

Guidebook for DX Series

Models: DX Series
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TABLE OF CONTENTS

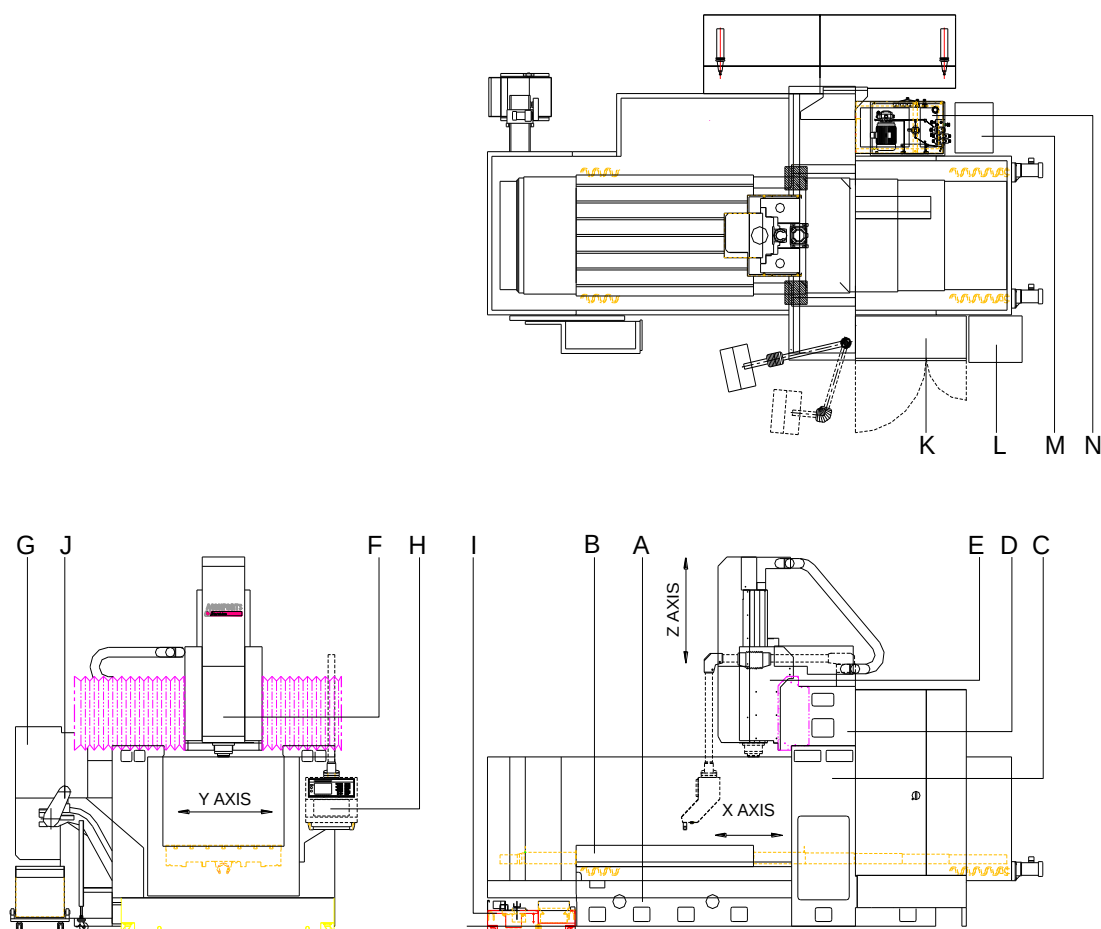
1.	Machine Introduction	1
1.1.	Machine Design.....	1
1.2.	Mechanical Instruction	1
1.3.	Accessory layout.....	2
2.	Machine Feature	3
3.	Machine Specification	5
4.	Standard Accessories	11
5.	Optional Accessories	12
6.	Major Technical Data.....	13
6.1.	Guide way type and dimension.....	13
6.2.	Table dimension and T-slot specification	16
6.3.	Working Travel.....	17
6.4.	Machine Floor Plan	19
6.5.	Spindle Power and Torque Chart.....	20
6.7.	Tool Shank and Pull Stud Dimension	24
7.	Components Specification	26
7.1.	Spindle.....	26
7.2.	Feeding Axis	27
7.3.	Linear guide way	28
7.4.	Main Supplier	29
8.	Optional accessories	30
8.1.	Coolant through Spindle	30
8.2.	Oil Skimmer	30
8.3.	Automatic Tool Measuring System	31
8.4.	Automatic Workpiece Measuring System	32
9.	Accuracy report	33
10.	Shipping requirement	37
11.	Foundation Plan	38
11.1.	J Bolt	38
11.2.	H Beam	39

1. Machine Introduction

1.1. Machine Design

DX Series Double Column Machining Center is structured with rectangle and step type crossbeam. In order to meet different market demands, we provide linear guide way design which makes your perfect choice for high efficiency machining and fast cutting.

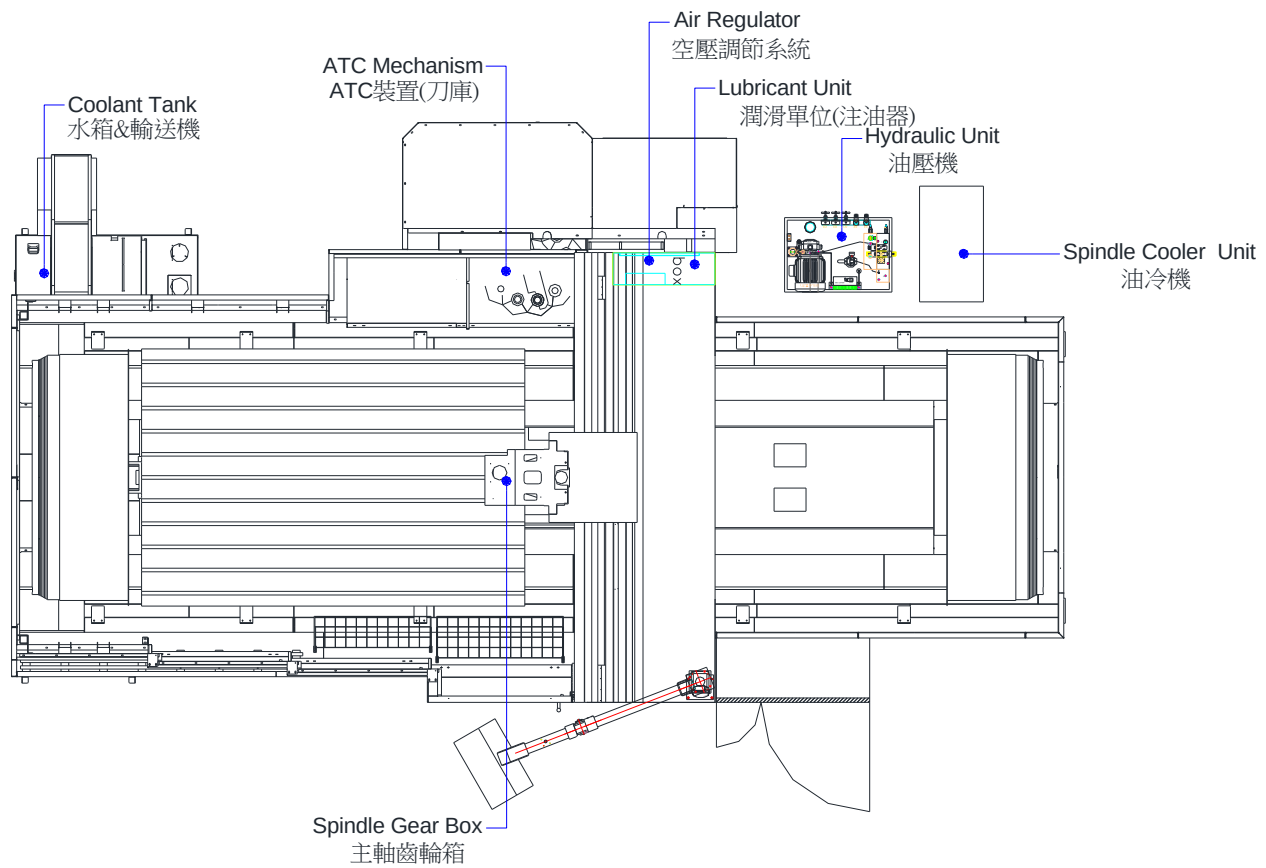
1.2. Mechanical Instruction



A	Base	H	Operation panel
B	Working table	I	Coolant tank
C	Column	J	Chip conveyor
D	Crossbeam	K	Electrical cabinet
E	Saddle	L	Transformer
F	Headstock	M	Spindle oil cooler
G	ATC (Automatic Tool Changer)	N	Hydraulic unit



1.3. Accessory layout



2. Machine Feature

The main structures of the machine castings including the Base, Table, Column, Crossbeam, Saddle and Headstock are designed by 3D graphics, together with structure analysis software to obtain the optimum way to deploy ribs inside the casting, increasing the rigidity as well as the durability of the machine.

■ Linear Guide ways

X/Y axes are high rigidity and high precision roller type linear guide way. Z axis is standard with very rigid box way design. However, according to different machining requirement, there is optional linear guide way in Z axis upon request. Combined with reliable construction to enhance stable performance and to absorb the vibration, linear guide way can achieve a long service life with highly accurate motion.

■ Machine Base

The inside structure of base adopted V-shape design to provide optimum support and to ensure the loading capacity of the machine. With roller type linear guide enhances not only the swiftness of the machine but also the accuracy performance during high speed cutting.

■ Working table

Box in box structure rib design strengthens the table loading capacity.

■ Cross beam

The best rectangle and step type design of the cross beam not only ensures the rigidity but also reduces structural deformation, offering efficient heavy cutting performance and stable cutting accuracy.

■ Columns

Super-sized column structure with cross-section 700x350mm for super supporting to the cross beam, and make sure machine to be more rigid and stable.

■ Headstock

Box in box structure design with square type ribs inside which not only efficiently reduces the weight of headstock but also enhances the swiftness of the machine, showing excellent machining rigidity in addition.

■ Gearbox

One piece casting design and strong structure ensures machining rigidity and accuracy.

2-step transmission design: low speed with higher torque for heavy cutting, and high speed with perfect cutting performance.

