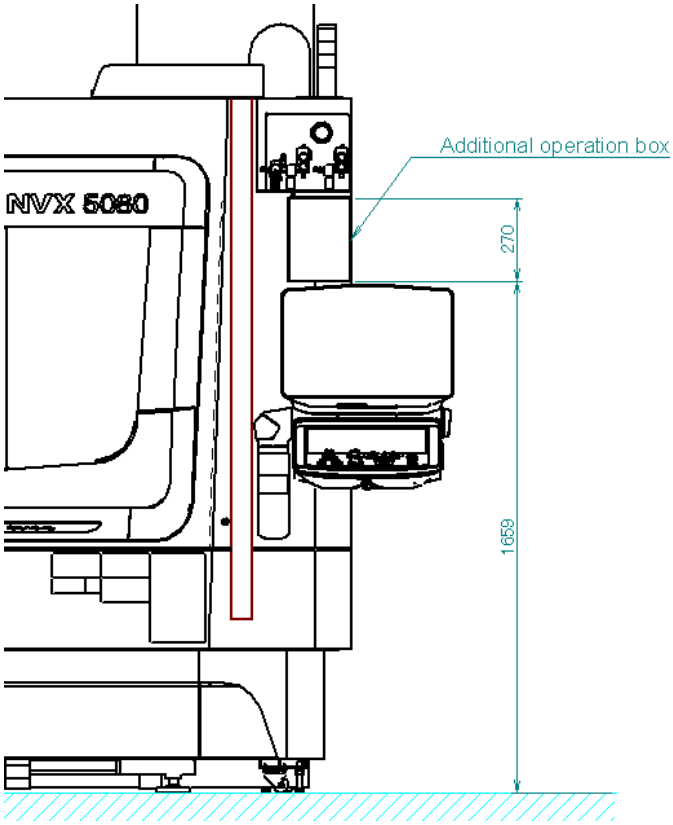
The LED light in the control cabinet lights up when the control cabinet door is opened.

7.67 Work number search(1-4)

You can select 1 to 4 home return program.
You need to press the home return button to execute the home return program.
※Key switch is customer supply.

7.68 Additional operation box

Install the sub operation panel on the front of the machine.



・AUTO/MANUAL select switch ①
AUTO : MEMORY mode only selectable
MANUAL : MDI mode or manual mode

・LAMP & BUZZER check button ②

・Home return button ③

・Key switch for work No. search (1-4) ④

・Door open/close button ⑤⑥

・Fixture 1 clamp/unclamp button ⑦⑧

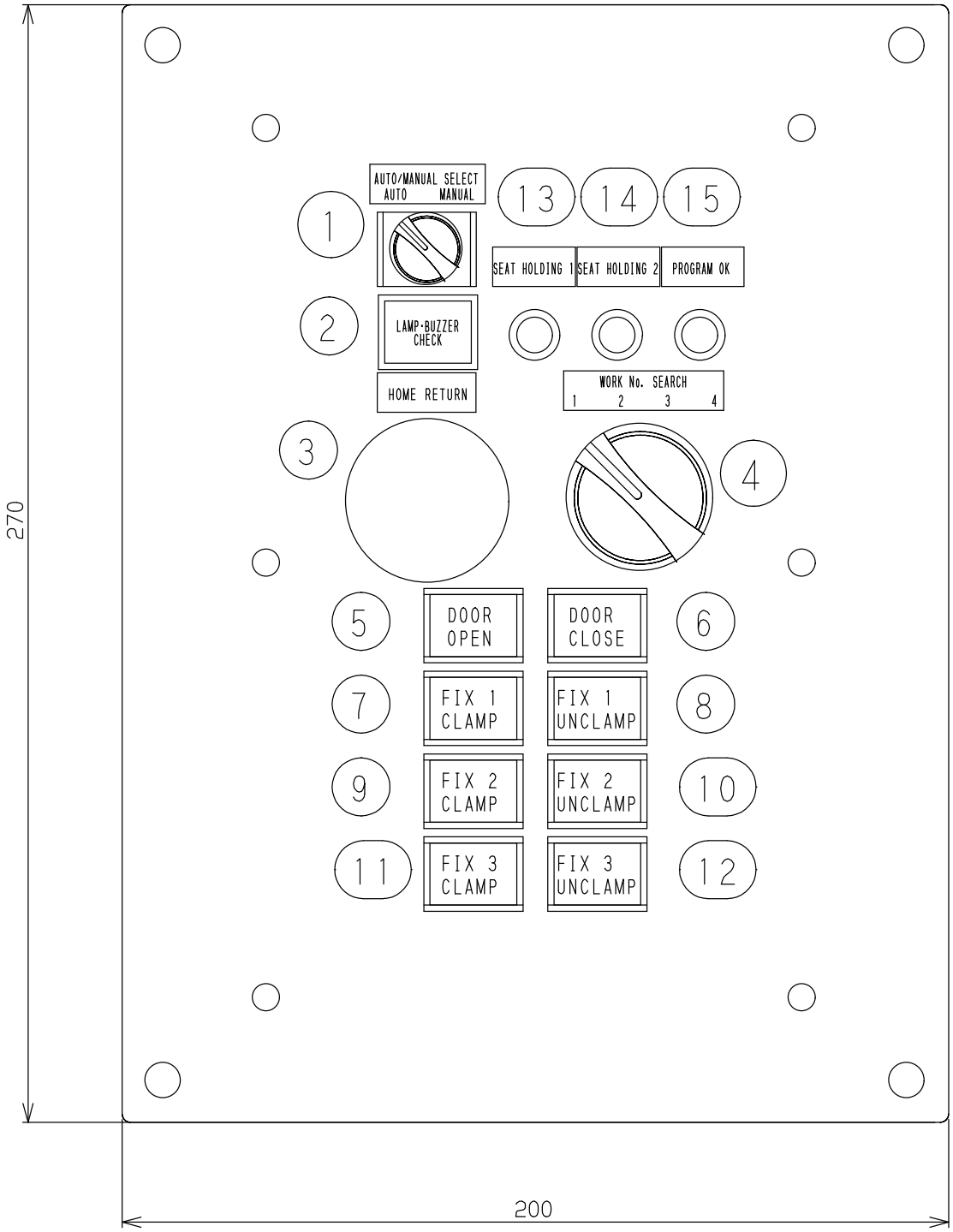
・Fixture 2 clamp/unclamp button ⑨⑩

・Fixture 3 clamp/unclamp button ⑪⑫

・Seat holding detection 1,2 lamp ⑬⑭

・Program OK lamp ⑮

Layput of sub operation panel



7.69 Fixture washing coolant

Coolant is discharged from the table front side coolant pipe.
Only OP10, supply coolant to rotary joint port.
Fixture coolant turns on/off by M-code.

・Fixture coolant pump

Name	Parts number	Electric power(kW) (50Hz/60HZ)
Pump for fixture coolant	2E5501071	2.2/2.2

7.70 Special shipment transit clamp

We provide special shipment transit clamp to ship the machine with fixture on the machine table.

7.71 KEYENCE Light curtain for Auto door

Keyence light curtain is attached at front panel of the machine.

7.72 Fixture interface (clamp/unclamp) (1pneumatic circuit (2 ports))

Only OP10 (NV503170112), supply the air to support table from rotary table (NIKKEN：CNC202) to use for support table clamp.

8. NC UNIT AND ELECTRICAL SPECIFICATIONS

8.1 Control Unit Specifications

8.1.1 Controlled Axis

8.1.1.1 Inch/Metric Conversion

The commands can be changed between inch and metric with the G20/G21 command.

8.1.1.2 Machine Lock

The NC program is executed without moving any controlled axes for the purpose of checking.

8.1.1.3 Overtravel

The overtravel function is to decelerate the axis movement and display alarms when a controlled axis travels beyond the machine stroke end.

8.1.1.4 Load Monitor Function C(Softkey Type)

This function monitors a load fluctuation of the motor during machining, and detects abnormality of a tool. If a motor load torque of a spindle or a feeding axis exceeds the abnormal value set beforehand, a warning and an alarm occur. Switch the teaching mode/monitoring mode by pressing a button provided on the option panel.

8.1.2 Operation

8.1.2.1 Dry Run

The dry run function is to check the NC program at the manually-selected speed rather than the programmed speed.

8.1.2.2 Single Block

Only one block of the program is executed in automatic operation every time the cycle is started.

8.1.2.3 Jog Feed (0～5,000 mm/min(20 Steps))

An axis is moved while an axis feed button is held down at the feedrate set with the feedrate override switch.

8.1.2.4 Manual Reference Position Return

The tool is returned to the first reference point by pressing the button on the operation panel.

8.1.2.5 Manual Handle Feed(Manual Pulse Generator 1:Unit ×1, ×10, ×50, ×100 (Per Pulse))

An axis is moved in the handle operation with the manual pulse generator.

8.1.2.6 Z-axis Neglect

The NC program is executed without moving the Z-axis for the purpose of checking.

8.1.2.7 Synchronous Peck Tapping

The load on the tool is reduced by specifying the depth of cut per path and tapping to the hole bottom in several passes.

8.1.3 Interpolation Functions

8.1.3.1 Nano Interpolation

This function enables output to the servo system to be performed using the detection unit

8.1.3.2 Positioning (G00)

In the absolute programming, coordinate value of the end point is programmed.In the incremental programming the distance the tool moves is programmed.

8.1.3.3 Single Direction Positioning

For accurate positioning without play of the machine (backlash), final positioning from one direction is available.

8.1.3.4 Exact Stop Mode (G61)

The tool is decelerated at the end point of a block, then an in-position check is made.Then the next block is executed.Once specified, this function is valid until G62, G63, or G63 is specified.

8.1.3.5 Tapping Mode (G63)

The tool is decelerated at the end point of a block, but the next block is executed.
When G63 is specified, feedrate override and feed hold are invalid.
Once specified, this function is valid until G61, G62, or G64 is specified.

8.1.3.6 Cutting Mode (G64)

The tool is not decelerated at the end point of a block, but the next block is executed.
Once specified, this function is valid until G61, G62, or G63 is specified. However, in G64 mode, feedrate is decelerated to zero and in-position check is performed in the following case;

Positioning mode (G00, G60)
Block with exact stop check (G09)
Next block is a block without movement command

8.1.3.7 Exact Stop (G09)

The tool is not decelerated at the end point of a block, then an in-position check is made.
Then the next block is executed. This function is valid for specified blocks only.

8.1.3.8 Helical Interpolation (Optional 2 Axes and Other 1 Axis)

By specifying X-, Y-, and Z-axes in the circular interpolation mode,the cutting tool movement is controlled along helix.

8.1.3.9 Reference Position Return (G28)

With G28 command, the commanded axis is positioned to the reference position via the commanded intermediate point. After positioning, the reference position return end lamp lights.
The tool moves to the intermediate point or reference position at the rapid traverse rate.

8.1.3.10 Reference Position Return Check (G27)

The reference position return check (G27) is the function which checks whether the tool has correctly returned to the reference position as specified in the program. If the tool has correctly returned to the reference position along a specified axis, the lamp for the axis for indicating the completion of reference position return goes on. When no movement was made along the axis, whether the current position is the reference position is checked.

8.1.3.11 Return From Reference Position (G29)

Based on the G29 command, the tool is positioned along the specified axis at the point specified by G29 through an intermediate point specified by G28.

8.1.3.12 2nd Reference Position Return (G30 (Used for ATC/APC))

The G30 command positions the 2nd, 3rd, or 4th reference position, via the specified intermediate point. Upon completion of positioning, the 2nd, 3rd, or 4th reference position return completion lamp is turned on. Before issuing the G30 command, The 2nd, 3rd, or 4th reference position must be set in parameters with coordinates in the machine coordinate system.

8.1.4 Feed Function

8.1.4.1 Rapid Traverse Rate (Max 30,000 mm/min)

8.1.4.2 Cutting Feedrate (1～30,000 mm/min{When Using High-precision Control <Look-ahead Control>})

8.1.4.3 Rapid Traverse Override

F0/1/2/3/4/5/6/7/8/10/15/20/25/30/40/50/60/70/80/90/100%
(F0 : set the parameter for each axis a constant speed)

8.1.4.4 Feed Per Minute (G94)

A movement is made at a feedrate specified in F on an axis from the current position to the point separated by a specified value.

8.1.4.5 Tangential Speed Constant Control

In cutting feed, it is controlled so that speed of the tangential direction is always the same commanded speed.

8.1.4.6 Feedrate Override (0～200%(10% increments 20 steps))

8.1.4.7 Override Cancel (M48, M49)

M code (M49) fixes the feedrate override to 100 %. (at the speed specified with address F)
The M48 command validates the feedrate override.

8.1.4.8 High-precision Control

The AI contour control Ⅰ functions are provided for high-speed, high-precision machining.
This function enables suppression of acceleration/deceleration delays and servo delays that become larger with increases with feedrate and reduction of machining profile errors.
Look-ahead blocks up to 150.

8.1.5 Program Input

8.1.5.1 Optional Block Skip

Inputting "/" (slush) at the beginning of the block allows selecting whether to jump or not in the program by pressing the button on the operation panel.

8.1.5.3 Program Number

A number or a character for arranging the stored multiple programs.
For a main program, an arbitrary name (32 characters max.) can also be used.
For a sub-program, only a program number (8 digits number or less) can be used.

8.1.5.4 Absolute/Incremental Programming (G90, G91)

There are two ways to programming travels of the each axis; the absolute programming, and the incremental programming. In the absolute programming, coordinate value of the end position is programmed. The incremental programming is used to program the amount of each axis movement. G90 and G91 are used to command absolute or incremental programming, respectively.

8.1.5.5 Decimal Point Programming (Decimal point programming or electronic calculator type decimal point programming can be set using parameters)

Numerical values can be entered with a decimal point. A decimal point can basically be used for a command value with a unit such as for distance, angle, time, or speed, and the position of the decimal point represents mm, inch, deg, or sec.

8.1.5.6 Diameter/Radius Programming (Decimal point programming or electronic calculator type decimal point programming can be set using parameters)

When turning is performed, the cross section of a workpiece is usually a circle. The size of a circle may be specified by its diameter or radius. When the diameter is specified, it is called diameter programming and when the radius is specified, it is called radius programming. Whether to use radius programming or diameter programming can be chosen for each axis by parameter setting.

8.1.5.7 Plane Selection (G17, G18, G19)

A plane to be used for circular interpolation, plane to be used for cutter compensation, plane to be used for coordinate system rotation, and plane perpendicular to hole machining can be selected using G codes.

8.1.5.8 Rotary Axis Designation

The absolute coordinate values and relative coordinate values on a rotary axis are rounded to coordinates within one rotation at all times. This function can prevent a coordinate overflow from occurring.