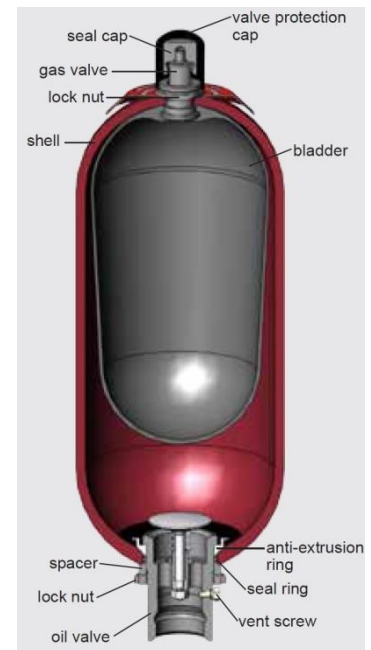
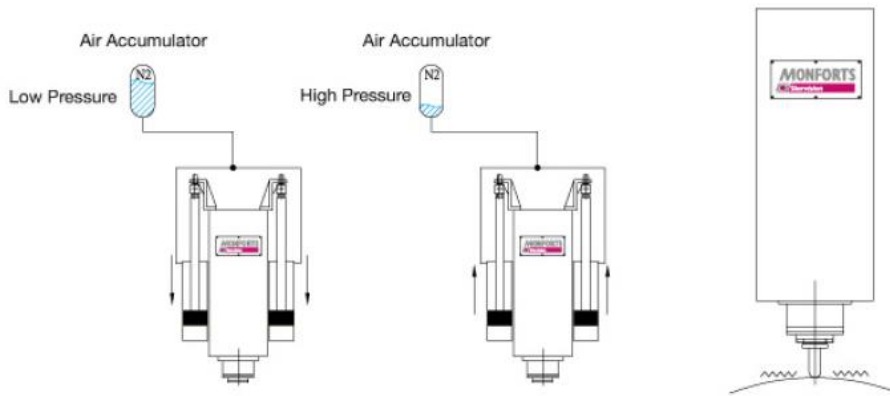
With stable coolant system for spindle and gear system, Japan made gear (HAMADA KOKI) provides high speed, low noise, low friction and best performance.





■ Z axis balancing system

Twin hydraulic cylinders plus pressured nitrogen accumulator balancing design doesn't just save the energy and keep the temperature of the hydraulic oil tank stable. It also enhances the response time and accuracy of Z axis movement.



■ Three axes transmission

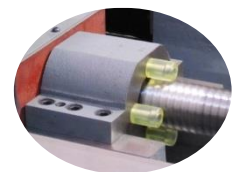
X-Axis: Gear Transmission with gear ratio 1: 2 enhances the axial movement response efficiently.
Y and Z-Axis: Direct type transmission ensures the accuracy of positioning and repeatability.

■ Three axis position feedback

Three axes position feedback is executed by absolute feedback systems. No need to return to the zero point after rebooting. Even when abnormal operation or power failure occurs, the absolute position shall be ensured.

■ Three axes with anti-collision design

With anti-collision design for three axes bearing support unit can ensure the longer service life of ball screw and bearing.



■ User friendly interface

Moveable pendulum operation panel design provides wider operation area which is very convenient for setting up the zero point.

■ Safety protection

Multi-piece splash guards protect not only the operator, but also prevent the chips and lubricants to pollute the environment. Multi-pieces operation door design is very convenient to load/unload work piece.



3. Machine Specification

Model	Unit	DX-2216	DX-2716	DX-3216	DX-4216
CNC controller		0iMD/10.4"	0iMD/10.4"	0iMD/10.4"	0iMD/10.4"
Travel					
Main structure	---	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)
Headstock balancing system	---	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)
X axis	mm	2,200	2,700	3,200	4,200
Y axis	mm	1,600	1,600	1,600	1,600
Z axis	mm	800	800	800	800
Distance from spindle nose to table	mm	150-950	150-950	150-950	150-950
Distance between two column	mm	1,700	1,700	1,700	1,700
Distance from spindle center to Z guide way	mm	375	375	375	375
Working table					
Table Length	mm	2,000	2,500	3,000	4,000
Table Width	mm	1,400	1,400	1,400	1,400
Table Load	kg	8,000	9,000	10,000	12,000
T- Slot (Width x Number x Pitch)	mm	22x7x180	22x7x180	22x7x180	22x7x180
Height of Table (table surface to ground)	mm	852	852	852	852
Spindle					
Spindle Taper	---	BT 50	BT 50	BT 50	BT 50
Spindle Speed	rpm	4,500	4,500	4,500	4,500
Spindle Gear maker	---	Hamada Koki	Hamada Koki	Hamada Koki	Hamada Koki
Spindle driven type	---	Gear drive 2-step	Gear drive 2-step	Gear drive 2-step	Gear drive 2-step
Spindle outside diameter	mm	190	190	190	190
Spindle Bearing I.D. (inside)	mm	100 (7020)	100 (7020)	100 (7020)	100 (7020)
Spindle motor power (continuous)	kW	18.5	18.5	18.5	18.5
Spindle motor power (rated)	kW	22	22	22	22



Model	Unit	DX-2216	DX-2716	DX-3216	DX-4216
Tool clamping force	kgf	1,800	1,800	1,800	1,800
Max. Spindle output Torque (continuous)	N-m	473	473	473	473
Max. Spindle output Torque (rated)	N-m	562	562	562	562
Feed					
Rapid Traverse-X	m/min	12	12	12	10
Rapid Traverse-Y	m/min	12	12	12	12
Rapid Traverse-Z	m/min	15	15	15	15
Cutting feedrate	mm/min	7,000	7,000	7,000	7,000
X axis linear guide way	---	MRD55	MRD55	MRD55	MRD55
Y axis linear guide way	---	MRB55	MRB55	MRB55	MRB55
Z axis box way (width x thickness)	mm	80X60	80X60	80X60	80X60
Z axis linear guide way (optional)	---	MRD65	MRD65	MRD65	MRD65
X axis Ball screw (diameter x lead)	mm	63X12	63X12	63X12	80X20
Y axis Ball screw (diameter x lead)	mm	50X10	50X10	50X10	50X10
Z axis Ball screw (diameter x lead)	mm	50X10	50X10	50X10	50X10
X axis gear ratio	mm	1:2	1:2	1:2	1:2
Y axis gear ratio	mm	1:1	1:1	1:1	1:1
Z axis gear ratio	mm	1:1	1:1	1:1	1:1
3 axes servo motor					
X axis Motor power	kW	7	7	7	9
Y axis Motor power	kW	7	7	7	7
Z axis Motor power	kW	7	7	7	7
X axis driving thrust force	kgf	3,204	3,204	3,204	3,204
Y axis driving thrust force	kgf	1,922	1,922	1,922	1,922
Z axis driving thrust force	kgf	1,922	1,922	1,922	1,922
Accuracy					
Positioning Accuracy (JIS)	mm	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full
Positioning Accuracy (VDI 3441)	mm	0.030	0.030	0.035	0.035

Model	Unit	DX-2216	DX-2716	DX-3216	DX-4216
Positioning Repeatability (JIS)	mm	±0.003	±0.003	±0.003	±0.003
Positioning Repeatability (VDI 3441)	mm	0.025	0.025	0.028	0.028
ATC					
Magazine Type	---	Hanging type	Hanging type	Hanging type	Hanging type
ATC Type	---	Arm type	Arm type	Arm type	Arm type
Tool magazine capacity	pcs	32	32	32	32
Max. tool size (full pocket/next pockets empty)	mm	125/245	125/245	125/245	125/245
Max. tool length	mm	400	400	400	400
Max. tool weight	kg	20	20	20	20
ATC time (Tool to tool) (50Hz/60Hz)	sec	5	5	5	5
ATC time (Chip to Chip)	sec	(24)20	(24)20	(24)20	(24)20
Tool selection method	---	Random	Random	Random	Random
Others					
Coolant tank capacity	liter	420	420	420	420
Max. coolant flow rate	l/min	130	130	130	130
Coolant motor power	W	2,380	2,380	2,380	2,380
Lubrication pump power	W	17	17	17	17
Spindle chiller motor power	W	373	373	373	373
Chip removal system	---	Twin auger	Twin auger	Twin auger	Twin auger
Ball screw lubrication	---	Centralized	Centralized	Centralized	Centralized
Guide ways lubrication	---	Centralized	Centralized	Centralized	Centralized
Lubrication Tank	liter	8	8	8	8
Power required	kVA	65	65	65	65
Dimension and Weight					
Machine net weight	kg	22,000	25,000	28,000	34,000
Machine gross weight	kg	25,000	28,000	31,000	37,000
Floor space (Length)	mm	7,600	8,600	9,600	11,600
Floor space (Width)	mm	5,600	5,600	5,600	5,600
Floor space (Height)	mm	4,700	4,700	4,700	4,700
Packing size (Length)	mm	6,500	7,600	8,700	10,900
Packing size (Width)	mm	3,700	3,700	3,700	3,700
Packing size (Height)	mm	3,800	3,800	3,800	3,800



Model	Unit	DX-2220	DX-2720	DX-3220	DX-4220
CNC controller		0iMD/10.4"	0iMD/10.4"	0iMD/10.4"	0iMD/10.4"
Travel					
Main structure	---	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)	X/Y-linear guide way Z-boxway (Z-linear guide way-opt.)
Headstock balancing system	---	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)	Hydraulic (Nitrogen)
X axis	mm	2,200	2,700	3,200	4,200
Y axis	mm	2,000	2,000	2,000	2,000
Z axis	mm	800	800	800	800
Distance from spindle nose to table	mm	150-950	150-950	150-950	150-950
Distance between two column	mm	2,100	2,100	2,100	2,100
Distance from spindle center to Z guide way	mm	375	375	375	375
Working table					
Table Length	mm	2,000	2,500	3,000	4,000
Table Width	mm	1,700	1,700	1,700	1,700
Table Load	kg	8,000	9,000	10,000	12,000
T- Slot (Width x Number x Pitch)	mm	22x9x180	22x7x180	22x7x180	22x7x180
Height of Table (table surface to ground)	mm	852	852	852	852
Spindle					
Spindle Taper	---	BT 50	BT 50	BT 50	BT 50
Spindle Speed	rpm	4,500	4,500	4,500	4,500
Spindle Gear maker	---	Hamada Koki	Hamada Koki	Hamada Koki	Hamada Koki
Spindle driven type	---	Gear drive 2-step	Gear drive 2-step	Gear drive 2-step	Gear drive 2-step
Spindle outside diameter	mm	190	190	190	190
Spindle Bearing I.D. (inside)	mm	100 (7020)	100 (7020)	100 (7020)	100 (7020)
Spindle motor power (continuous)	kW	18.5	18.5	18.5	18.5
Spindle motor power (rated)	kW	22	22	22	22