8.1.5.9 Coordinate System Setting (G92)

By using the following program command, a workpiece coordinate system can be set so that the current tool position is at a specified position.
G92 IP_;

8.1.5.10 Coordinate System Setting (G54～G59)

A coordinate system in which the zero point is set to a fixed point on the workpiece, to make programming simple.

8.1.5.12 Additional Workpiece Coordinate Systems (6 sets)

The standard 6 sets of workpiece coordinate systems are available from G54 to G59.

8.1.5.13 Programmable Data Input (G10, G11)

By executing programs specified in the formats after a G10 command, various types of data as indicated in the table below can be set.
Workpiece origin offset value:G10 L2
Tool compensation value: G10 L10/L11/L12/L13

8.1.5.15 Sub-program Call(Up to 8 nestings)

If a program contains a fixed sequence or frequently repeated pattern, such a sequence or pattern can be stored as a sub program in memory to simplify the program.M98 is used to call a sub program, and M99 is used to return from a sub program. Up to eight levels of sub programs can be nested.

8.1.5.16 Hole Machining Canned Cycle (G80～G89)

This function are used to perform prepared sequences of machining programs, such as positioning, hole drilling, boring and tapping in a block.

8.1.5.17 Programmable Mirror Image

When the shape of the workpiece is symmetrical along one axis, all the machining can be done just with the program for one part of the workpiece, by using the programmable mirror image function in combination with the sub-program.

8.1.5.19 Custom Macro Common Variables (200 variables)

Custom macro common variables 200 in total (#100-#199, #500-#599).

8.1.6 Miscellaneous Function/Spindle Speed Function

8.1.6.1 Miscellaneous Function(M Function,4-digits M Code)

The M codes consist of the address M and a numerical value up to four digits that follows address M. NC programs are aided by M00 or M02, etc. The machine movement is aided by M03 or M08, etc.

8.1.6.2 Auxiliary Function Lock

The auxiliary function lock signal disables execution of a specified M,S, T, or B function.
This means that the code signal and strobe signal are not output.
Even in the auxiliary function lock state, M00, M01, M02, M30, M98, M99, and M198 are executed.

8.1.6.3 Spindle Speed Function (S Function, S 5-digit S Code)

The spindle speed is specified with a numerical value up to five digits that follows address S. The specified S-value is retained until the next S-value is specified. It is not possible to specify beyond the maximum spindle speed of the spindle specifications.

8.1.6.4 Spindle Speed Override (50～150%(10% Increments))

The spindle speed is overridden in the range of 50% to 150% (10% increments) of the programmed speed specified with address S.

8.1.6.5 Spindle Orientation (M19, M119)

The spindle is stopped at the preset position. M119 indexes the spindle at the required orientation position.

8.1.6.6 Synchronous Tapping (M29)

The movements of the hole machining axis (tapping axis) and the spindle are synchronously controlled in the tapping cycle (G84). It is possible to perform high-speed and high-accuracy machining without using a float tapper, etc.

8.1.7 Tool Offset

8.1.7.1 Tool Function (T Function, 8-digit T Code)

To select a tool, the tool number is specified with a numerical value up to eight digits that follows address T.

8.1.7.2 Number of Tool Offsets (200 Sets) (diameter+length=1 set,number of offsets indicates that diameter and length are displayed separately)

Registerable number of tool offsets becomes 200 in total. The offset amount of tool length, tool diameter and tool position can be registered per tool offset, and this registered information can be allotted for up to 200 tools.

8.1.7.3 Tool Offset Memory C(D/H Code, Geometry/Wear)

Memory for geometry compensation and wear compensation is separate in tool compensation memory C. Geometry compensation and wear compensation can thus be set separately. Separate memories are prepared for cutter compensation (for D code) and for tool length compensation(for H code).

8.1.7.4 Tool Length Offset(G43,G44,G49)

When the difference between the tool length assumed at the time of programming and the tool length of the tool actually used for machining is set in offset memory, the difference in tool length can be corrected without modifying the program. G43 and G44 specify the offset direction, and a number following the tool length compensation specification address(H code) specifies the tool length compensation amount set in offset memory.

8.1.7.5 Cutter Radius Offset(G40～G42)

Use of this function can offset a programmed tool path by the tool radius set in the CNC when machining is performed. When the radius of the tool to be used for machining is measured and set as the offset value in the CNC, the tool moves along the offset path to cut a programmed profile. Therefore, even when the tool diameter changes, you must only change the offset value and need not modify the program.

8.1.7.6 Tool Position Offset (G45～G48)

The programmed travel distance of the tool can be increased or decreased by a specified tool offset value or by twice the offset value. The tool offset function can also be applied to an additional axis.

8.1.7.7 Tool Management System

Information on various tools (tool life, offset value, spindle speed, feed rate etc.) can be managed comprehensively, to support efficient programming and machining plans.
Tool IC function, MCC-TMS, Tool presetter etc. are not included.

8.1.8 Mechanical Error Compensation

8.1.8.1 Backlash Compensation

Function for compensating for lost motion on the machine.

8.1.8.2 Rapid Traverse/Cutting Feed Backlash Compensation

Since different backlash compensation value can be used for cutting feed and rapid traverse, the machining precision is improved.

8.1.8.3 Stored Pitch Error Compensation

The error caused by machine position, as pitch error of the feed screw, can be compensated.

8.1.8.4 Interpolation Type Pitch Error Compensation

In stored pitch error compensation, the pitch pulse at each pitch error compensation point is output in the interval between that point and the next compensation point. In interpolation type pitch error compensation, the compensation amount at each error compensation point is divided into pulse in the interval between that point and the next point on the travel axis and output.

8.1.9 Editing

8.1.9.1 Part Program Edit

Following program editing operations are possible.
・Replacing a word or address.
・Cut-and-paste of character units or word units.
・Copying and moving programs.

8.1.9.2 Program Protect

This function prevents the contents of the program from rewriting without permission.Disable editing or diplay of Nos. O8000 to O8999 and Nos. O9000 to O9999 by setting parameter.

8.1.9.3 Background Editing

While a program is being executed, another program is edited. Such an edit operation is called background editing (BG editing). Background editing can be performing in exactly the same way as ordinary editing (foreground editing).

8.1.9.4 Undo/Redo Function <MAPPS>

It is possible to reverse from a current state to a previous state or reverse from a previous state to a latter state while the NC program is edited.

8.1.9.5 Line Number Display <MAPPS>

Since the line numbers are displayed while the NC program is edited or displayed, it is easy to check the currently-editing section. Owing to the edited section highlighted in red, the operator can check the sections to be noted easily.

8.1.10 Operation and Display

8.1.10.1 Status Display

The cutting mode, automatic operation state, alarm state, and program editing state are displayed.

8.1.10.2 Clock Function

Time is displayed in the hour/minute/second format on each display screen. Some screens allow display of the year, month, day. The custom macro system variable can be used to read the time.

8.1.10.3 Current Position Display

The current position and the remaining distance in the relative, work piece, and machine coordinate system are displayed.

8.1.10.4 Program Comment Display (48 Characters)

Comments are entered up to 48 characters.

8.1.10.5 Parameter Setting Display

Parameter settings are displayed.

8.1.10.6 Alarm Display

When failure occurs, an alarm message appears on the screen on the NC operation panel.

8.1.10.7 Alarm History Display

This screen displays alarms in order from the latest alarm.

8.1.10.8 Operator's Message History Display

What operator key input in the event of a fault or alarm, and also, if with the signal operation, this function allows you to store the alarm history what had occurred.

8.1.10.9 Running Time/Parts Count Display

On the current position screen, operation times (run time and cycle time) and the number of machined parts are displayed. The cumulative value of automatic operation time, the cumulative value of cutting time, and timer values that can be set freely can be modified and preset by MDI.

8.1.10.10 Actual Cutting Feedrate Display

The actual machine federate per minute can be indicated.

8.1.10.11 Operating Monitor Screen

Load values (torque values) of spindle and servo motors are displayed in the bar graph form on the screen. In the bar graph display, the latest sampling values are indicated. By setting the rated load value of the motor corresponding to each load meter in a parameter in advance, the load meter shows 100% when the load value equals the rated load value.

8.1.10.12 Guidance Input Function

Pressing the Guidance button on the Foreground/Background Edit Screen allows checking and putting the G codes and M codes.

8.1.10.13 Self-diagnosis(Includes Alarm Display, I/O Signal Diagnosis and Ladder Diagram)

The current internal status of the system is indicated.

8.1.10.14 Total Counter Display <MAPPS>

Total counter display is used to display the number of machined workpieces.
Each time the M70 commands written in a program are read, the counter increments the count.

8.1.10.15 Work Counter Display <MAPPS>

Work counter display is used to control the number of machined workpieces.
Each time the M70 commands written in a program are read, the counter increments the count.
When the number of workpieces reaches the setting maximum value, the machine will perform start interlock or block delete.

8.1.11 I/O Functions and Units

8.1.11.1 I/O Interface (USB)

A USB port is placed on the operation panel. This port is used to input and output data.

8.1.11.3 Program Storage Area 6GB (For MAPPS-DNC Operation Function, for Data Backup) <MAPPS>

The capacity of the user memory area on the operation panel is 6GB. The area for the customer is reserved in the MAPPS to store the machining programs and memos, and drawings. The machining programs in the memory area can be executed in the DNC operation. The memos and drawings can be reviewed on the machine by using the media viewer function.

8.1.11.4 MAPPS-DNC Operation Function

A program stored in the user memory area is transferred to the NC and runs at the same time.
By specifying M98/G65 in the main program stored in the user memory area, sub-programs and G code macros stored in the NC memory can be called.

8.2 Electrical Specifications of Electrical Cabinet and Operation Panel

8.2.1 Specifications of Electrical Cabinet and Operation Panel

(1)The electrical cabinet doors shall be so constructed that they can open at least 95 degrees. (IEC60204-12.4)

(2)The door is one door structure. The width is 900 mm and the height is 1,657 mm long.(IEC60204-12.4)

(3)Devices that need to be accessed for regular maintenance or adjustment shall be installed at a height of between 0.4 m and 2.0 m. (IEC60204-12.2.1)

(4)Capacity of short circuit
Main breaker 100kA
SCCR * 5kA
(Short Circuit Current Rating shows the capacity of rating circuit for the whole electrical cabinet)

(5)IP ratings

IP54

(6)The electrical cabinet is designed so that the control circuit and the source circuit are located separately, but they may be partially located close to each other depending on the arrangement of devices.

(7)Devices are attached on the bottom and sides inside the electrical cabinet. They are arranged so that maintenance operation is easily conducted.

(8)Battery key switches are attached on the electrical cabinet door.

(9)Devices employed for the electrical cabinet are in conformity with the standards cited in IEC60204-1. The PNP type is used for limit switches and photoelectric switches.

(10)The device numbers agree with the drawing numbers in the electrical circuit diagram.

(11)Seals with the device numbers are directly adhered to the devices.

(12)Codes for each device start with the following alphabets.

Name	Device No.
Limit switch/proximity switch	SQ
Solenoids	YV
Pressure switches	SP
Float switches	SL
Foot switches	SF
Thermostatic switches	ST
Motors	M
Magnet switches	KM
Circuit protectors	QF
Relays	KA
Timer relay	KT
Terminal relay	KATR
Motor breaker	QM
Fluorescent lamps	EL
Halogen lighting	HL
LED indicators/LED lighting	LED
Signal light	PT
Pushbuttons (illuminated type included)	SB
Selector switches (including key switches and rotary switches)	SA
DC stabilized power supplies	GS
SSR relays	KS

(13) Doors shall in principle be constructed with mechanical interlocks actuated by a circuit breaker handle. When the gatefold door construction is adopted, the door that is opened first shall be equipped with the circuit breaker handle, and the door that is opened second shall be equipped with a door interlock limit switch, establishing a circuit that shuts off the main circuit breaker.

(14)While the main breaker handle is in the OFF position, lockout can be executed by locking the main breaker handle with a padlock. A padlock needs to be prepared by the customer. The breaking capacity of the main breaker is selected as 125% of the total rated load

(15)The control circuit is designed based on ISO 12100, securing required safety for the control unit.

(16)When the door of the machine is opened, power supply to the drive units in the machine is shut off.

(17)If the main power supply of the machine is shut off unexpectedly due to a reason such as power failure, the spindle may continue rotating by inertia inside the machining area, but the door of the machine does not open because it is locked with the door lock device.

(18)There is no circuit for bypassing the emergency stop circuit.

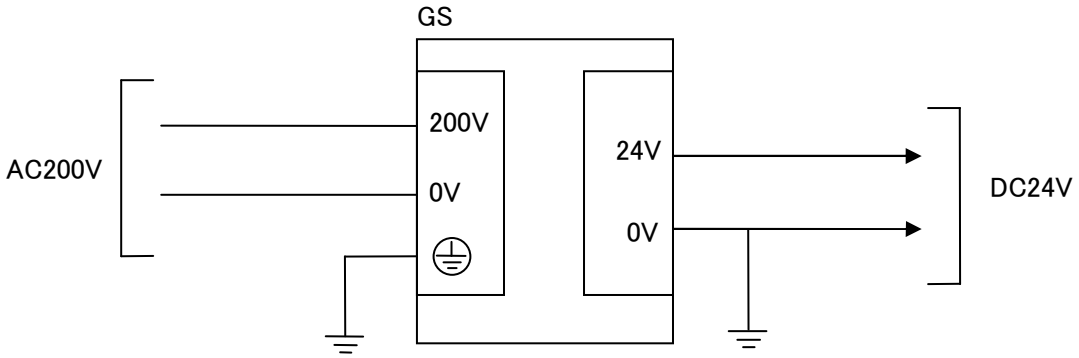
(19)The control circuit is protected by providing a device for protecting against overcurrent such as a circuit protector and a fuse.

(20)The DC24V control circuit employs the switching power source.