Model	Unit	DX-2216	DX-2716	DX-3216	DX-4216
Tool clamping force	kgf	1,800	1,800	1,800	1,800
Max. Spindle output Torque (continuous)	N-m	473	473	473	473
Max. Spindle output Torque (rated)	N-m	562	562	562	562
Feed					
Rapid Traverse-X	m/min	12	12	12	10
Rapid Traverse-Y	m/min	12	12	12	12
Rapid Traverse-Z	m/min	15	15	15	15
Cutting feedrate	mm/min	7,000	7,000	7,000	7,000
X axis linear guide way	---	MRD55	MRD55	MRD55	MRD55
Y axis linear guide way	---	MRB55	MRB55	MRB55	MRB55
Z axis box way (width x thickness)	mm	80X60	80X60	80X60	80X60
Z axis linear guide way (optional)	---	MRD65	MRD65	MRD65	MRD65
X axis Ball screw (diameter x lead)	mm	63X12	63X12	63X12	80X20
Y axis Ball screw (diameter x lead)	mm	50X10	50X10	50X10	50X10
Z axis Ball screw (diameter x lead)	mm	50X10	50X10	50X10	50X10
X axis gear ratio	mm	1:2	1:2	1:2	1:2
Y axis gear ratio	mm	1:1	1:1	1:1	1:1
Z axis gear ratio	mm	1:1	1:1	1:1	1:1
3 axes servo motor					
X axis Motor power	kW	7	7	7	9
Y axis Motor power	kW	7	7	7	7
Z axis Motor power	kW	7	7	7	7
X axis driving thrust force	kgf	3,204	3,204	3,204	3,204
Y axis driving thrust force	kgf	1,922	1,922	1,922	1,922
Z axis driving thrust force	kgf	1,922	1,922	1,922	1,922
Accuracy					
Positioning Accuracy (JIS)	mm	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full	±0.005/300 ±0.015/Full
Positioning Accuracy (VDI 3441)	mm	0.030	0.030	0.035	0.035



Model	Unit	DX-2216	DX-2716	DX-3216	DX-4216
Positioning Repeatability (JIS)	mm	±0.003	±0.003	±0.003	±0.003
Positioning Repeatability (VDI 3441)	mm	0.025	0.025	0.028	0.028
ATC					
Magazine Type	---	Hanging type	Hanging type	Hanging type	Hanging type
ATC Type	---	Arm type	Arm type	Arm type	Arm type
Tool magazine capacity	pcs	32	32	32	32
Max. tool size (full pocket/next pockets empty)	mm	125/245	125/245	125/245	125/245
Max. tool length	mm	400	400	400	400
Max. tool weight	kg	20	20	20	20
ATC time (Tool to tool) (50Hz/60Hz)	sec	5	5	5	5
ATC time (Chip to Chip)	sec	(24)20	(24)20	(24)20	(24)20
Tool selection method	---	Random	Random	Random	Random
Others					
Coolant tank capacity	liter	490	490	490	490
Max. coolant flow rate	l/min	130	130	130	130
Coolant motor power	W	2,380	2,380	2,380	2,380
Lubrication pump power	W	17	17	17	17
Spindle chiller motor power	W	373	373	373	373
Chip removal system	---	Twin auger	Twin auger	Twin auger	Twin auger
Ball screw lubrication	---	Centralized	Centralized	Centralized	Centralized
Guide ways lubrication	---	Centralized	Centralized	Centralized	Centralized
Lubrication Tank	liter	8	8	8	8
Power required	kVA	65	65	65	65
Dimension and Weight					
Machine net weight	kg	23,000	26,000	29,000	35,000
Machine gross weight	kg	26,000	29,000	32,000	38,000
Floor space (Length)	mm	7,600	8,600	9,600	11,600
Floor space (Width)	mm	6,100	6,100	6,100	6,100
Floor space (Height)	mm	4,700	4,700	4,700	4,700
Packing size (Length)	mm	6,500	7,600	8,700	10,900
Packing size (Width)	mm	4,100	4,100	4,100	4,100
Packing size (Height)	mm	3,800	3,800	3,800	3,800

4. Standard Accessories

Item	Standard Accessories
1	FANUC Oi-MD controller
2	18.5/22 kW spindle motor
3	4,500rpm 2-step gear drive spindle
4	X/Y axes linear guide way and Z axis box way
5	Z travel 800mm
6	Automatic Tool Changer 32 tools
7	Fully enclosed splash guard (roof excluded)
8	X/Y/Z axes absolute pulse coder
9	Rigid tapping
10	Twin hydraulic cylinders
11	Nitrogen balancing system
12	Automatic lubrication system
13	Spindle oil cooler
14	Air blast through spindle
15	Manual Pulse Generator
16	Working lamp
17	3-color alarm lamp
18	RS-232 interface
19	Heat exchanger for electrical cabinet
20	Water gun and air gun interface
21	Cutting coolant system
22	Twin auger chip removal system
23	Belt type chip conveyor with cart
24	Leveling bolts & blocks
25	Tool box
26	Operation manual and electric drawing
27	Two years warranty for CNC controller system
28	One year warranty for mechanical parts



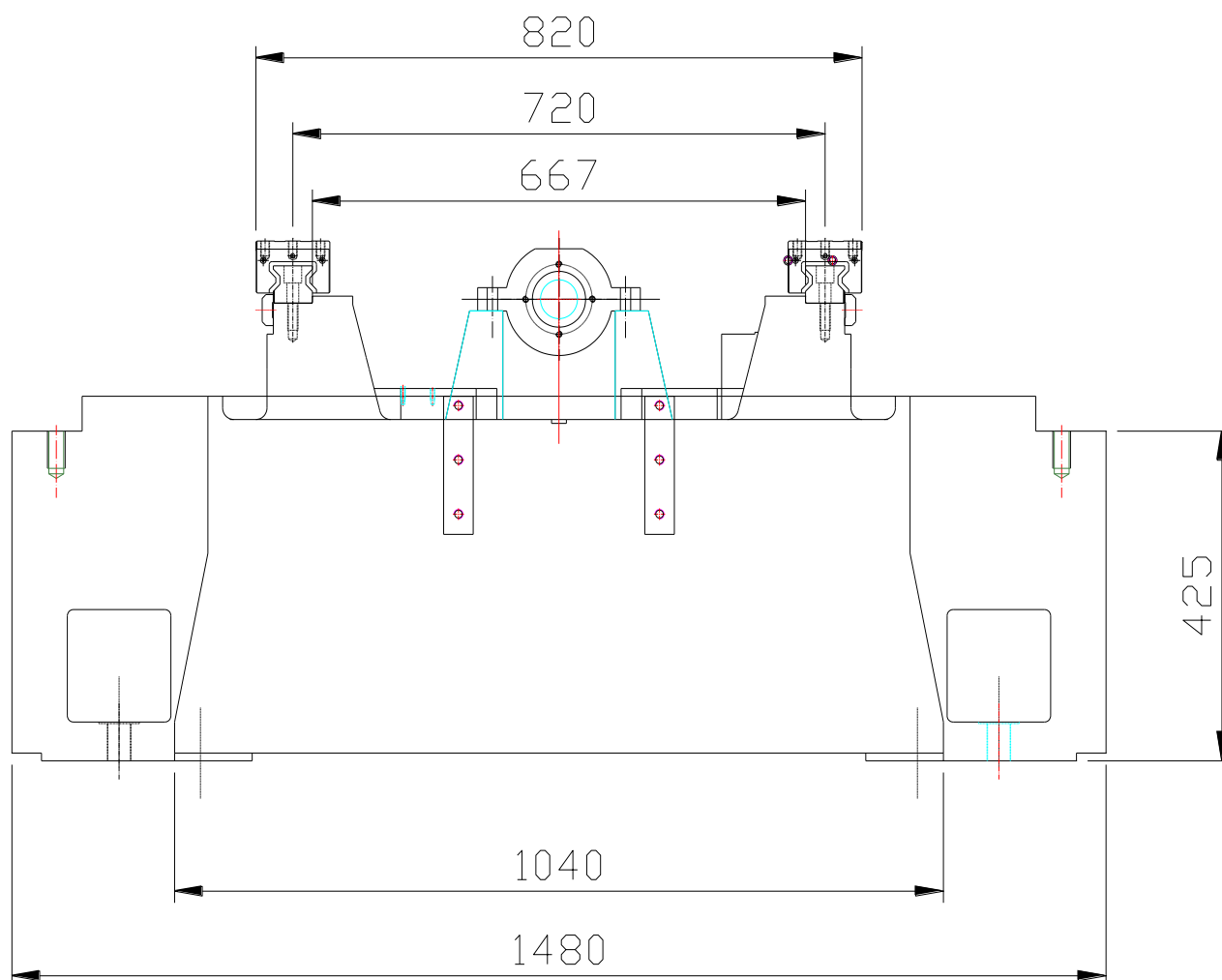
5. Optional Accessories

Item	Optional accessories
1	FANUC 31i-MB controller
2	MITSUBISHI M70 controller
3	SIEMENS 840D controller
4	HEIDENHAIN iTNC530 controller
5	22/26 kW spindle motor
6	6,000rpm 2-step gear drive spindle
7	8,000/10,000rpm direct drive spindle
8	Z axis linear guide way
9	Z travel 1000mm
10	200/300mm higher column (standard Z travel)
11	Automatic Tool Changer 24/40/60 tools
12	Semi splash guard
13	Fully enclosed splash guard (roof included)
14	Sub-table
15	Air conditioner for electrical cabinet
16	Transformer
17	3 axes manual pulse generator for mold processing
18	Coolant through spindle at 20/40/70 bar
19	Coolant through tool holder interface
20	Oil skimmer
21	Oil mist collector
22	CE norm
23	Heidenhain Linear Scale
24	Automatic tool measuring system
25	Automatic work piece measuring system
26	CNC Rotary table
27	4 th axis preparation
28	Manual: 90° angular milling head/ universal head/ extend head/ boring head
29	Semi-automatic: 90° angular milling head/ 2-axis head/ extend head/ boring head -V/H ATC and AHS inapplicable
30	Manual Head Station (Table type)
31	Manual Head Station (Arm type)

6. Major Technical Data

6.1. Guide way type and dimension

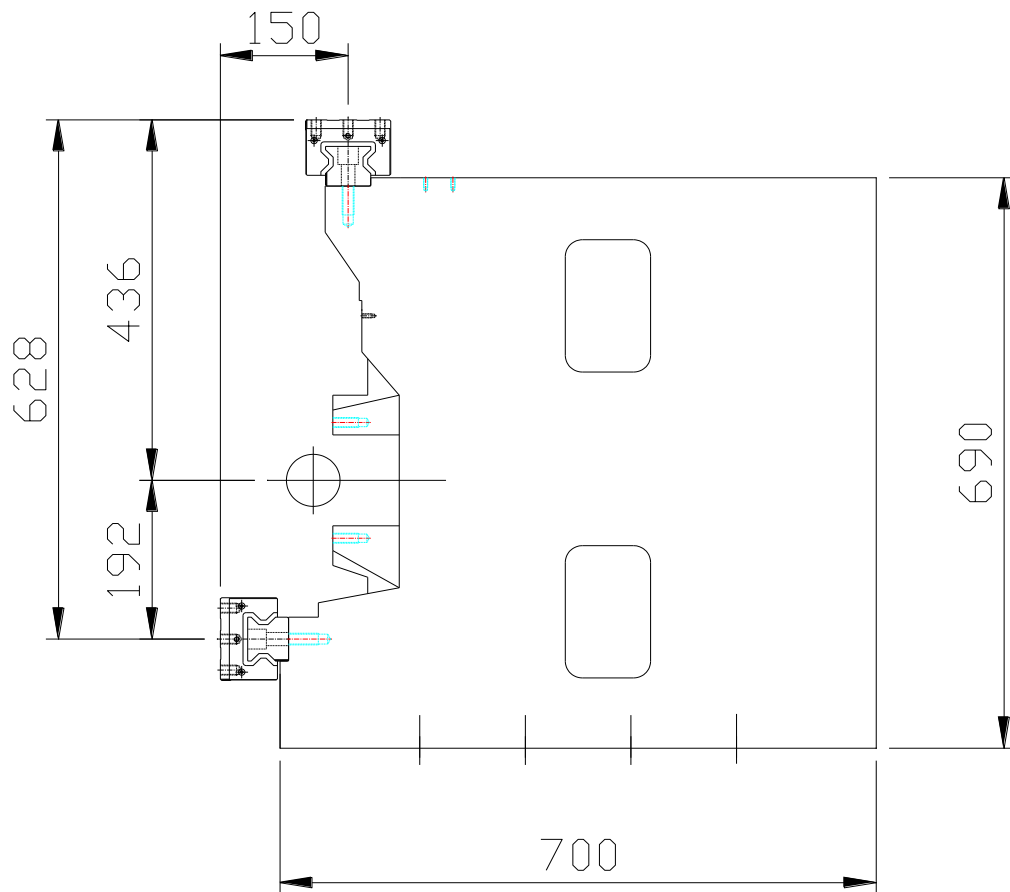
X axis guide way type and dimension (Linear guide way)



(unit: mm)



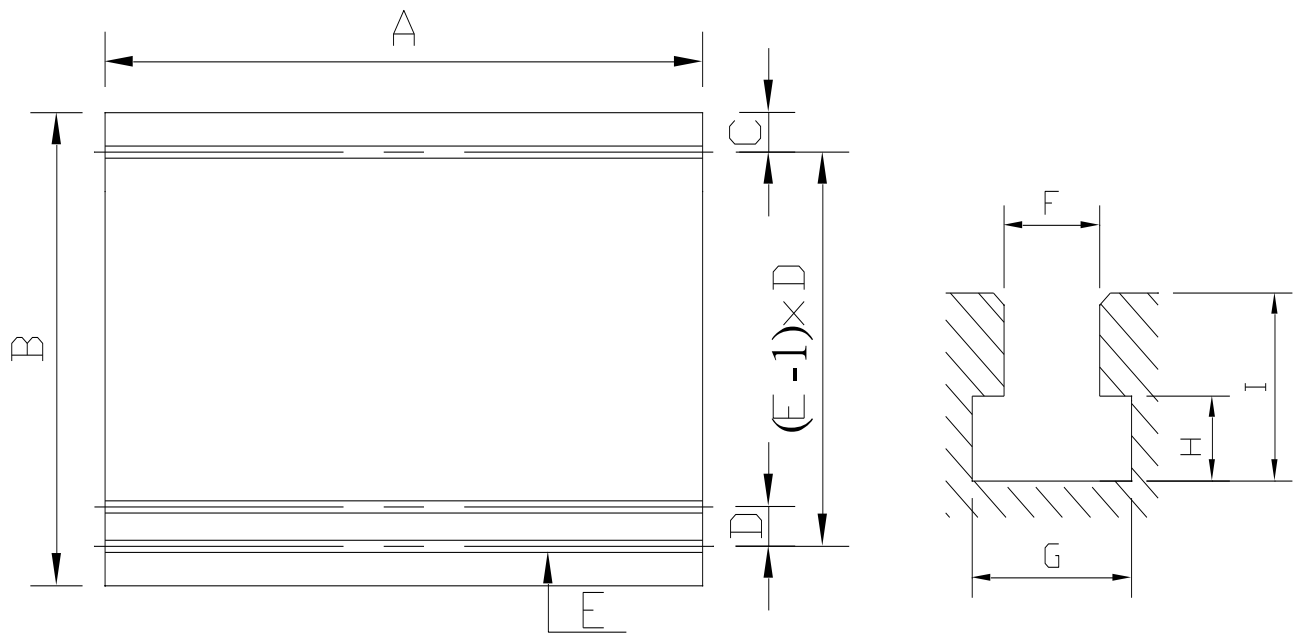
Y axis guide way type and dimension (Linear guide way)



(unit: mm)



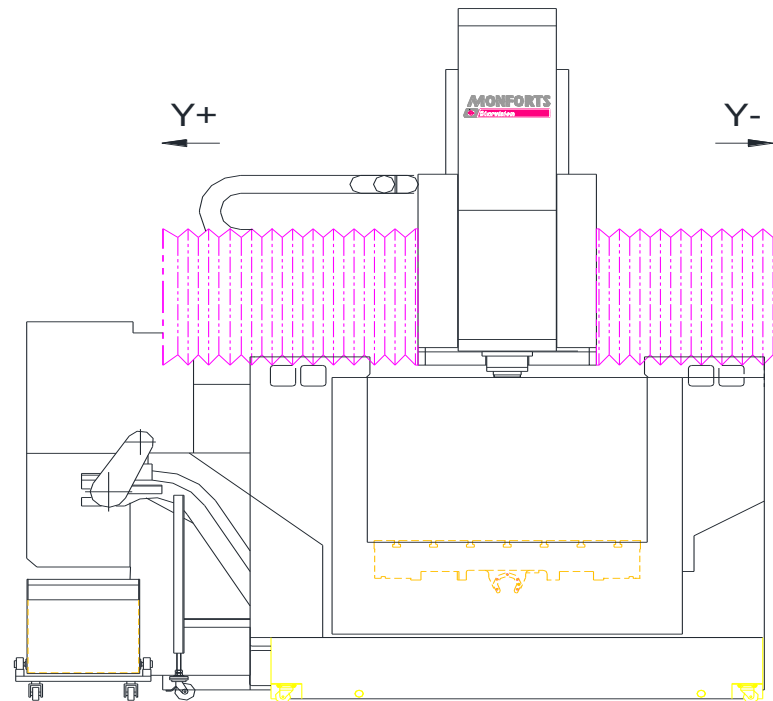
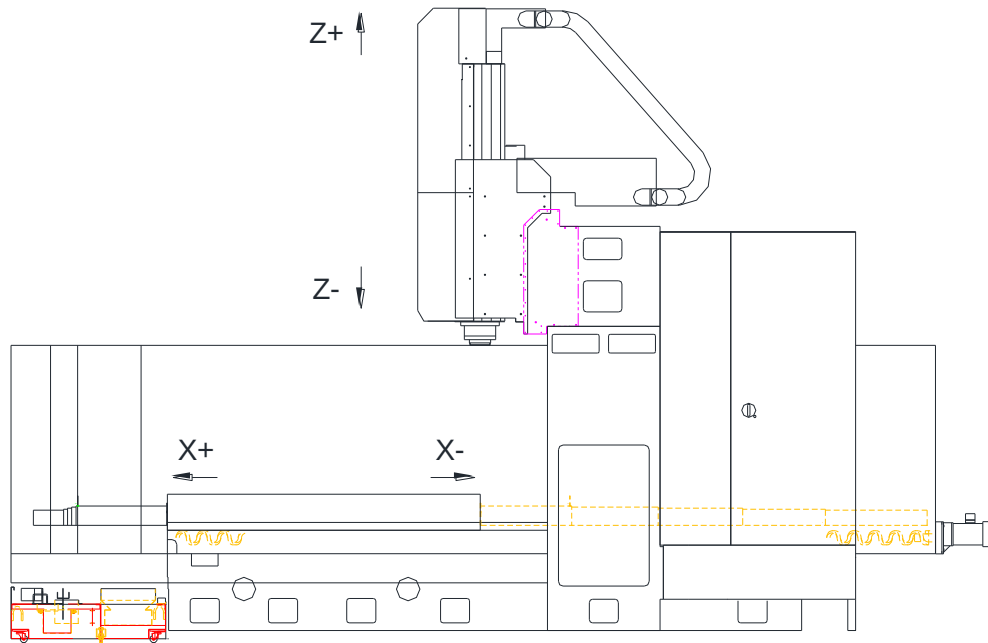
6.2. Table dimension and T-slot specification