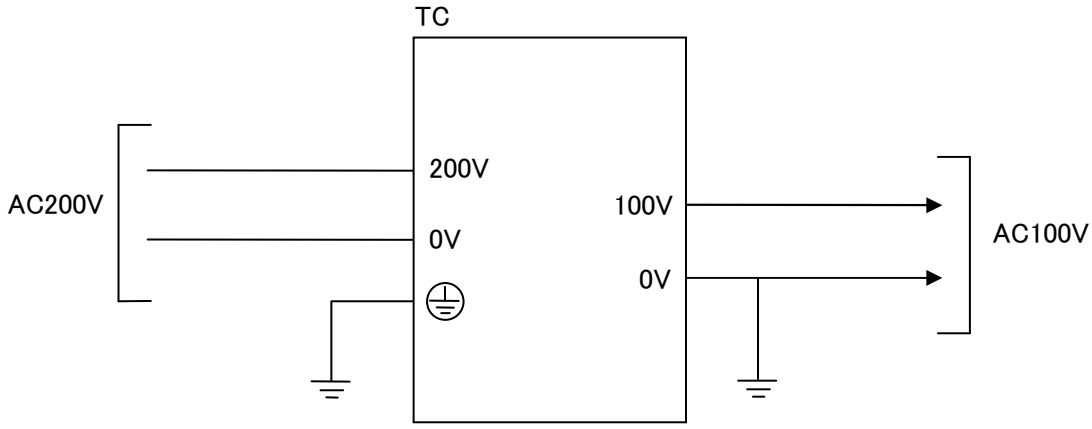
(21)The DC24V specification coil for the electromagnetic switch is employed; also the AC100V specification is employed depending on the purpose.

(22)The control circuit on the load side is grounded for protection.

Example of the circuit grounding for protection



The negative side of DC24V is grounded (N24 line)



The OV side of AC100V is grounded (S12 line).)

(23)The addresses of I/O whose addresses are already allocated by DMG Mori Seiki cannot be changed.

(24)For the devices required to be grounded, the grounding work is done. The device mounting board inside the electrical cabinet and the door of the electrical cabinet are grounded.

(25)Shielded wires are used for high-frequency signal such as communication wires and encoders.

(26)Surge absorber is attached for the devices which generate surge, e.g. magnet switch and solenoid valve.

(27)Terminal box for signals
The finger safe terminal box (IP2X) of the gage clamp (spring type terminal box) is used. Structurally, it cannot be touched directly with a finger.

(28)The danger marking (thunder mark) by electrical shock is adhered to a terminal box and a relay box. This mark complies with the article 16.2.1 of IEC 60204-1.

(29)Battery
NC internal memory—parameters, programs, offset data—and the position information that the encoder retains are backed up by batteries. Replace the batteries every year. When a battery alarm occurs, immediately replace the batteries even within a year.

(30) Machine Operation Panel

Emergency stop button on the main operation panel: push-lock, pull-return type button: Red
When the emergency stop button is pressed, the drive unit of the machine stops.

Cycle start switch: push-button switch: Green
This button is used to start an automatic operation in the memory, MDI or DNC mode.

Cycle stop switch: push-button switch: Red
This button is used to temporarily stop axis movement during automatic operation.

(31)Symbols in electrical diagrams comply with IEC 60617-5 to IEC 60617-12 and IEC 61082-1.

(32)Connections at each unit (inside the electrical cabinet, the operation panel, and the external device) are clearly described in the diagram for the electrical cabinet.

(33)In the electrical circuit diagram, sections such as the power circuit, the control circuit, input, and output are separately described, but some sections are described together depending on the circuit.

(34)The following items are listed on the cover page of the electrical circuit diagrams.
Machine model
NC unit
Serial number
Power source voltage
Power capacity
Spindle motor output

(35)The electrical circuit diagrams are stored in the pocket in the electrical cabinet.

8.2.2 Specifications of the Cables

(1)The power cables with appropriate cross-sectional areas are selected according to the load current.
The size of power cables comply with the UL standard—most strictly prescribed standard.
AC200V circuit 14 AWG (2.0mm^2) or more (power circuit)
AC100V circuit 18 AWG (0.75mm^2) or more (control circuit, solenoid circuit)
DC24V circuit 24 AWG (0.2mm^2) or more (control circuit, operation circuit)

(2)Wire sizes for control circuits (selection of signal lines)
Either of the following requirements shall be satisfied. (UL508A 38.2.1)
a)Rating of overcurrent protective devices for control circuits, or ampere rating for the secondary side of power supplies and transformers
b)Minimum wire dimensions determined for the relevant power supply capacity by referring to Table 1 or 2.

Table1. Cable Sizes According to the Power Supply Capacity of the Control Circuit(UL508A)

Conductor Size	Electric Capacity[A]
16AWG (1.3mm^2)	10
18AWG (0.82mm^2)	7
20AWG (0.52mm^2)	5
22AWG (0.32mm^2)	3
24AWG (0.20mm^2)	2
26AWG (0.13mm^2)	1
28AWG (0.08mm^2)	0.8
30AWG (0.05mm^2)	0.5

(3)Wire sizes for power circuits

Internal wires for power circuits shall have a current rating that enables connection of conductors of 14 AWG (2.0mm^2) or greater (UL508A 28.3.1).

Table 2. Cable Sizes by the Power Supply Capacity of the Power Circuit (UL508A)

	Electric Capacity[A]
Conductor Size	75℃
14AWG (2.1mm^2)	15
12AWG (3.3mm^2)	20
10AWG (5.3mm^2)	30
8AWG (8.4mm^2)	50
6AWG (13.3mm^2)	65
4AWG (21.2mm^2)	85
3AWG (26.7mm^2)	100
2AWG (33.7mm^2)	115
1AWG (42.4mm^2)	130
1/0AWG (53.5mm^2)	150
2/0AWG (67.4mm^2)	175
3/0AWG (85.0mm^2)	200
4/0AWG (107.2mm^2)	230
250kcmil (127mm^2)	255
300kcmil (152mm^2)	285
350kcmil (177mm^2)	310

＊Heat resistant cables of 90 degrees or higher are used for safety reasons.

(4)Cable Types

UL-certified cables are used by referring Table3.

Table3. UL Style Table

Table Type	UL Style Number	Rated Voltage [V]	Rated Temperature [°C]
Multiple Cores	UL20276	30	80
Multiple Cores	UL2464	300	80
Multiple Cores	UL2517	300	105
Multiple Cores	UL2587	600	90
Multiple Cores	UL2501	600	105
Single Core	UL1007	300	80
Single Core	UL1015	600	105
Single Core	UL1283	600	105
Single Core	UL1284	600	105
Single Core	UL3468	600	200

Multi-core cables are used for wiring inside the electrical cabinet.

(5)Cable color

For other insulated wires, use of the following color coding is recommended. (IEC 60204-1, 14.2.4)

Black: AC or DC power circuit
Red: AC control circuit (including neutral line)
Blue: DC control circuit (including neutral line)
Green-yellow stripe: earth
Yellow red (orange): Interlock control circuit powered by an external power supply
Yellow: Short circuit for field wiring
(Temporary shorting of the emergency stop circuit of an external device)

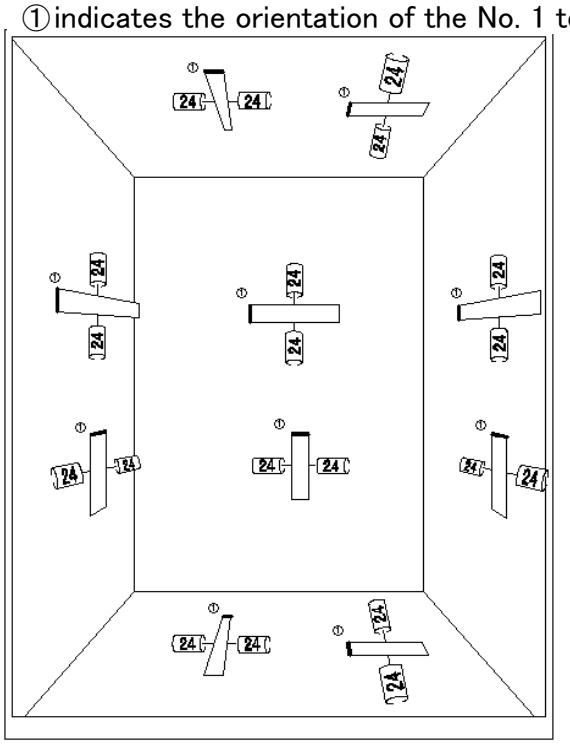
However, the above mentioned colors are not applicable in the following situations.
When a device with wiring completed is used as a completed product.
Green for multi-core cables is used for other than earth.

(6)Identify cables

Line numbers shall be inscribed on the marker tubes to identify cables with a substance that will not be erased easily. The orientations for fitting marker tubes are defined as follows in respect to the orientation of the terminal block.
When connecting a cable from bottom left in respect to the terminal block or connector. The line number shall be readable with the terminal lug (cable end) facing to the right.
When connecting a cable from top right in respect to the terminal block or connector. The line number shall be readable with the terminal lug (cable end) facing to the left.

(Directions of the mark tubes viewed from the front side of the electrical cabinet)

①indicates the orientation of the No. 1 terminal.



(7)Wires on which chips and coolant may be splashed are protected by using conduits.

(8)Conduits are selected according to where and how they are used.

Inside the machine (movable sections): wire blade is covered on the surface where vinyl is covered.
Inside the machine (fixed sections): metal type (the outside is covered with vinyl), resin type
Outside the machine (sections where cables need to be protected): metal type (the outside is covered with vinyl), resin type

(9)Connecting sections between conduits and the electrical cabinet/relay box are firmly fixed.

(10)Power cables for limit switches, proximity switches, and optoelectronic switches need to be long enough so that they can be replaced easily.

(11)Terminal boxes and connectors are used so that replacement work is easily conducted when conducting wires and switches are damaged.

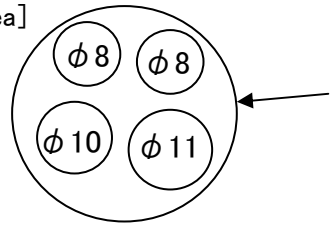
(12)Name plates and labels are attached so that pairs of connectors can be recognized.

(13)Convex pins are used for the load side of the connector pairs of multi-core cables.

(14)Wiring to the outside is arranged so that wires can be inserted from the bottom or sides of the electrical cabinet and the relay box.

(15)Space inside conduits and duct for wiring
Duct for wiring and conduits of the standard specification are selected based on the following criteria.
When the conduit is fixed: 60% or less of the sectional area
When the conduit is movable: 40% or less of the sectional area
Duct for wiring: 70% or less of the sectional area

[Example drawing of sectionl area]



In a movable φ30 conduit:

Two φ8 cables, one φ10, and one φ11 cable

The space is calculated as shown below:

(50.3+50.3+78.5+95)/706.5 ≒ 32.3%

9. SOFTWARE

9.1 MAPPS MTConnect Adapter

The MAPPS MTConnect adapter is an MAPPS interface to convert machine data such as availability factors, alarm history, and counter values to the standard communication protocol of MTConnect. MTConnect is a free and open standard designed to improve interoperability among the control unit, devices and software applications by enabling data transmission through networks via the Internet protocol. The data output through this adapter can be read by web-based machine monitoring applications such as DMG MORI Messenger or other monitoring software. The optional monitoring software needs to be purchased separately.

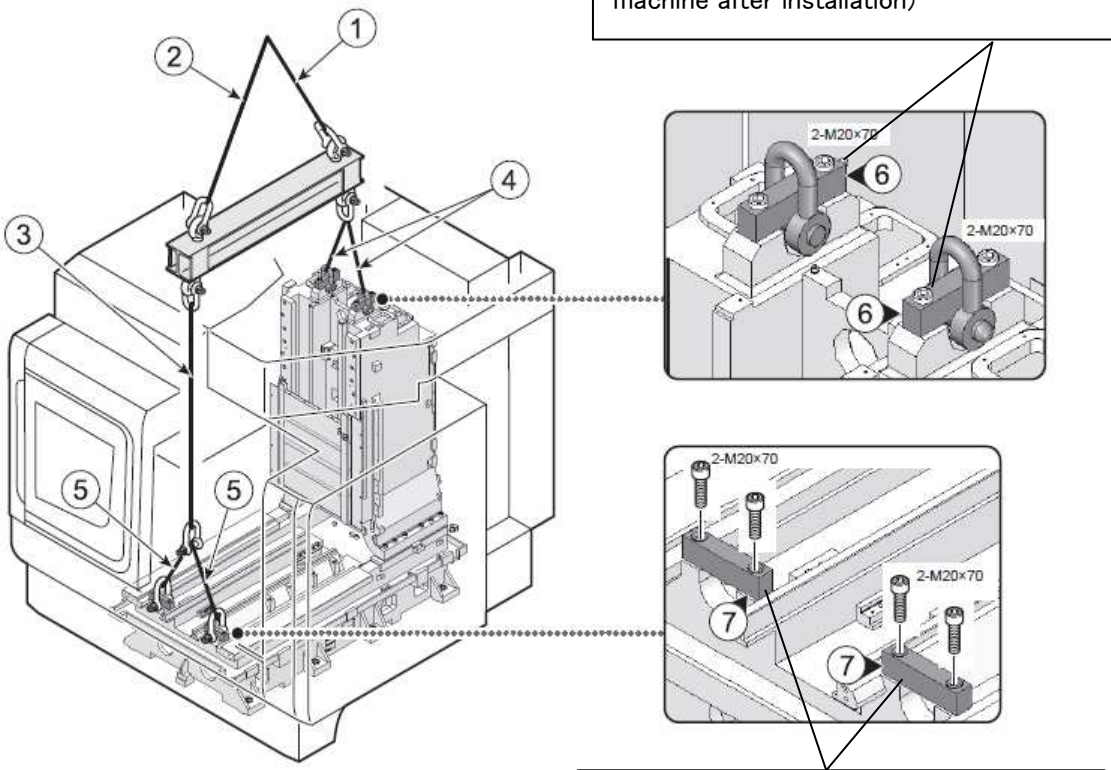
14. SHIPPING INSTALLATION

14.1 Style of Packing (Tool Storage Capacity: 30)

At the time of shipment, the Y-axis front side protector covers and the front door are both open.
Also at the time of shipment, the direction of the signal light is different from its original position. *Optional
For the details of the shipment size, refer to the accompanying material (4) showing the shipment size diagram.

Machine width : 2,686mm
Depth : 2,987mm
Machine height : 2,791mm
Machine weight : 6,510kg

The hoisting blocks are the accessories of the machine. (The blocks are left on the machine after installation)



The hoisting blocks are the accessories of the machine.(The blocks are removed from the machine after installation)

Symbols	Length (mm)	Diameter (mm)
①	1200	φ30
②	1400	
③	1600	
④	650	φ25
⑤	650	

14.2 Installation Space, Height (Chip conveyor (Hinge type))

Please secure an installation space with the dimensions shown in the table below. (Maintenance space included)
If it is not possible to secure the installation space with the dimensions shown in the table, check that there is sufficient space to install the machine by referring to additional data 1～3 (installation diagram).

Width[mm]	Depth[mm]	Height[mm]
3,696	4,950	2,801

The size above does not include the stand-alone peripheral devices. If stand-alone peripheral devices are to be installed as well, make sure to check the installation spece by referring to the accompanying materials (1) to (3) (installation diagrams and general view diagrams).

15. INSTALLATION CONDITIONS

15.1 Environmental Conditions

＜Appropriate Conditions＞

Item	Usage Restrictions
Ambient temperature	10～35℃
Permissible Temperature Variation	1.1℃/min
Relative Humidity	75 % or less(No condensation)
Vibration	4.9 m/s^2 or less
Elevation (Above Sea Level)	1000m or less＊1

1. Select a site with the following requirements:
   ・Free from dirt, dust, and mist.
   ・Out of range of chips, water, and oil scattered from other machines.
   ・Foundations are level.
   ・Foundations are strong enough to support the total weight of the machine.
   ・Machine and NC unit are free from direct sunlight
   ・No local elevation of temperature caused by the air conditioner or ambient air.
   ・The machine is free of direct air from the air conditioner or ambient air.
   [Machine thermal displacement, Machine accuracy reduction]

2. Operating the machine in an environment other than “Usage Restrictions” described in the <Appropriate Conditions> above may lead to machine failures such as malfunction of machine, alarm occurrence, and deteriorated machine accuracy. Contact DMG MORI SEIKI beforehand when installing the machine in such an environment.

3. ＊1 If the machine is installed at an altitude above 1000 m, the upper limit of the machine’s ambient temperature (the temperature inside the plant) falls by 1.0° C for each 100 m rise in altitude. If the ambient temperature exceeds the upper limit, installing a device such as an electrical cabinet cooler may be required in order to prevent the temperature inside the electrical cabinet from rising.

4. Provide sufficient space to allow the chip conveyor and coolant tank to be removed and the electric cabinet door and other doors to be opened and closed without difficulty.

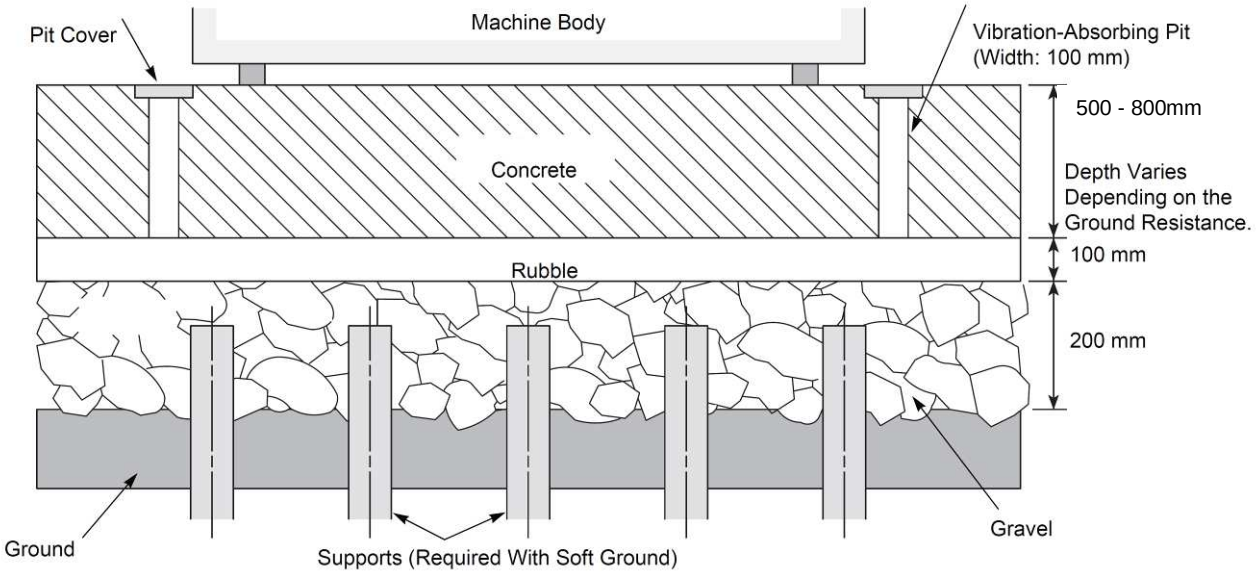
15.2 Precautions for Machine Relocation

This product can detect when the machine is relocated. After relocation, you will not be able to operate this product until you receive confirmation from DMG MORI SEIKI. DMG MORI SEIKI and its distributor representative may refuse to re-enable the Equipment if it determines that doing so would be an unauthorized export of technology or otherwise violates applicable export restrictions. DMG MORI SEIKI and its distributor representative shall have no obligation to re-enable such Equipment. DMG MORI SEIKI and its distributor representative shall have no liability (including for lost profits or business interruption or under the limited service warranty included here in) as a result of the Equipment being disabled.

15.3 Floor Strength

The foundation at the installation location is very important to maintain the accuracy of the machine tool and the stability of the entire system. Please prepare an installation location that is rigid and will not deteriorate over a period of years as far as possible.
Since this machine adopts three-point support and has sufficient machine rigidity, there is no need to install foundation bolts as anchor bolts.
Consult a civil engineer to determine the number and depth of the supports and the thickness of the concrete as requirements differ according to ground conditions.

※To obtain and maintain intended levels of accuracy and performance from a machine over a prolonged period of time, perform foundation work carefully and pay close attention to machine installation.



For the details of Ground Resistance, refer to Chapter 5 "FOUNDATION DIAGRAMS" of the accompanying material.

15.4 Installation Conditions

Please confirm the following installation flow;

Installation overview	
1	Lifting machine →Machine Installation
2	Machine Placement and Provisional Level Adjustment →Checking/adjusting level
3	Removing Transit Clamp →Removing/Mounting Transit Clamp
4	Unit Installation →Unit Installation
5	Oil Supply →Oil Supply
6	Post-Installation Checks →Checks before Turning ON Power for First Time
7	Connecting Power Supply/Compressed Air Supply →Connecting Power Supply →Connecting Compressed Air Supply
8	Machine Level Adjustment →Adjusting Machine Level
9	Operation Confirmation →Checks after Turning ON Power for First Time

15.5 Required Power Sources (Main Breaker)

15.5.1 Conditions of Using Machines

(1)Power Supply to Electrical Cabinet
AC200/220V/+10%～−15%(3-phase with grounding)

(2)Grounding
D-type grounding (ground resistance 100 Ω or less.)

(3)Vibration
0.5G or less

15.5.2 Main Breaker Size and Primary Power Source Cable

Electrical capacity	41.6kVA ～48.4kVA	48.5kVA ～55.4kVA	55.5kVA ～62.3kVA
Current rating	175A	200A	225A
Frame size	250AF	250AF	250AF
DMG Mori Seiki part No.	E58475	E58476	E58477
Cable size	67.4mm^2 ～107.2mm^2	85.0mm^2 ～107.2mm^2	107.2mm^2
Solderless terminal	70-8～100-8	80-8～100-8	100-8
Terminal size	M8	M8	M8
Tightening torque	10.5N・m	10.5N・m	10.5N・m

Padlock size: φ4 to φ8

The electric capacity changes by the specifications of the machine.
Please contact your DMG MORI SEIKI representative for details.

15.5.3 Wiring Inlet for Primary Power Source and Connection

(1)A holes of φ60 is provided on the right side of the electrical cabinet viewing from its door.

(2)Primary power source should be connected directly to the primary-side terminal of the main breaker.
A relay terminal block for connecting the primary power source is not provided in the electrical cabinet.

(3)The space for wiring is provided above the main breaker.

(4)The terminal block for connecting the grounding wire (earth) is provided near the main breaker.

(5)The handle for the main breaker is provided where you can operate it easily.

15.6 Air Supply

Conditions	Usage Restriction
Pneumatic pressure of compressor	0.5～1.0 MPa
Pressure dew point	10℃以下(0.7MPa)
Machine operating pressure	0.5 MPa
Flow rate <ANR>*	300 L/min
Compressed air supply port of the machine	Rc3/8 (female)

※Temp. 20° C, absolute pressure 101.3 kPa, and relative humidity 65%.
When the tool tip air blow is regularly used, air supply of more than 300 L/min (79.2 gpm) is separately required.

(1) Supply the air to the machine from your plant in the state of clean and dry (without any oil, moisture, dust). Consider pressure loss due to air piping, and arrange piping so that 0.4 MPa to 1.0 MPa is secured while the required air is flowing (pipe diameter 3/8 or more). If the air supply pressure from the plant exceeds 1.0 MPa, provide the reducing valve at your end.
We recommend installation of the air dryer as supplying the air with oil, moisture, or dust to the machine may damage the parts inside the machine.
The air pipe from the plant to the machine should be bore of 9.5 mm or more.
(Please note that the narrow pipe may cause malfunction of equipment such as oil mist lubricator.)

16. OILS/CONSUMABLE PARTS

16.1 Oils

(1) Recommended oils

Use the following recommended oils. Using other oils may degrade the machine performance.

Oil Supplied to		Type	Quantity (L)
Lubricating Unit Tank (for Spindle)		Idemitsu Daphne Mechanic Oil 32	2
Lubricating Unit Tank (for Feed Box, Receiving Box, Slideways, Gib and BallNut)		Shell Shell Tonna S3 M 68	4.2
Hydraulic Unit Tank (For tool unclamp)		Idemitsu Daphne Hydraulic Fluid 32	3.9
Hydraulic Unit Tank (For fixture clamp)		Idemitsu Daphne Hydraulic Fluid 32	20
Magazine Pot Roller		Shell Shell Gadus S2 V220 0	As required
Magazine Pot Shaft, Bush			
Magazine Pot Guide Rod			
Tool Clamp Unit*1	※BT/BT Dual Contact Specifications	Shell Shell Stamina Grease RL2	As required
	※HSK specifications	METAFLUX METAFLUX 70-81	As required

*1 Use only recommended grease

(2) Recommended coolant oils

Use the following recommended coolant oils. Using other oils may degrade the machine performance.

Oil Supplied to	Type	Quantity (L)
Fan Cooler Tank	JX NIPPON OIL & ENERGY PRECISE FLUID LT	7.5
Chiller Unit Tank ※Chiller unit spec, High-torque spec, High-speed spec.	JX NIPPON OIL & ENERGY PRECISE FLUID LT	10

(3) Oil Equivalents

The following table shows equivalent product names for your information.

The oils other than recommended oils are not guaranteed on the dynamic characteristics.

◆Recommended Oils

Oil Supplied to	Type			
	Idemitsu	Mobil	Shell	Castrol
Lubricating Unit Tank (for Spindle)	◆Daphne Mechanic Oil 32	DTE Oil Light	Shell Tellus S2 M 32	Hyspin AWS 32
Lubricating Unit Tank (for Feed Box, Receiving Box, Slideways, Gib and BallNut)	Daphne Super Multi Oil 68	Vectra Oil No.2	◆Shell Tonna S3M68	Magna BD68
Hydraulic Unit Tank (For tool unclamp)	◆Daphne Hydraulic Fluid 32	DTE 24 DTE Oil Light	Shell Tellus S2 M 32	—
Hydraulic Unit Tank (For fixture clamp)	◆Daphne Super Multi Oil 2M	DTE 24 DTE Oil Light	Shell Tellus S2 M 32	—
Magazine Pot Roller	Daphne Eponex Grease SR No. 0	Mobilux EP0	◆Shell Gadus S2 V220 0	Spheerol EPL0 Grease
Magazine Pot Shaft, Bush				
Magazine Pot Guide Rod				

16.2 Consumable Parts

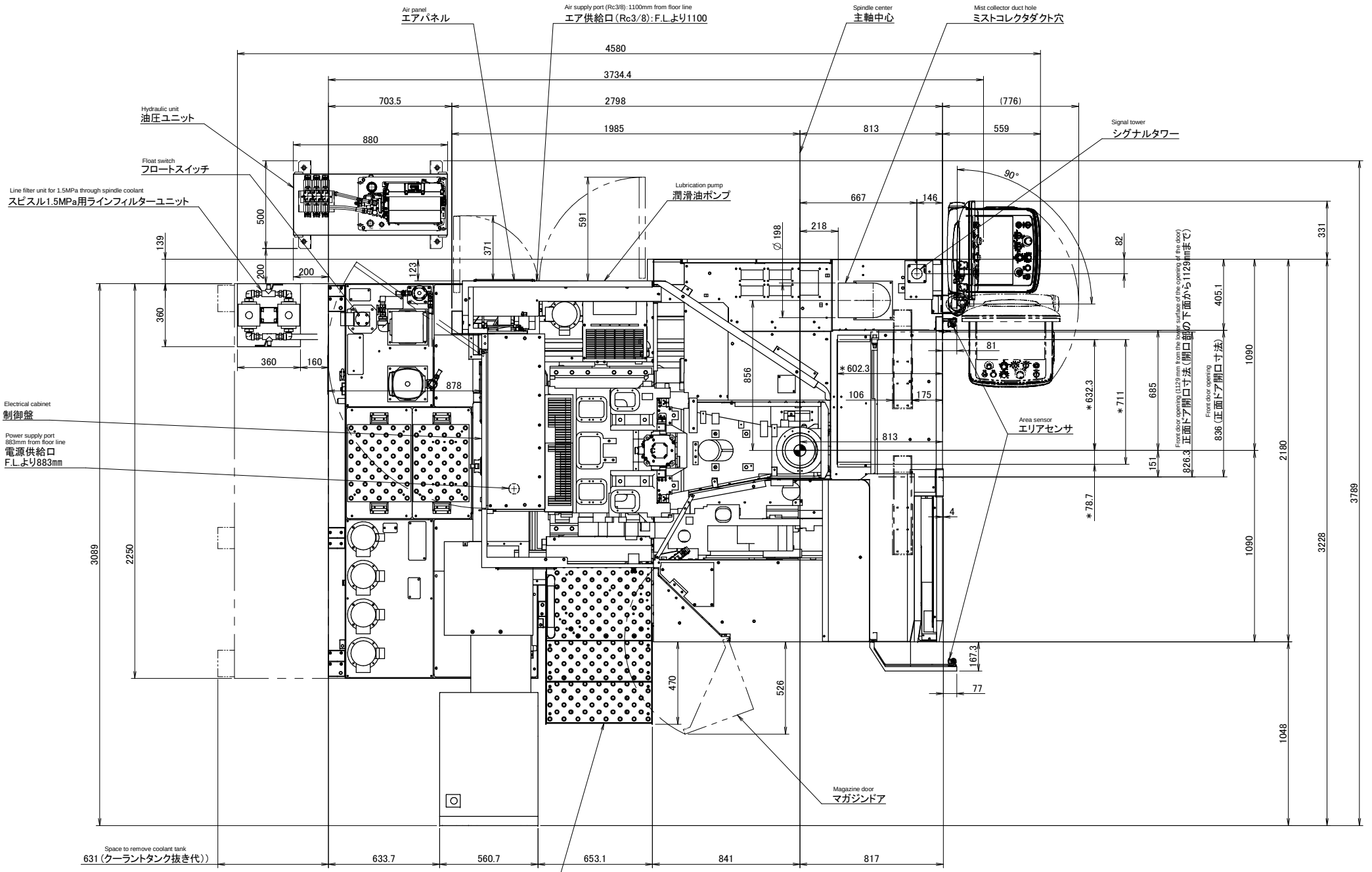
The following table lists the main consumable parts.