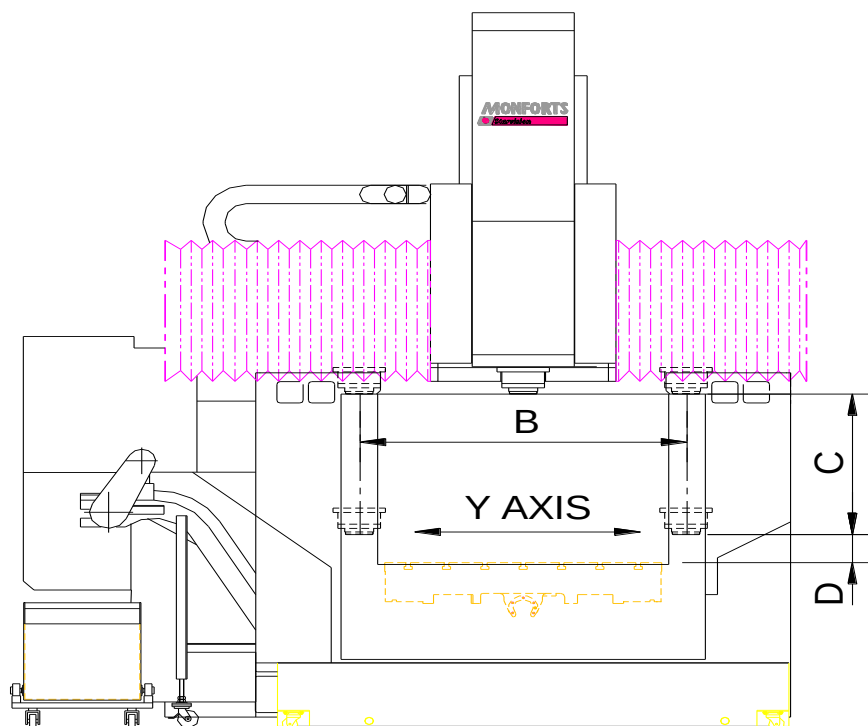
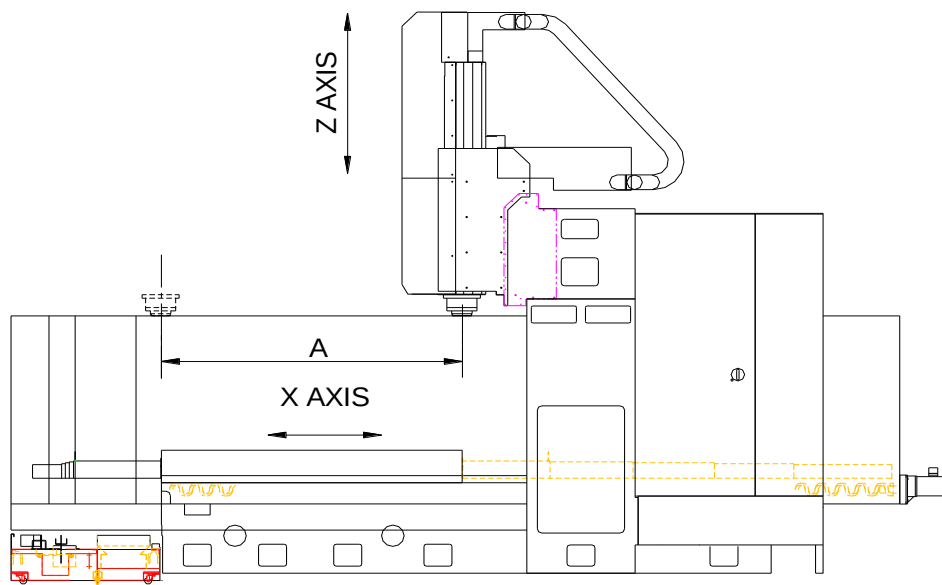


(unit: mm)

Model	A	B	C	D	E	F	G	H	I
DX-2216	2,000	1,400	160	180	7	22H8	38	16	38
DX-2716	2,500	1,400	160	180	7	22H8	38	16	38
DX-3216	3,000	1,400	160	180	7	22H8	38	16	38
DX-4216	4,000	1,400	160	180	7	22H8	38	16	38
DX-2220	2,000	1,700	130	180	9	22H8	38	16	38
DX-2720	2,500	1,700	130	180	9	22H8	38	16	38
DX-3220	3,000	1,700	130	180	9	22H8	38	16	38
DX-4220	4,000	1,700	130	180	9	22H8	38	16	38

6.3. Working Travel



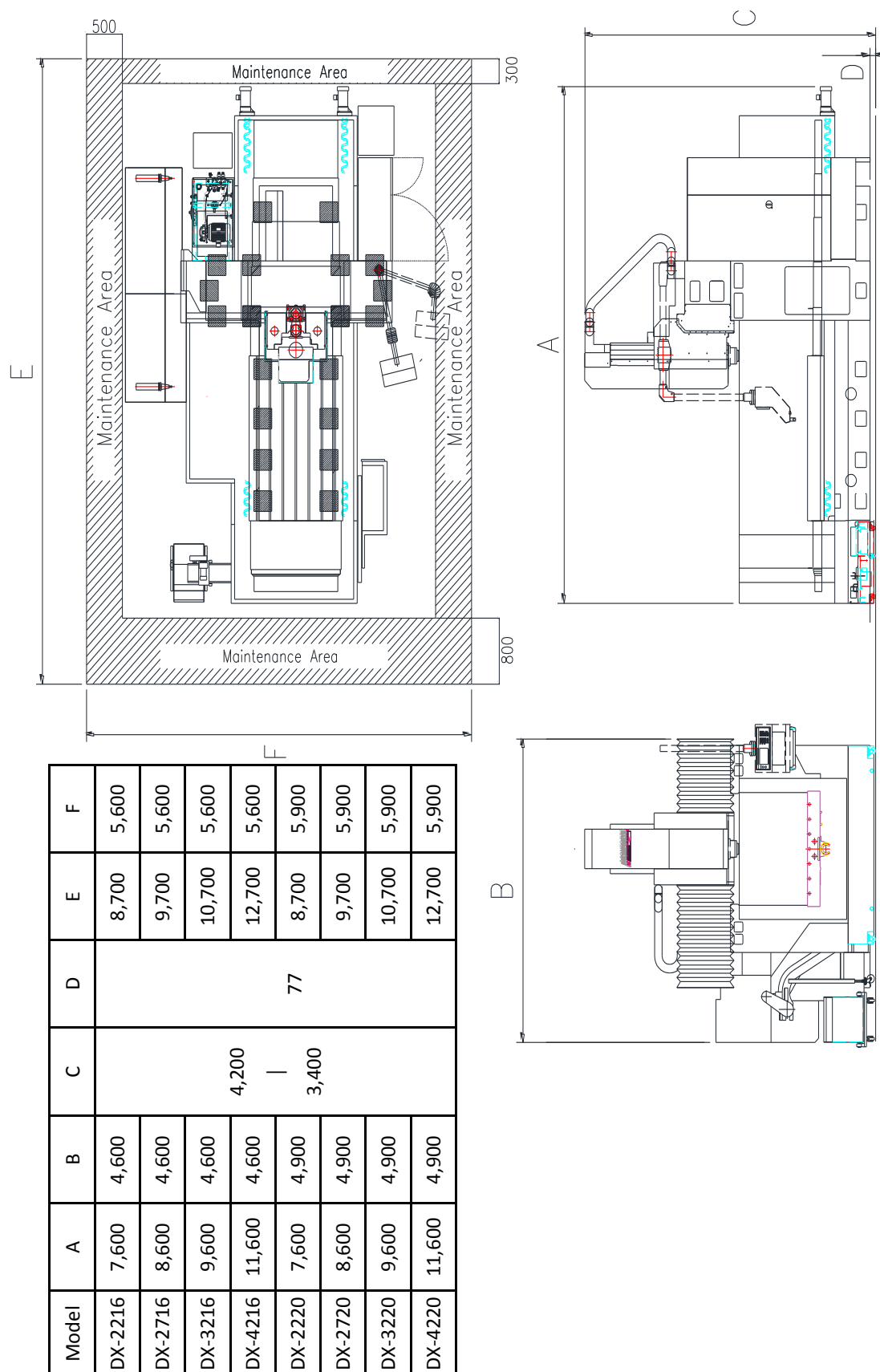


DX Series Working Travel

(unit: mm)

	DX-2216	DX-2716	DX-3216	DX-4216	DX-2220	DX-2720	DX-3220	DX-4220
A	2,200	2,700	3,200	4,200	2,200	2,700	3,200	4,200
B	1,600	1,600	1,600	1,600	2,000	2,000	2,000	2,000
C	800	800	800	800	800	800	800	800
D	150	150	150	150	150	150	150	150