Unit Name	Part Name	Part No.
Machining Chamber Observation Window	Impact Resistant Window	W34080
	Silicon Packing	X12626 x3ps
Slide Seal		X25314、X25319、X25313、X25318、X25401、X22743 X25402、X22744、X25316、X25317、X22745
Machine Light	LED Unit	E36541
Tool Clamp Unit (BT/BT Two-Face Contact Specifications)	Shell Stamina Grease RL2	W20043
Tool Clamp Unit (HSK Specifications) (option)	Grease: METAFLAX 70-81	W20042
	Lip Seal	W09552
Positioning Block for Oil Hole Drill (option)	O-ring	W06012
Retention Knob for Center Through (option)	O-ring	W06009
Plunger for Side Through Spindle (option)	O-ring	W06005
	Spring	Y73591
Hydraulic Unit Line Filter (APC specification)	Line Filter	W12037
	Filter Element (with O-ring)	W12028
Line Filter for Coolant (1.5MPa Specifications)	O-ring	W06014 , W07045 W07055 , W07100
Line Filter for Coolant (7.0MPa Specifications)(option)	O-ring	W07050 W07115
Chiller Unit (option)	Fill Port Packing	X08681
Electrical Cabinet	Fan Filter	E18099
	Back Fin Filter	E18211
	Battery	E30356
Air device	Filter regulater element	U40484
	Mist separator element	U40928
Multi dry filter element (option)	The first element	U29235
	The second element+Oil mist element	U29236
ZEROCHIP (option)	Long pack	W13014
	Suction pipe	R45131
	PTFE cartridge filter	W12053
	ULPA filter	W12054
	Suction hose	P29866
	Suction hose (Spindle+External type)	P29866 , P29867

※For the details, refer to the maintenance manual.

＜APPENDIX＞

① Installation Diagrams (Top View)
② General View (Front view)
③ General View (Left side view)
④ Packing Style Diagrams
⑤ Foundation Diagrams
⑥ Interference Diagrams (OP10)
⑦ Interference Diagrams (OP20)



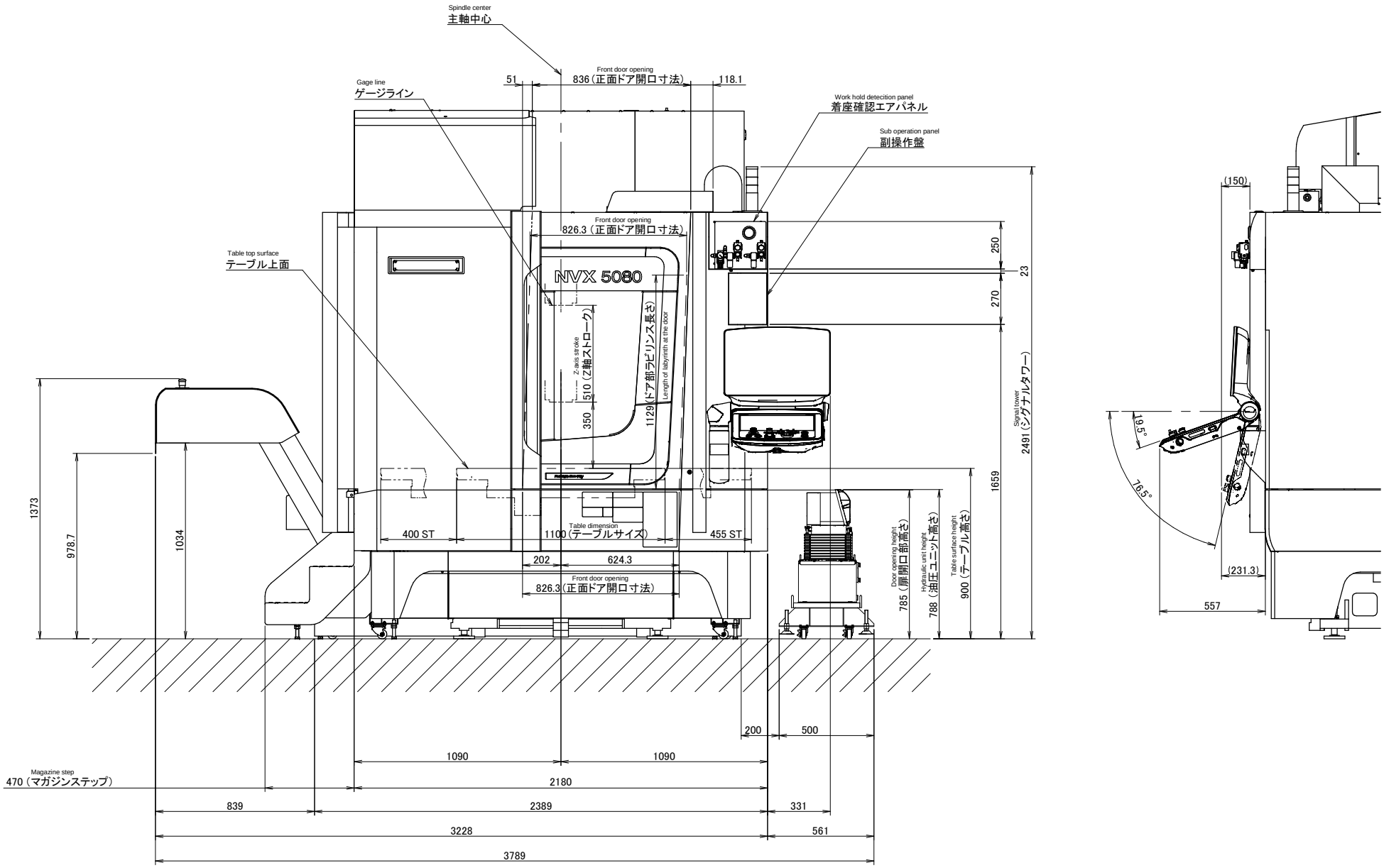
Hinge type external chip conveyor specification
ヒンジ式機外チップコンベヤ仕様
#40 30tools storage specification
#40 30本仕様
Values marked with * indicate the ceiling shutter opening.
*印寸法は天井開口寸法
Separate units must not be located at exact position as shown in the drawing as long as interference is avoided.
別置ユニットは、干渉しない範囲であれば、必ずしも図中寸法通りの位置にある必要はありません。

REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIHIRO INADA

IC : INTER COMPATIBILITY FC : FORWARD COMPATIBILITY – : NO COMPATIBILITY

MACHINE MODEL *			MASTER NO. *
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER
*	*	*	*
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS
NAOKI OKUNO	17.01.23	*	*	* kg
PROJECTION	SCALE 1:10	TITLE GENERAL VIEW		
DMG MORI	DRAWING NO. 3Q1500816	A	1/3	

出図 17.01.23



Hinge type external chip conveyor specification
◦ヒンジ式機外チップコンベヤ仕様
#40 30tools storage specification
◦#40 30本仕様

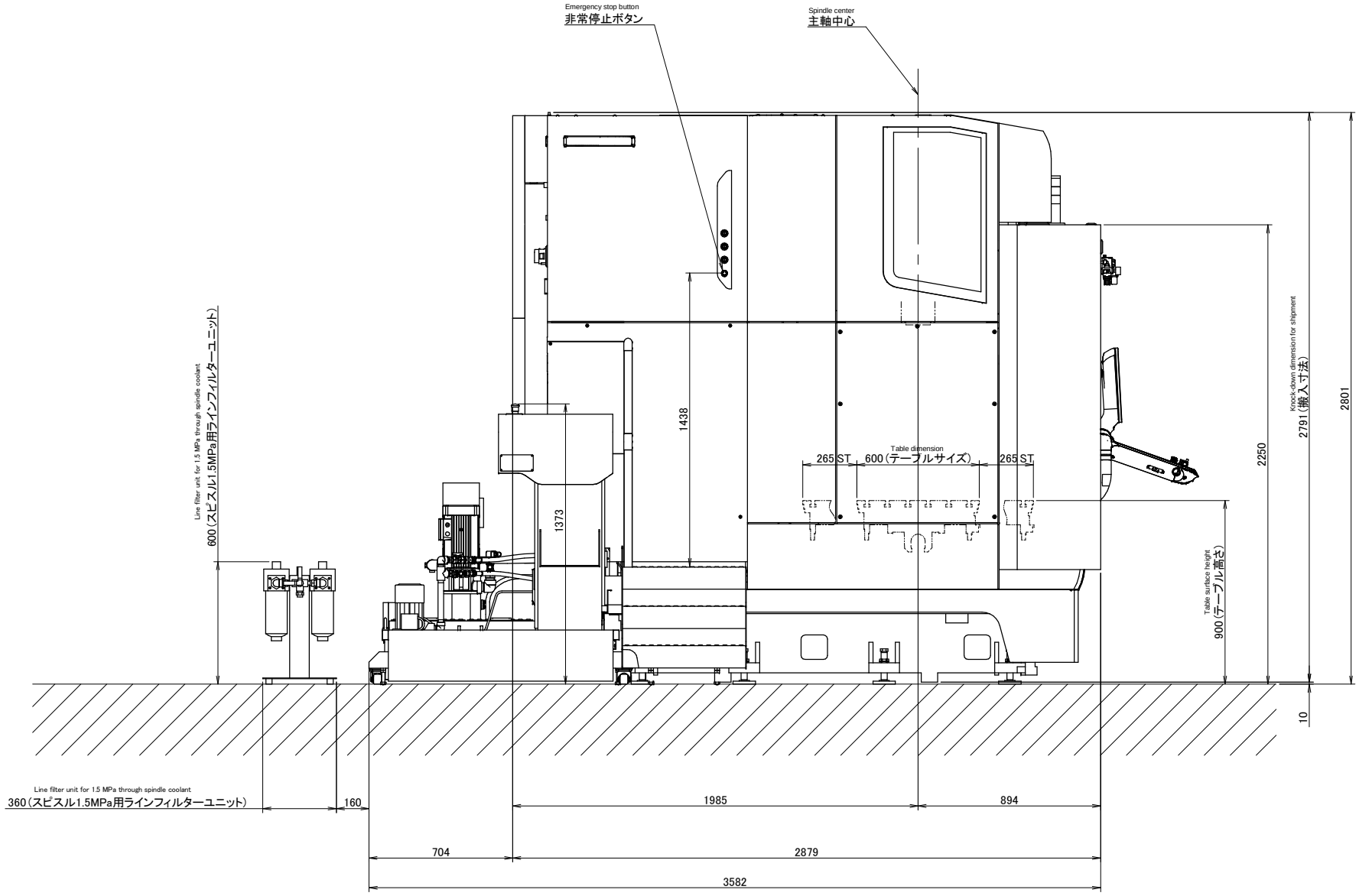
REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIHIRO INADA

REVISION	DATE	DESIGNED	APPROVED

IC : INTER COMPATIBILITY　FC : FORWARD COMPATIBILITY　– : NO COMPATIBILITY

MACHINE MODEL	*			MASTER NO.	*
ARRANGED		UNIT NO.	QUANTITY	CUSTOMER	
*		*	*	*	
OPERATED		INITIAL DATE	Q. C.	MATERIAL	MASS
NAOKI OKUNO		17.01.23	*	*	* kg
PROJECTION	SCALE	TITLE	GENERAL VIEW		
	1:10				
DMG MORI		DRAWING NO.	3Q1500816	A	2/3

出図 17.01.23



Hinge type external chip conveyor specification
◦ヒンジ式機外チップコンベヤ仕様
#40 30tools storage specification
◦#40 30本仕様

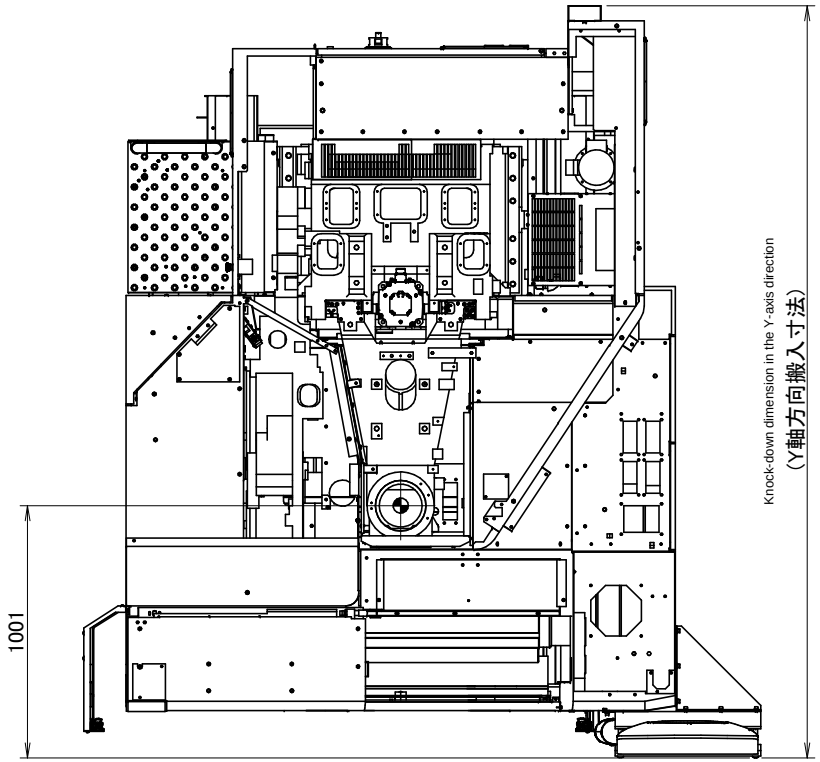
REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIHIRO INADA

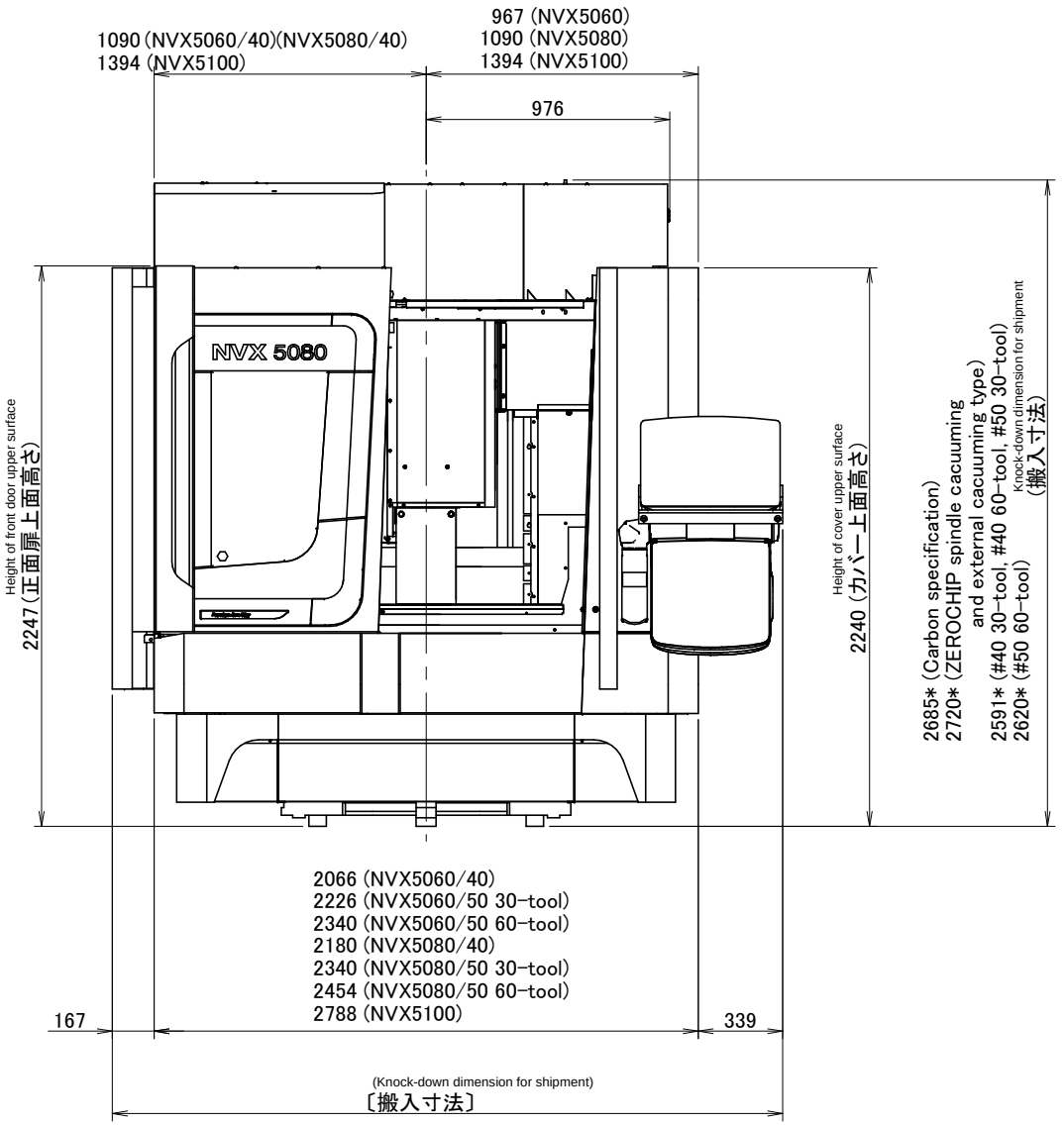
IC : INTER COMPATIBILITY　FC : FORWARD COMPATIBILITY　– : NO COMPATIBILITY

MACHINE MODEL	*			MASTER NO.	*
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
OPERATED	INITIAL DATE	Q. C.	MATERIAL	MASS	
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	GENERAL VIEW		
	1:10				
DMG MORI	DRAWING NO.	3Q1500816	A	3/3	

出図 17.01.23

Knock-down Dimension for Shipment in the Y-Axis Direction
Y軸方向搬入寸法





(#40) 30-tool specification
(＃40)ツール30本仕様時 2987(操作盤固定金具より背面カバーまで)
(from the fixed plate for the opration panel to the rear cover)

(#40) 60-tool specification
(＃40)ツール60本仕様時 3351(操作盤固定金具よりマガジンカバーまで)
(from the fixed plate for the opration panel to the magazine cover)

(#50) 30-tool specification
(＃50)ツール30本仕様時 2987(操作盤固定金具より背面カバーまで)
(from the fixed plate for the opration panel to the rear cover)

(#50) 60-tool specification
(＃50)ツール60本仕様時 3537(操作盤固定金具よりマガジンカバーまで)
(from the fixed plate for the opration panel to the magazine cover)

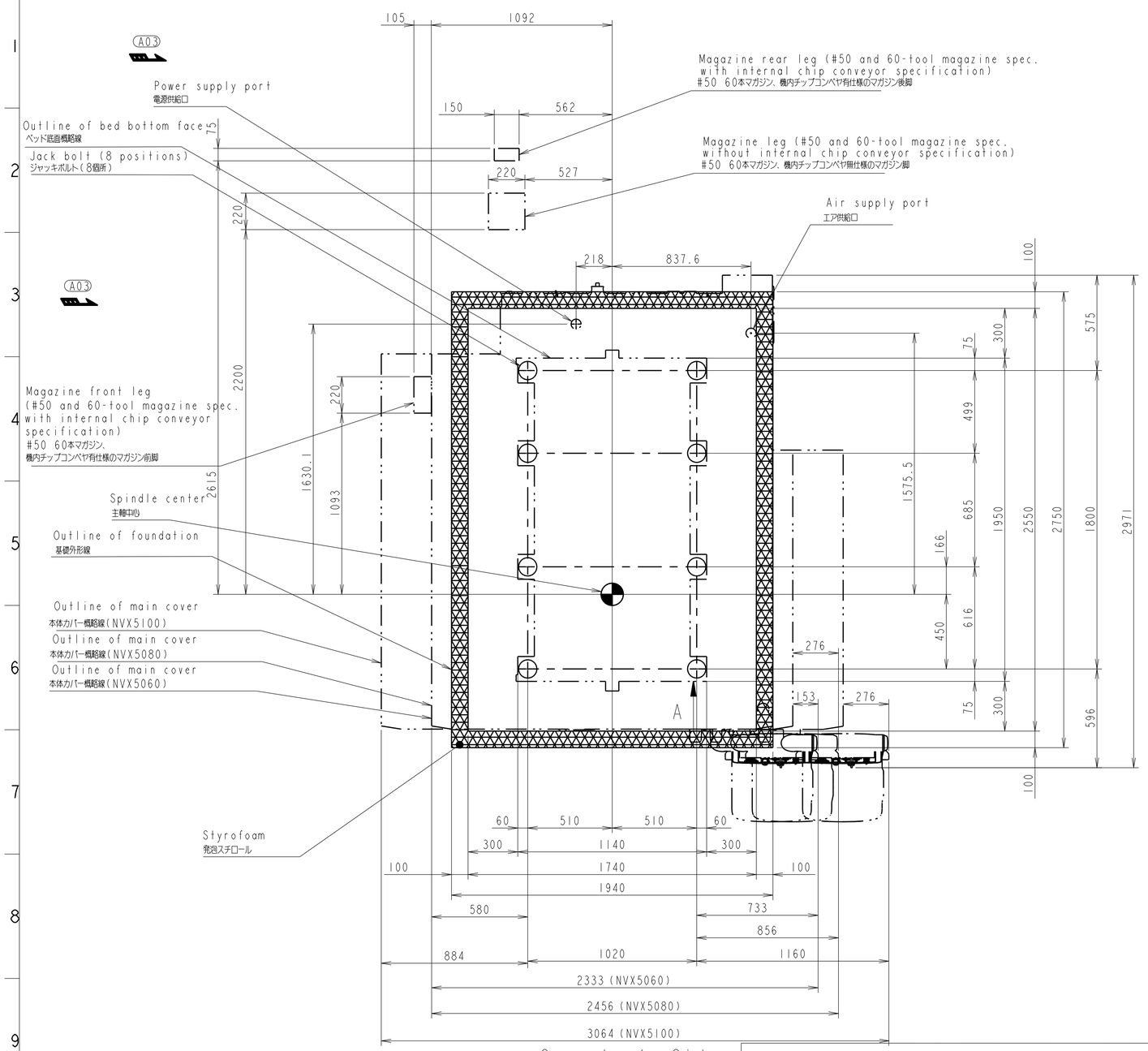
For the high column specification, the dimensions marked with an asterisk are added by 200 mm.
・ハイコラム仕様時は、*印寸法が
・200mm高くなります。
・
・
・

REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIHIRO INADA

IC : INTER COMPATIBILITY　FC : FORWARD COMPATIBILITY　– : NO COMPATIBILITY

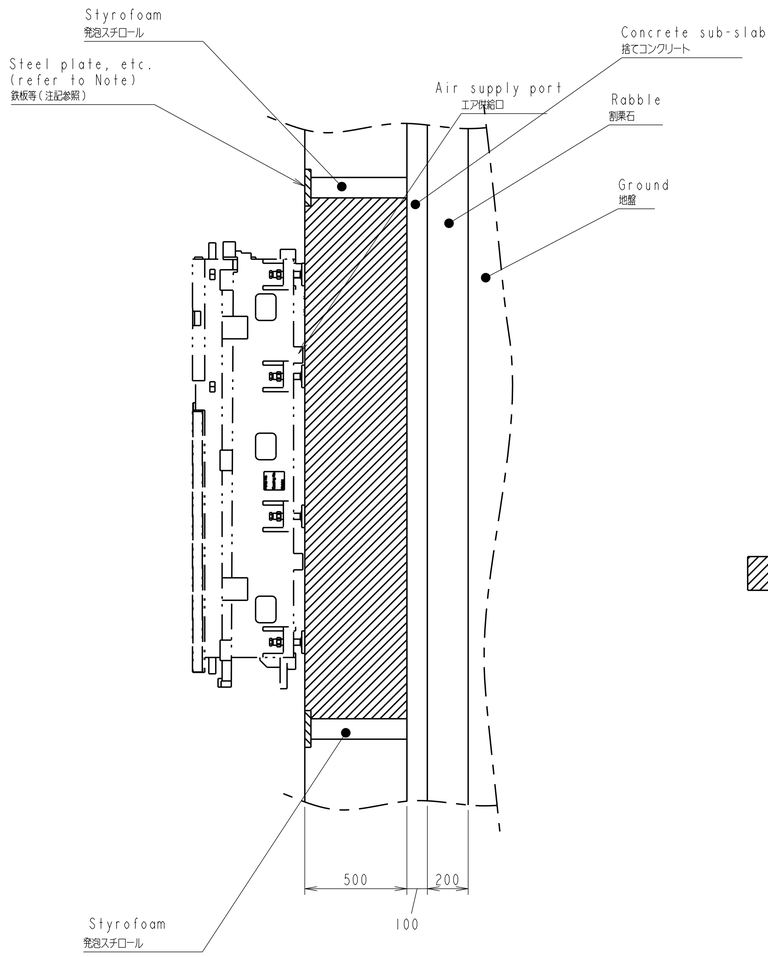
MACHINE MODEL *				MASTER NO. *	
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS	
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	KNOCK DOWN DRAWING		
	1:15				
DMG MORI	DRAWING NO.	3Q7500377	A		

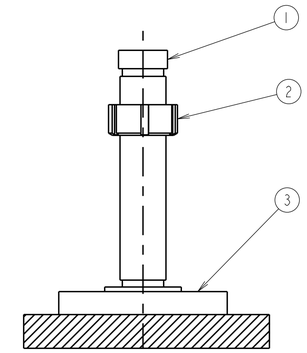
出図 17.01.23



Operator's Side

作業者側





View A
1:2

No.	Part No.	Part Name	Material	Q	Remarks
1	N22002	JACK BOLT ジャッキボルト	SCM435	8	Standard accessory 付属部品
2	N71093	LOCK NUT ジャッキボルト用ロックナット	S45C	8	Standard accessory 付属部品
3	A28000	BLOCK ジャッキボルト敷板	FC250	8	Standard accessory 付属部品

This drawing shows the standard foundation. Determine the thickness of concrete according to the ground conditions.
・本図は大体の標準を示すもので据付場所の地盤により、コンクリートの厚みを加減して下さい。
Dig the ground 100 mm to the outside of the foundation dimensions to allow Styrofoam to be placed in the ground.
・注) 基礎外形より外側に100mm土を掘ること。(発泡スチロールを土の内側に張り付ける為)
Place steel plate on Styrofoam blocks around foundation outline because casters of coolant tank and other units pass over the area.
・基礎外形周囲の発泡スチロールの上はクーラントタンク等のキャスターが通りますので鉄板等を置いて下さい。
Width of Styrofoam: 100 mm
・発泡スチロールの幅: 100mm
Applicable concrete is specified as σ28 (strength of 28 days after application) =20.6 MPa , Slump value: 8, Gravel: approx. 25 mm.
・コンクリートは、σ28(打込後28日目の強度)=20.6MPa スランプ8、砂利の大きさ25mm程度の物を使用して下さい。

Estimate of mass and bearing
重量及び面圧の推定値 (A02)

Type 機種	NVX5060/40			NVX5060/50		NVX5080/40			NVX5080/50		NVX5100/40			NVX5100/50	
Tool storage capacity 工具収納本数	30	60	90	30	60	30	60	90	30	60	30	60	90	30	60
Machine mass 本機重量	6,370kg	7,180kg	8,270kg	7,340kg	8,970kg	6,510kg	7,320kg	8,410kg	7,480kg	9,110kg	6,800kg	7,610kg	8,700kg	7,700kg	9,400kg
Max. workpiece mass 最大加工物重量	800kg	800kg	800kg	800kg	800kg	1000kg	1000kg	1000kg	1000kg	1000kg	1200kg	1200kg	1200kg	1200kg	1200kg
Foundation concrete mass 基礎コンクート重量	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg	4,437kg
Average bearing of foundation concrete lower face 基礎コンクリート下面の平均面圧	25.6kPa	27.4kPa	29.8kPa	27.8kPa	31.4kPa	26.4kPa	28.2kPa	30.6kPa	28.5kPa	32.1kPa	27.5kPa	29.3kPa	31.7kPa	29.6kPa	33.2kPa
Required safety bearing power of soil 要求される安全地耐力	38.5kPa	41.1kPa	44.7kPa	41.7kPa	47.1kPa	39.6kPa	42.3kPa	45.9kPa	42.8kPa	48.2kPa	41.2kPa	43.9kPa	47.5kPa	44.4kPa	49.8kPa

Part Number.