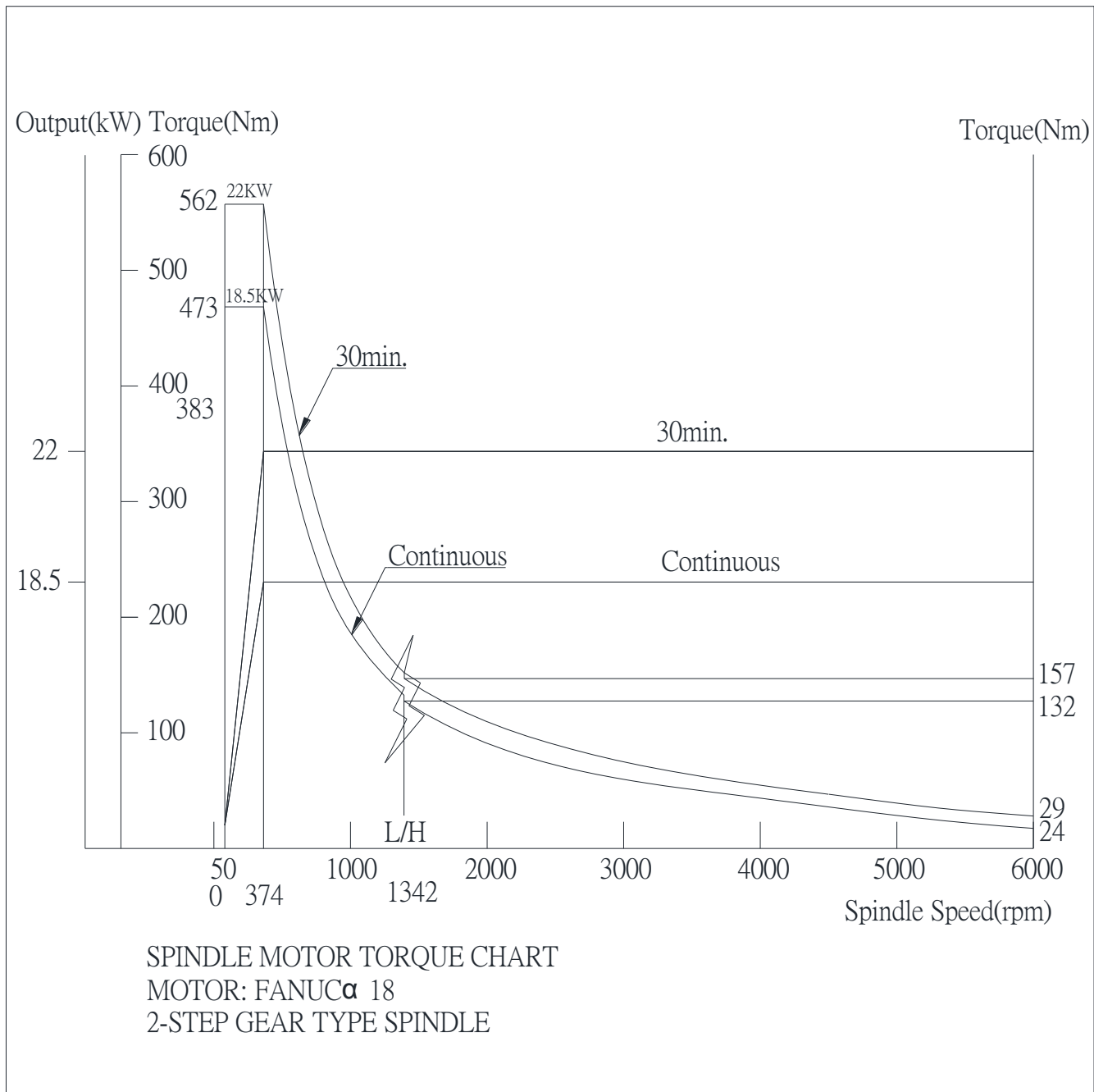
6.4. Machine Floor Plan



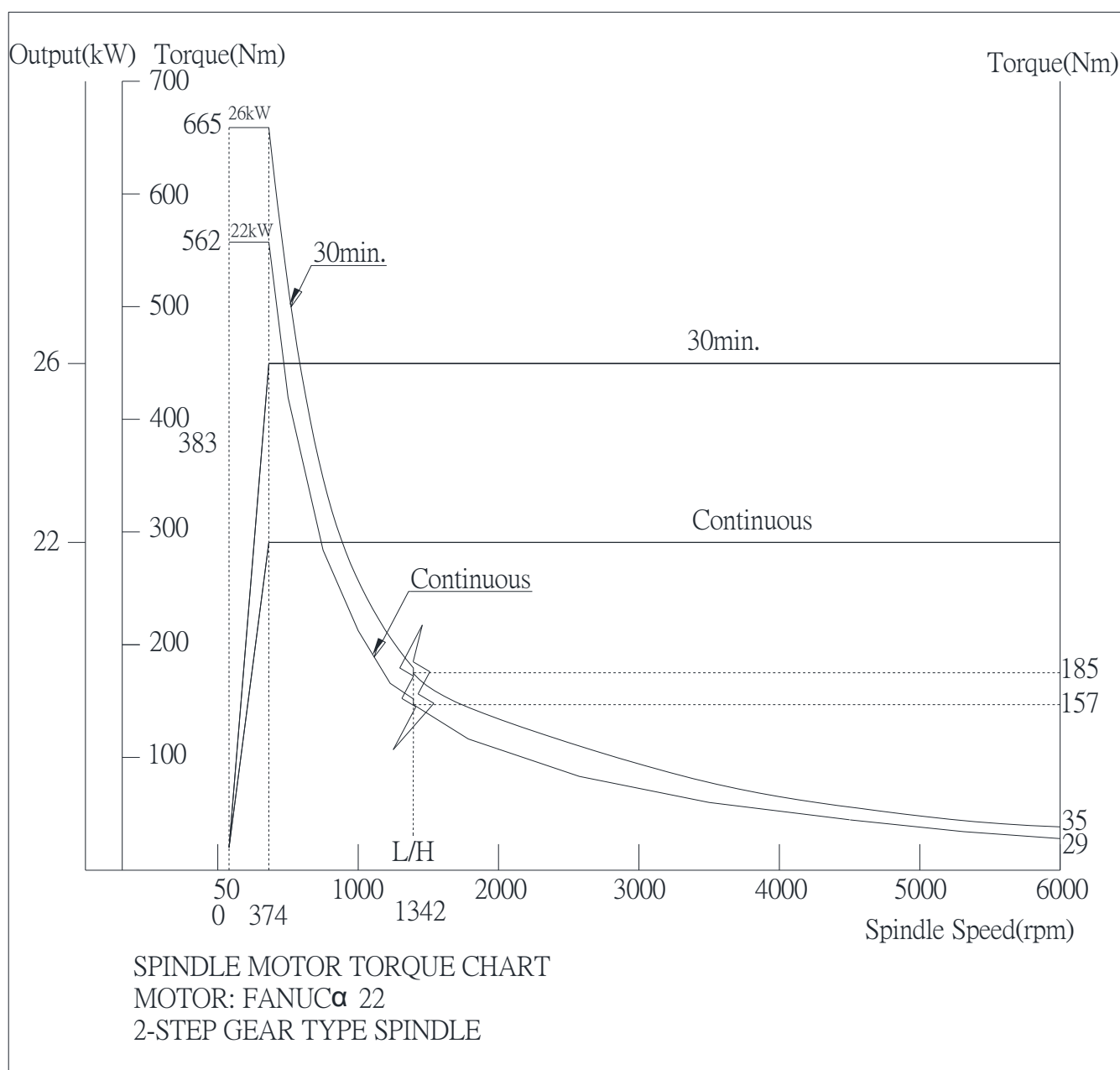


6.5. Spindle Power and Torque Chart

Type I: One piece gear head with two step gear transmission (Standard)

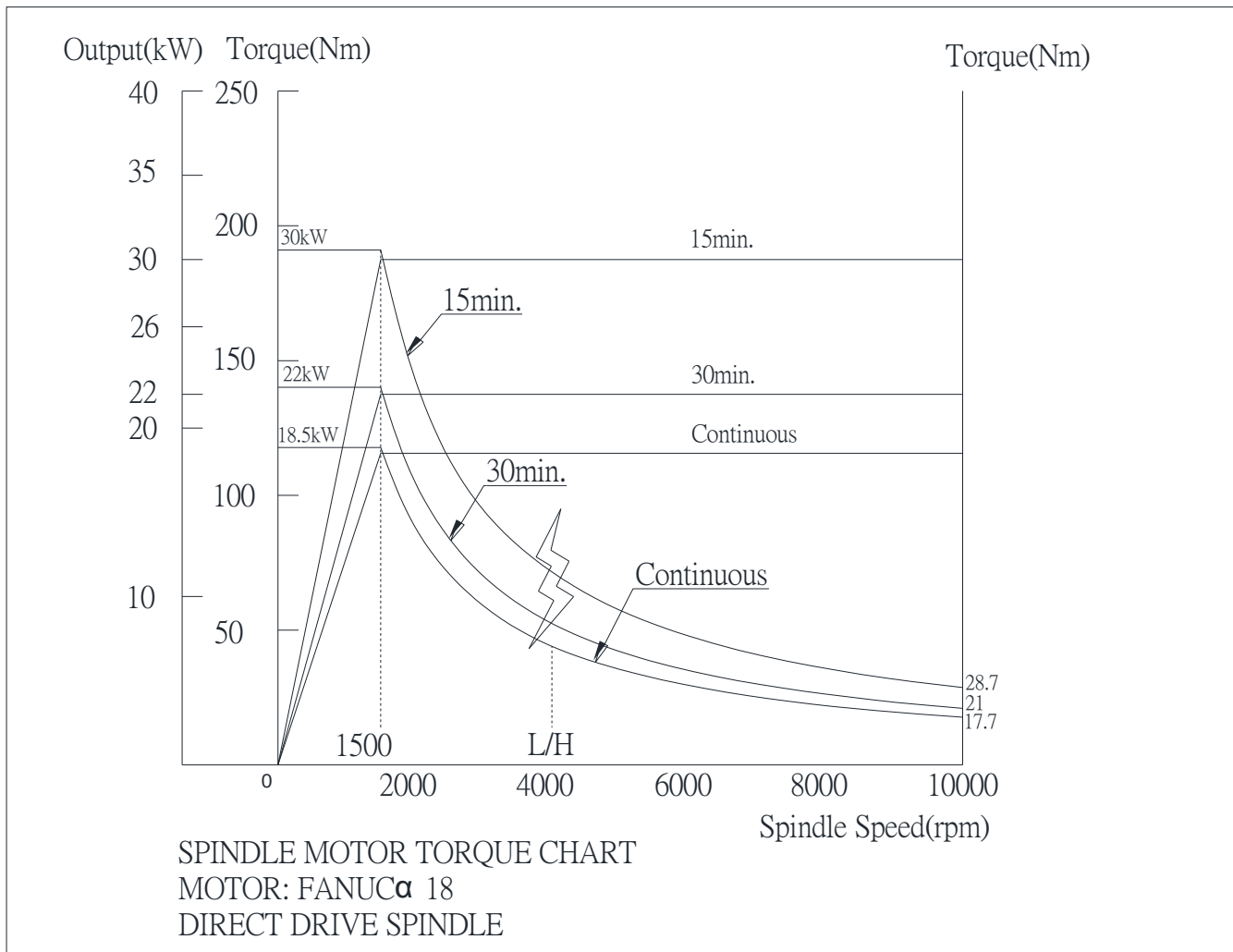


Type I: One piece gear head with two step gear transmission (Optional)