*	*	*	*
*	*	*	*
*	*	*	*
A03	MM22431	08.02.2016	YUSUKE IKEDA
A02	MM21239	19.12.2014	YUYA HASEGAWA
A01	MM20941	08.09.2014	YUYA HASEGAWA
Rev.	Change No.	Date(d.m.y)	Changed by

	Date(d.m.y)	Name	Pre:	Document type:
drw.	08.09.2014	YUYA HASEGAWA	Q.C.:	-
appr.	08.02.2016	YOSHINORI SAKASHITA	Mass:	Format: A1 Scale: 1:15
rel.			Material:	

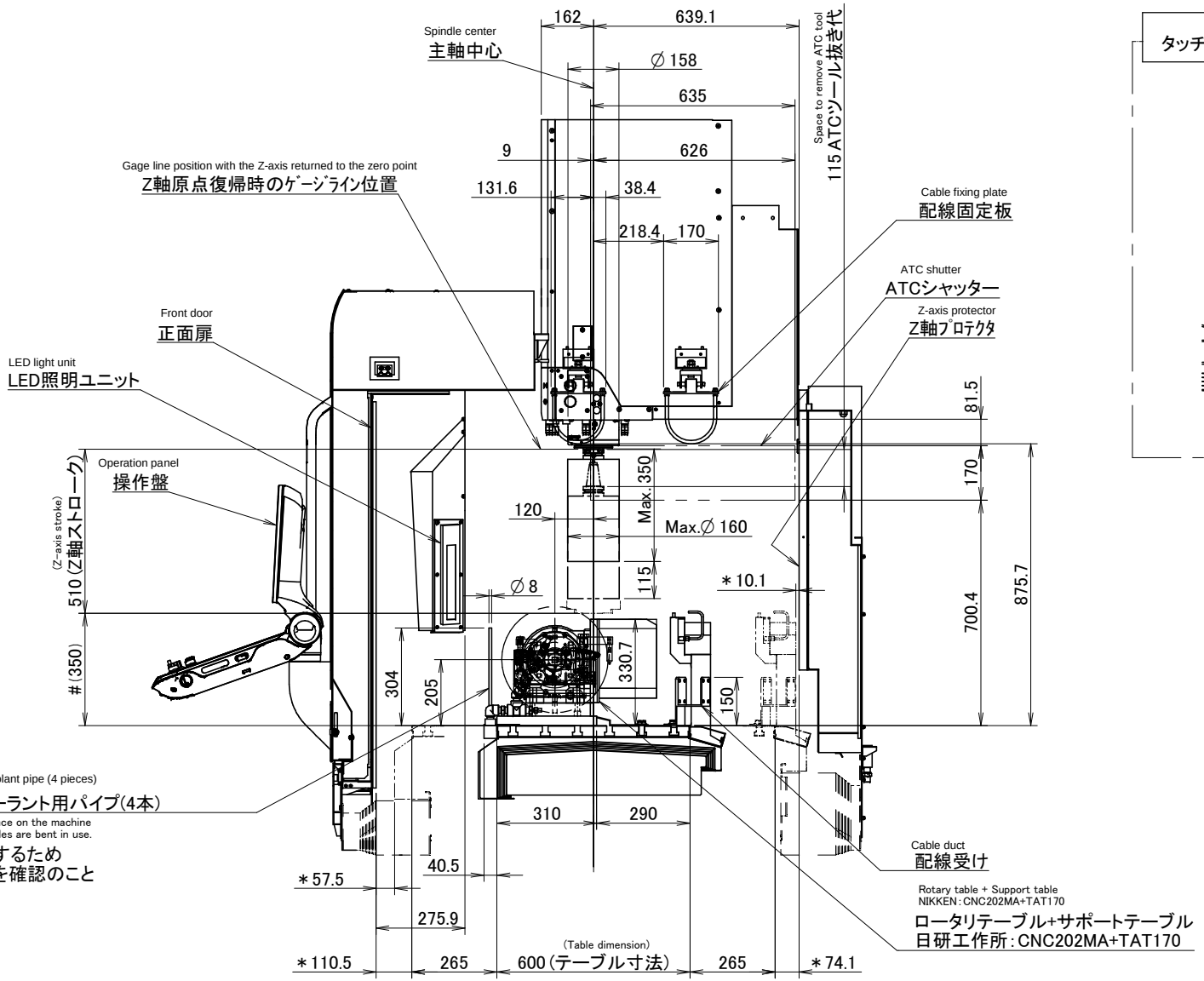
THIRD ANGLE PROJECTION

Title :
FOUNDATION DIAGRAM

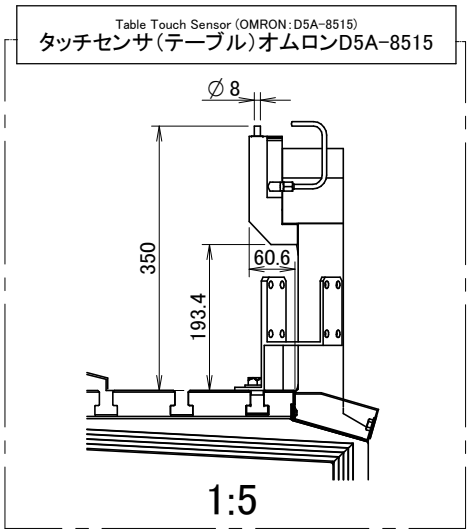
Drawing Number:	Rev.:	Type:	Sheet:
Q55621	A03	@	1/2

DMG MORI

出図	16.02.09	管理文書



Side View
側面図



OP10

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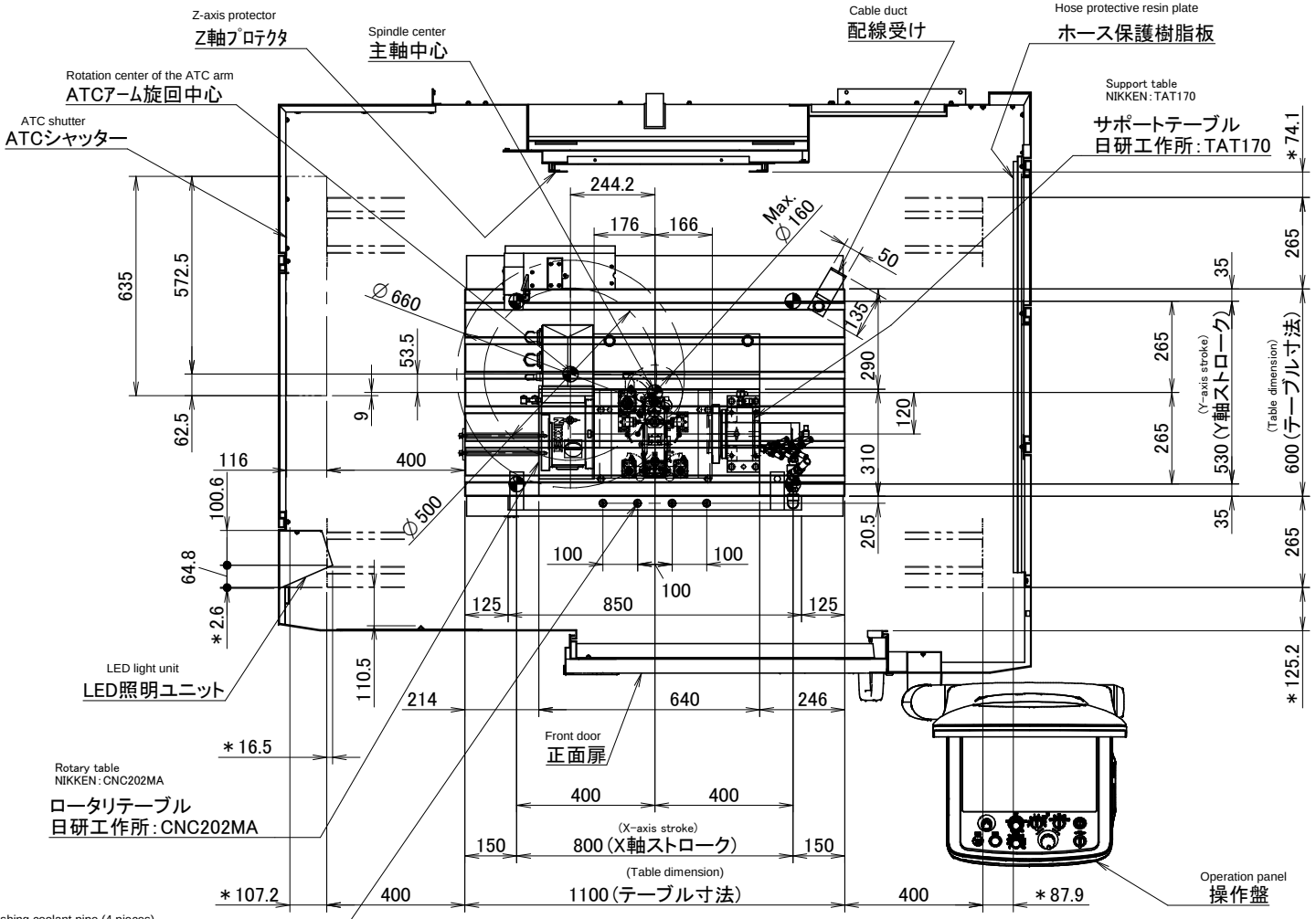
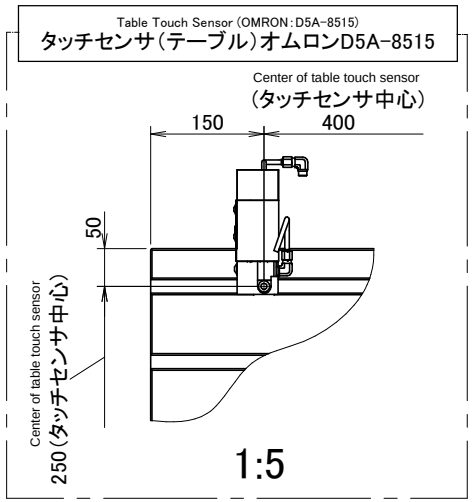
REVISION	DATE	DESIGNED	APPROVED	REVISION	DATE	DESIGNED	APPROVED
*	*	*	*	A	17.01.23	NAOKI OKUNO	YOSHIIHRO INADA

IC : INTER COMPATIBILITY　FC : FORWARD COMPATIBILITY　– : NO COMPATIBILITY

MACHINE MODEL	*			MASTER NO.	*
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS	
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	INTERFERENCE DIAGRAM		
	1:10				
DMG MORI	DRAWING NO.	3Q4501168	A	1/3	

出図 17.01.23





Top View
平面図

OP10

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REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIIHRO INADA

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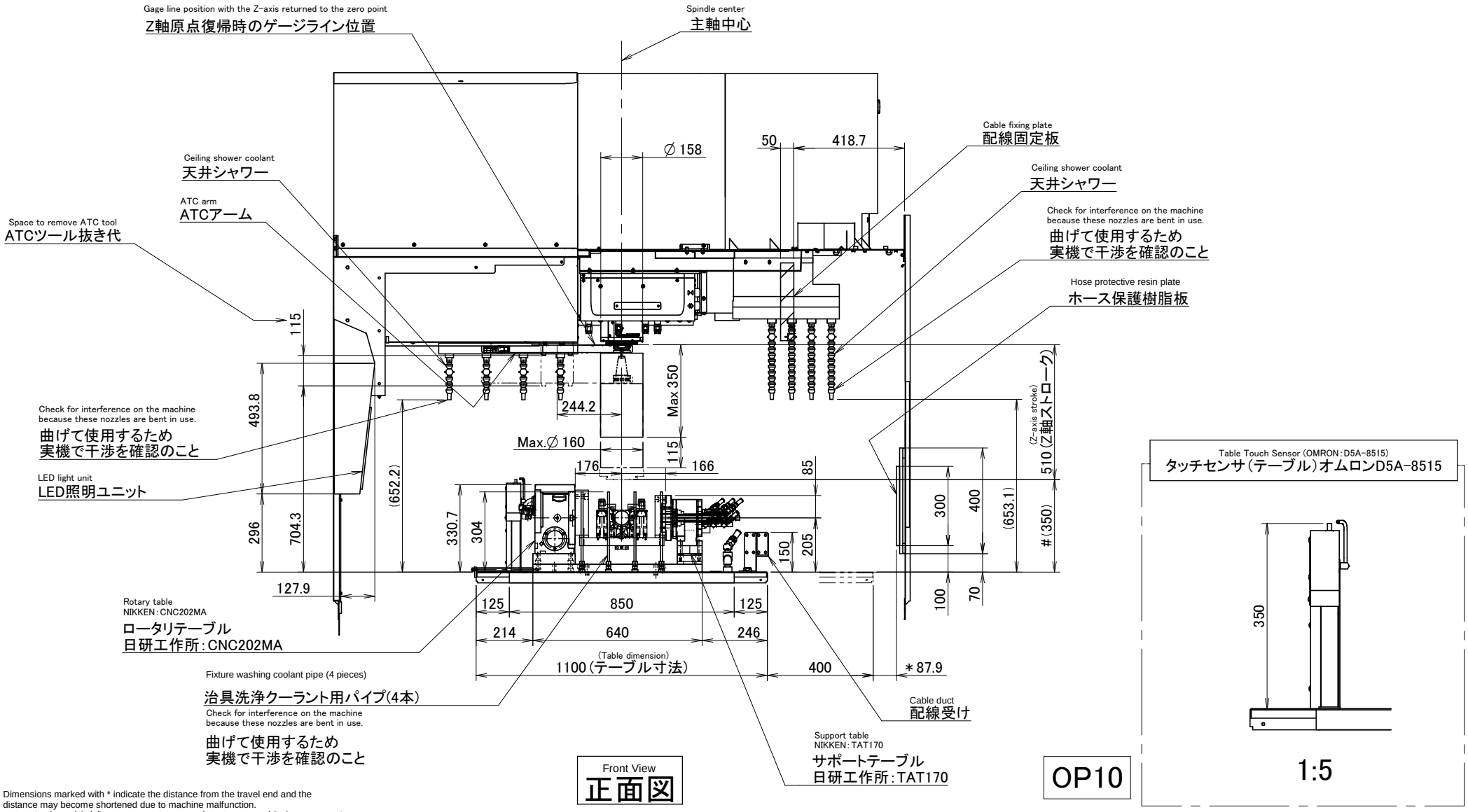
MACHINE MODEL	*			MASTER NO.	*
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS	
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	INTERFERENCE DIAGRAM		
	1:10				
DMG MORI	DRAWING NO.	3Q4501168	A	2/3	