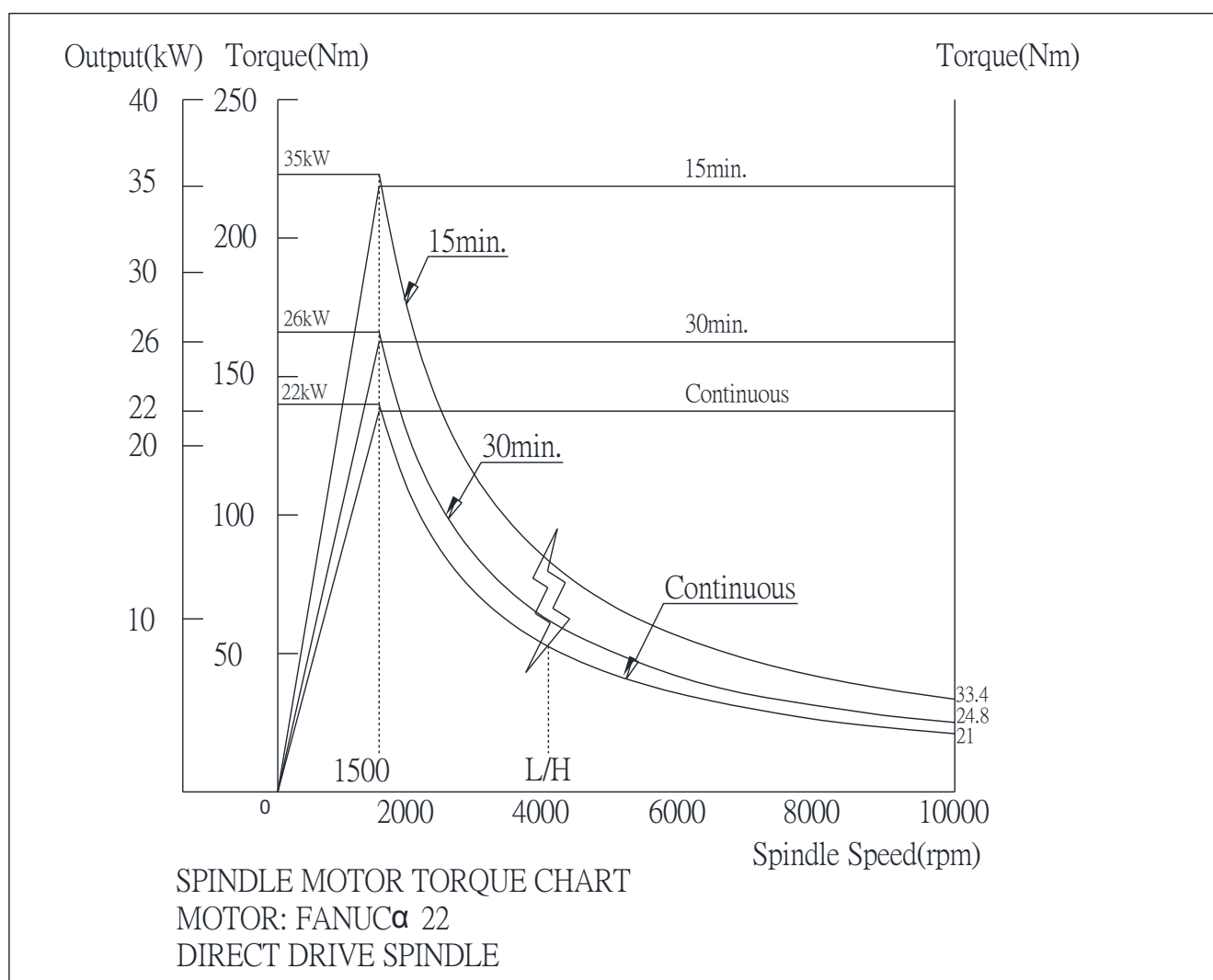




Type II Direct Drive Spindle Motor $\alpha 18$ (Optional)



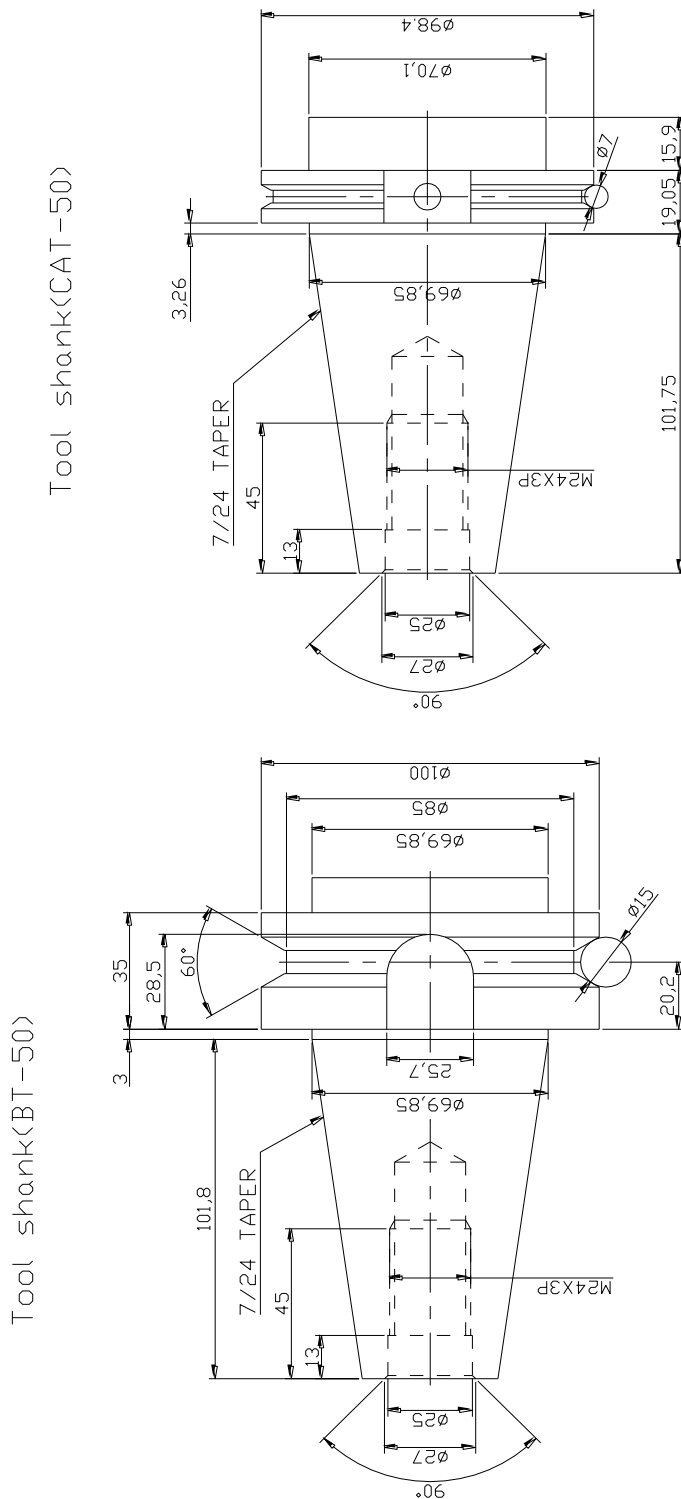
Type II Direct Drive Spindle Motor $\alpha 22$ (Optional)



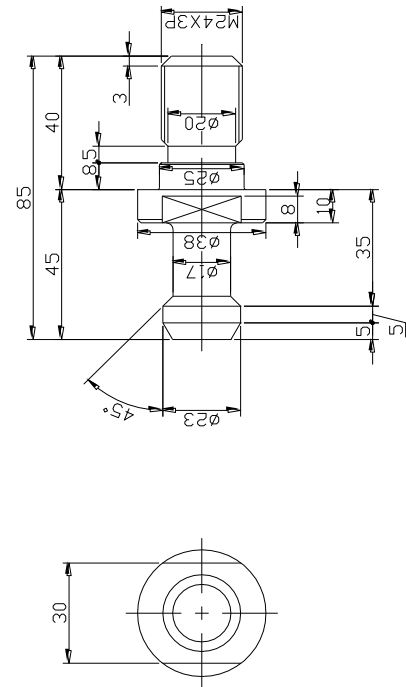


6.7. Tool Shank and Pull Stud Dimension

Type I: BT-50/CAT50

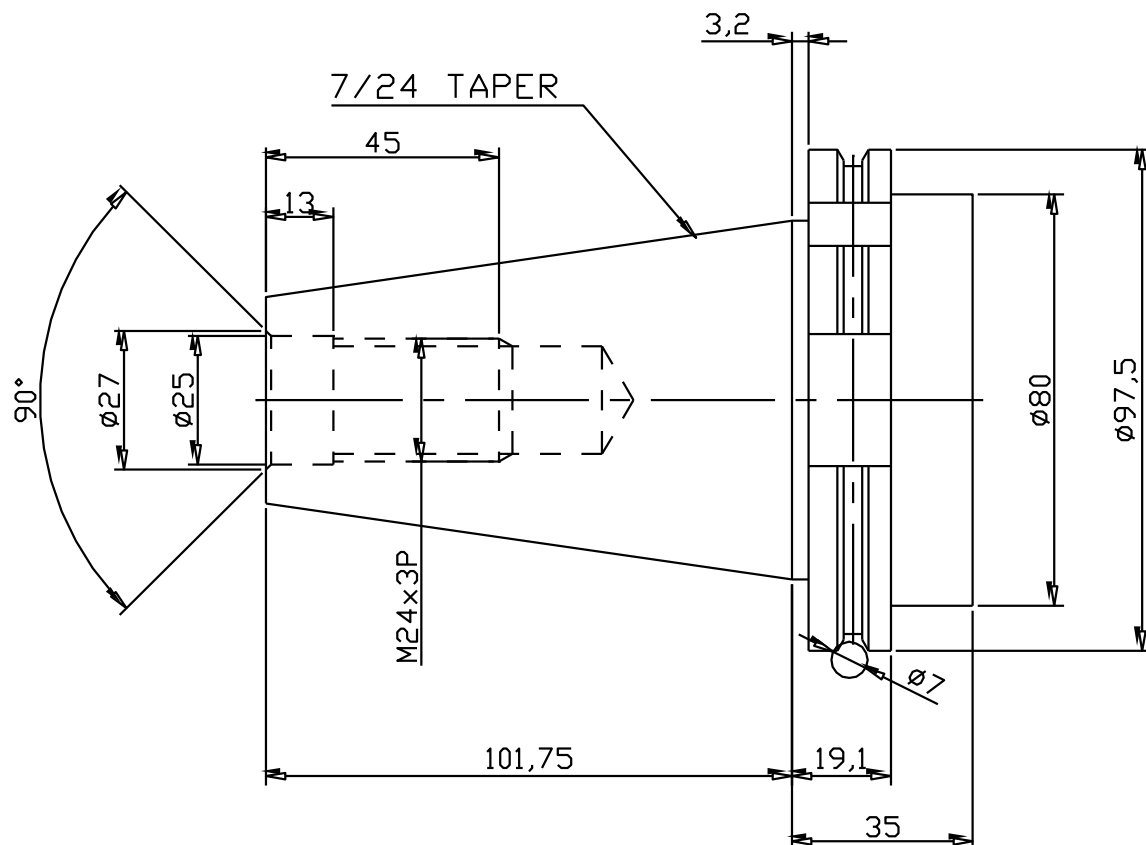


Pull Stud Bolt (P50t-1) for both BT-50 and CAT-50

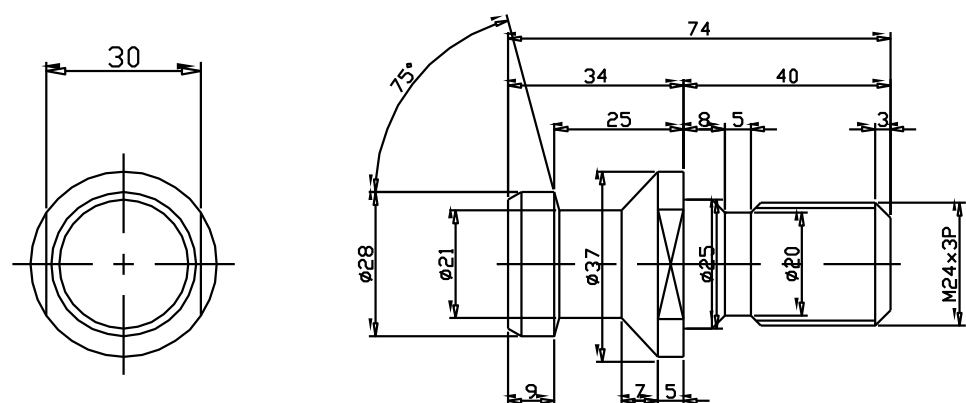


Type II: DIN-50/ (DIN69872B-50)

Tool shank(DIN-50)



Pull Stud Bolt (DIN69872B) DIN-50





7. Components Specification



Component suppliers in the same quality level are subject to change to meet strict delivery schedule.