出図 17.01.23



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REVISION	DATE	DESIGNED	APPROVED
A	17.01.23	NAOKI OKUNO	YOSHIIHRO INADA

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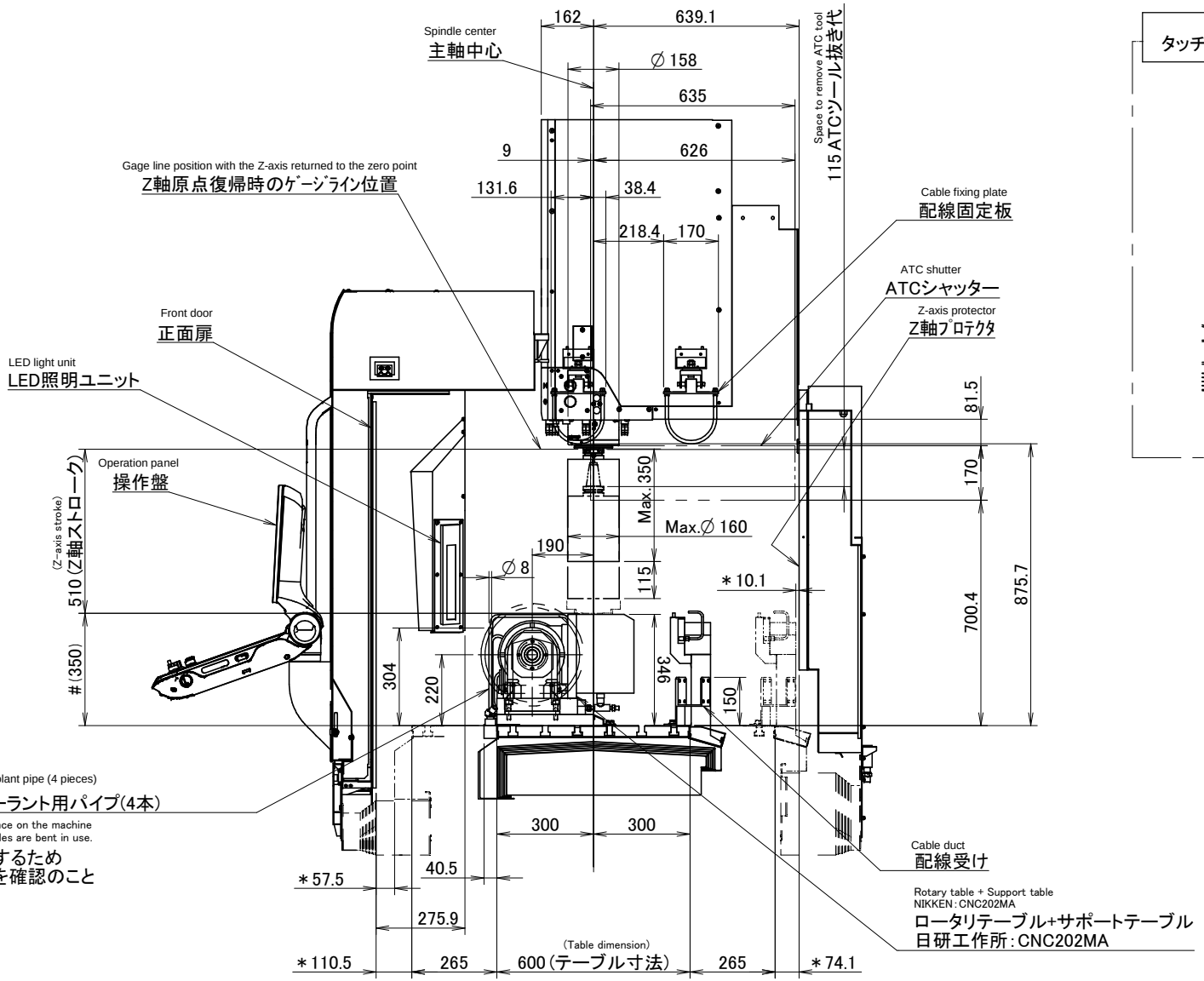
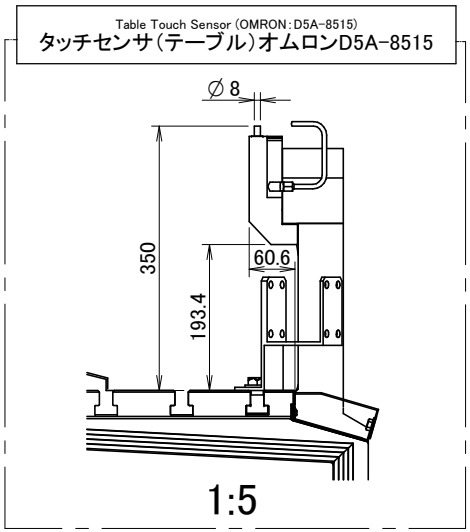
MACHINE MODEL	*		MASTER NO.	*
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER	
*	*	*	*	
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS
NAOKI OKUNO	17.01.23	*	*	* kg
PROJECTION	SCALE	TITLE	INTERFERENCE DIAGRAM	
	1:10			
DMG MORI	DRAWING NO.	3Q4501168	A	3/3

出図 17.01.23



Side View
側面図



OP20

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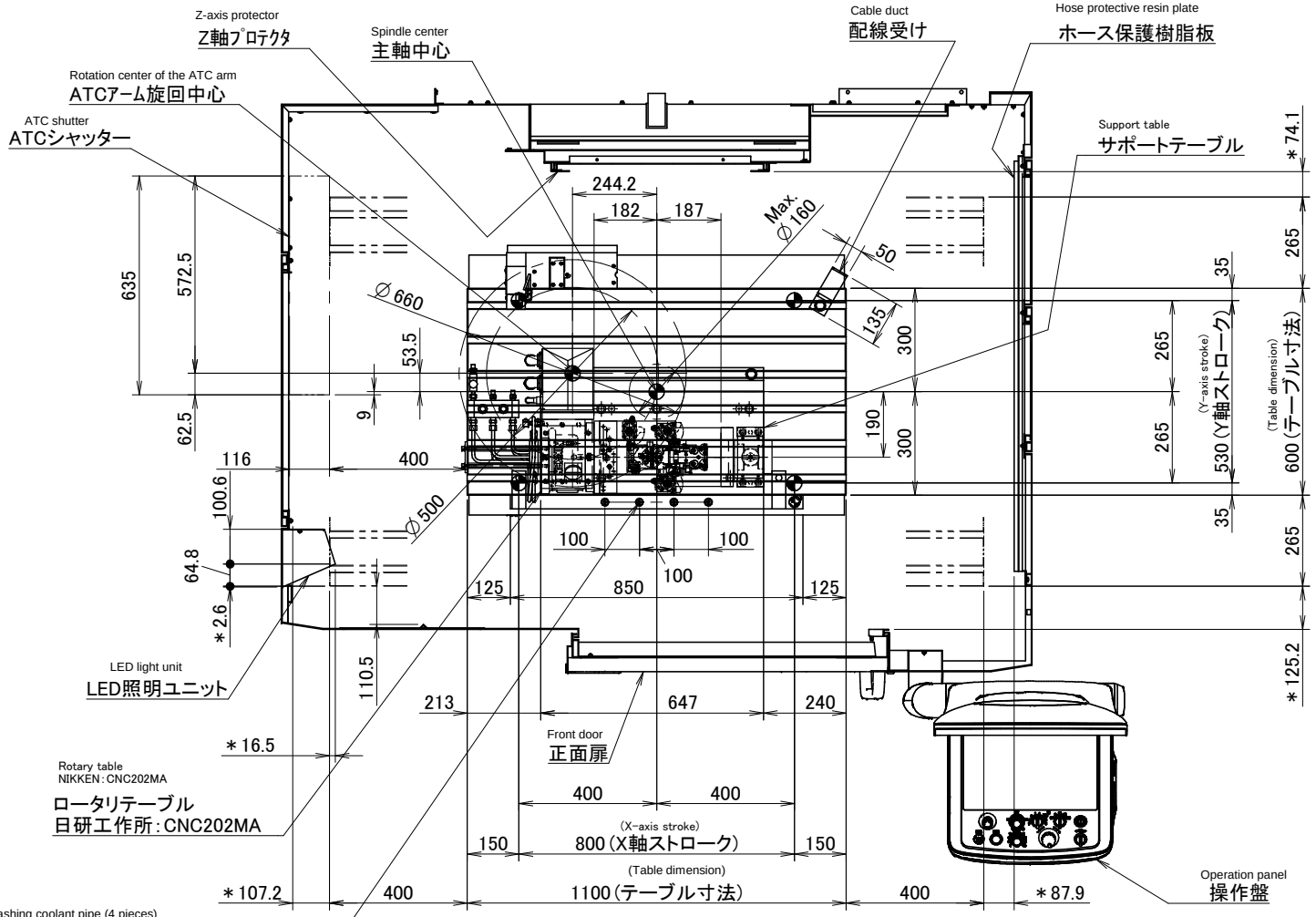
REVISION	DATE	DESIGNED	APPROVED	REVISION	DATE	DESIGNED	APPROVED
*	*	*	*	A	17.01.23	NAOKI OKUNO	YOSHIIHRO INADA

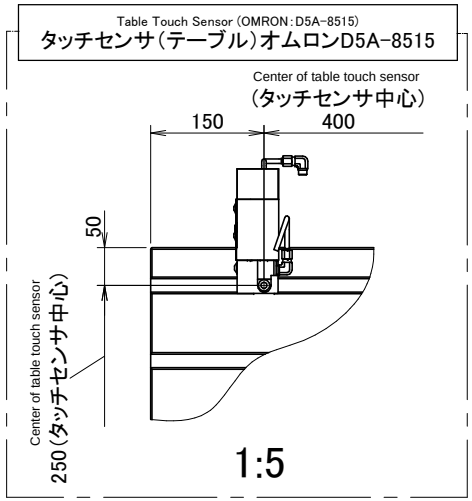
IC : INTER COMPATIBILITY　FC : FORWARD COMPATIBILITY　– : NO COMPATIBILITY

MACHINE MODEL	*			MASTER NO.	*
ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
OPERATED	INITIAL DATE	Q.C.	MATERIAL	MASS	
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	INTERFERENCE DIAGRAM		
	1:10				
DMG MORI	DRAWING NO.	3Q4501169	A	1/3	

出図 17.01.23



Top View
平面図



OP20

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ARRANGED	UNIT NO.	QUANTITY	CUSTOMER		
*	*	*	*		
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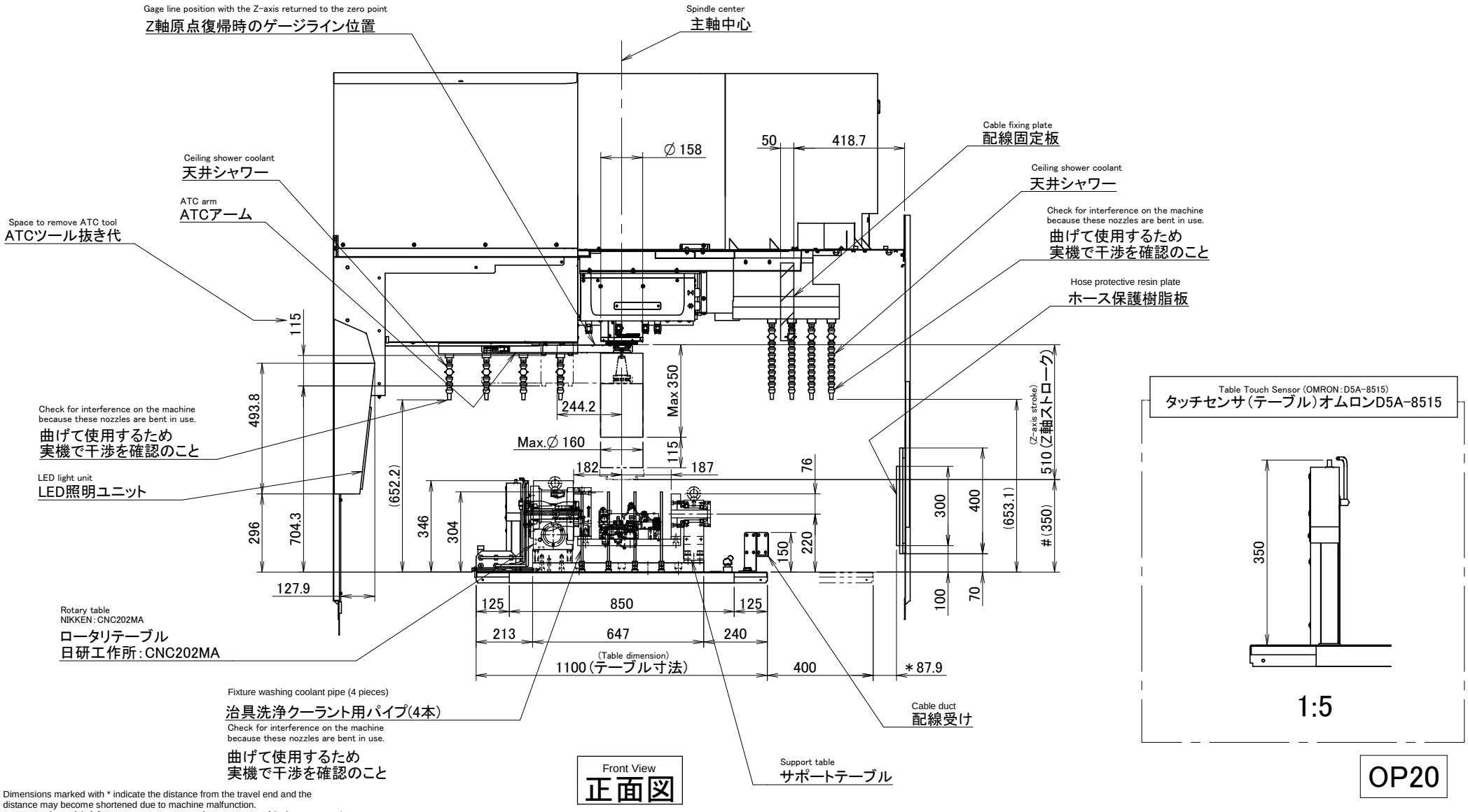
NAOKI OKUNO	17.01.23	*	*	* kg	
PROJECTION	SCALE	TITLE	INTERFERENCE DIAGRAM		
	1:10				
DMG MORI	DRAWING NO.	3Q4501169	A	2/3	

出図 17.01.23



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	1:10			
DMG MORI	DRAWING NO.	3Q4501169	A	3/3

出図 17.01.23