7.1. Spindle

A. Spindle Type and Specification

Driven Way	Speed (rpm)	Spindle Taper	Spindle Nose End		Bearing inside and outside diameter	Rear side of spindle
			Brand	Description		
Gear Type	4,500	#50	NSK	7020* 5 SET	100x150mm	6016x1pce
	6,000		NTN	7020* 5 SET		
Direct Drive	10,000	#40	FAG	7014*4 SET	70x110mm	n/a
		#50	FAG	7018C*4 SET	90x140mm	

B. Spindle Gear Specification

Gear Accuracy	Lubrication Way	Coolant Way
JIS 0	Oil Bath	Oil Coolant

7.2. Feeding Axis

A. Bearing Specification

Axis	Model	Motor End	Brand	Free End	Brand	
X Axis	DX-2216/20	40TAC72BPN7B*4 SET	NSK FAG	40TAC72BPN7B*4 SET	NSK FAG	
	DX-2716/20					
	DX-3216/20	60TAC120BPN7B*4 SET		60TAC120BPN7B*4 SET		
	DX-4216/20					
Y Axis	DX Series	40TAC72BPN7B*4 SET		40TAC72BPN7B*4 SET		
Z Axis	DX Series	40TAC72BPN7B*4 SET		40TAC72BPN7B*3 SET		

B. Ball Screw Specification of Feeding Axis

Feeding Axis		Diameter x Lead (Unit: mm)	Nut Specification	Grade	Lubrication way
X Axis	DX-2216/20	Φ63 x 12	FDV	C3	Oil Lubrication
	DX-2716/20				
	DX-3216/20				
	DX-4216/20	Φ80 x 20			
Y Axis	DX Series	Φ50 x 10	FDV		
Z Axis	DX Series	Φ50 x 10	FDV		
Remarks	Nut Specification: FDV (External Ball/P.B&S.L); FDW(Internal Ball/P.L&S.H)				



7.3. Linear guide way

Feeding Axis		Rail			Carriage	
		Specification	Width	Height	Quantity	Width
X Axis	DX-2216/20	R55	53mm	48mm	6	100mm
	DX-2716/20				8	
	DX-3216/20				8	
	DX-4216/20				10	
Y Axis	DX Series	R55	53mm	48mm	5	140mm
Z Axis	DX Series	R65	63mm	58mm	6	126mm

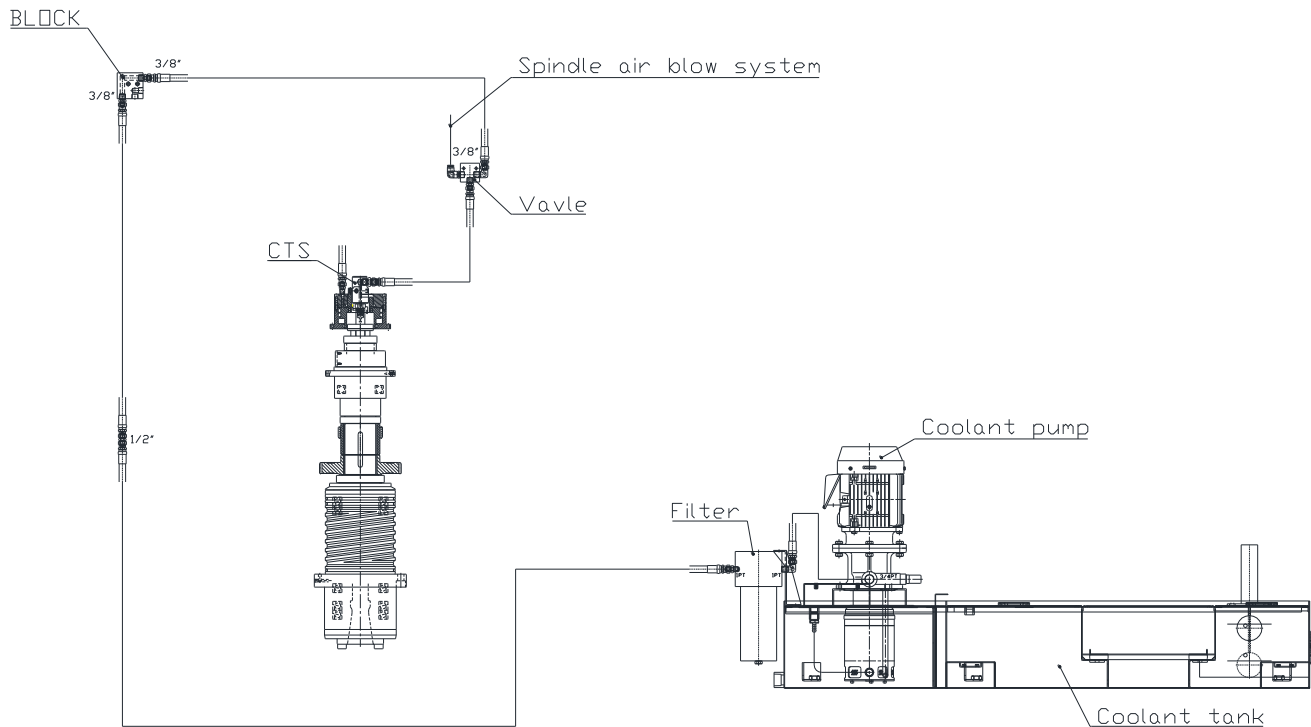
7.4. Main Supplier

Component	Manufacturer	Country of origin
Casting	YCFI/Fuyu	Taiwan
Linear guide	SCHNEERBERGER/Hiwin	Germany/Taiwan
Spindle bearing	FAG/NSK/NTN	Germany/Japan
Spindle gear	HAMADA	Japan
Spindle oil cooler	Wexten/Habor/Kaukan	Taiwan
X axis ball screw	Hiwin/PMI/SHUTON	Taiwan/Spain
Y axis ball screw	Hiwin/PMI/SHUTON	Taiwan/Spain
Z axis ball screw	Hiwin/PMI/SHUTON	Taiwan/Spain
Tool magazine	Gifu	Taiwan
X/Y/Z axis linear scale	HEIDENHAIN	Germany
Accumulator	HYDAC	Germany
Automatic oil lubrication system	Chen Yeng/SHOWA	Taiwan/Japan
Hydraulic pump	ANSON	Taiwan
Solenoid valve (hydraulic system)	DOFLUID	Taiwan
Solenoid Valve (pneumatic system)	PAKER	USA
Pneumatic actuator	UNIMEC	Taiwan
Coolant pump	WALRUS	Taiwan
Coolant valve	DOFLUID	Taiwan
Transformer	SUENN LIANG/Shin Hsing	Taiwan
Magnetic contactor	SIEMENS	Germany
Thermal relay	SIEMENS	Germany
Molded-case circuit breaker	SIEMENS	Germany
Terminal blocks	SIEMENS	Germany
PCB RELAY	SIEMENS	Germany
Heat exchanger	Habor	Taiwan
Metal-oxide varistor	FOTEK	Taiwan
Quick Connector	MS	Taiwan
Band Switch	FUTURE	Taiwan
Cable carrier	igus	Germany
Controller panel suspension	BERNSTEIN	Germany
Warning Light / Work Light	EMINENT MAIN	Taiwan
Hand pulse generator	TOSUKU	Japan
HONDA connector	HONDA	Japan
Limit switch	EUCHNET	Germany
Proximity Switch	ILTC	Italy
Milling Head	YIH KUAN/Gong Yang	Taiwan



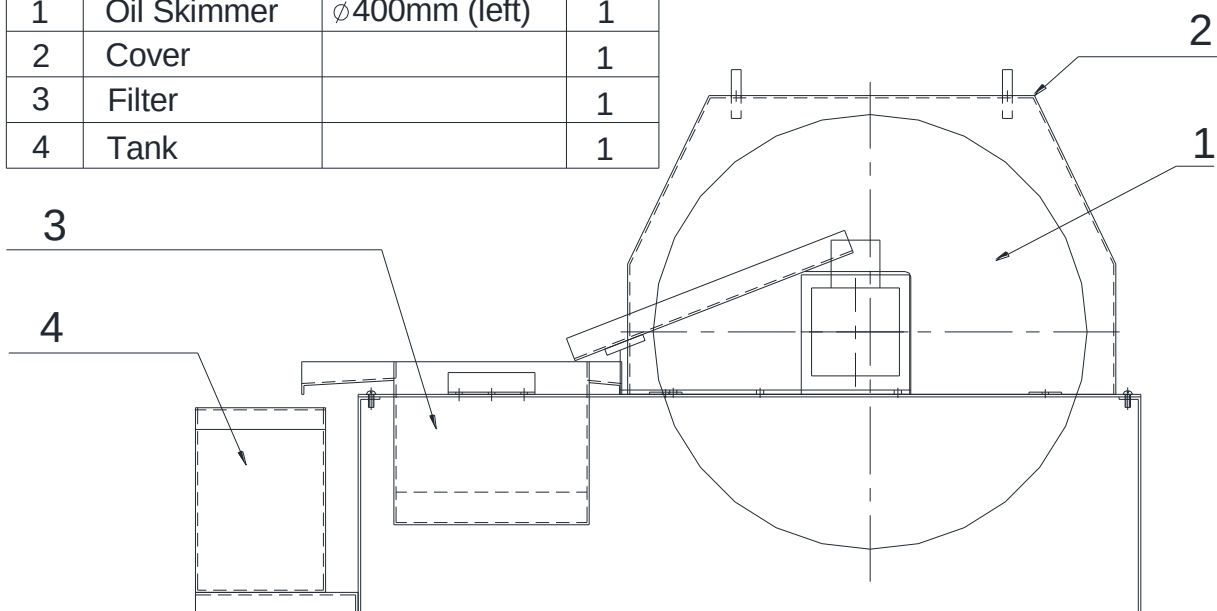
8. Optional accessories

8.1. Coolant through Spindle

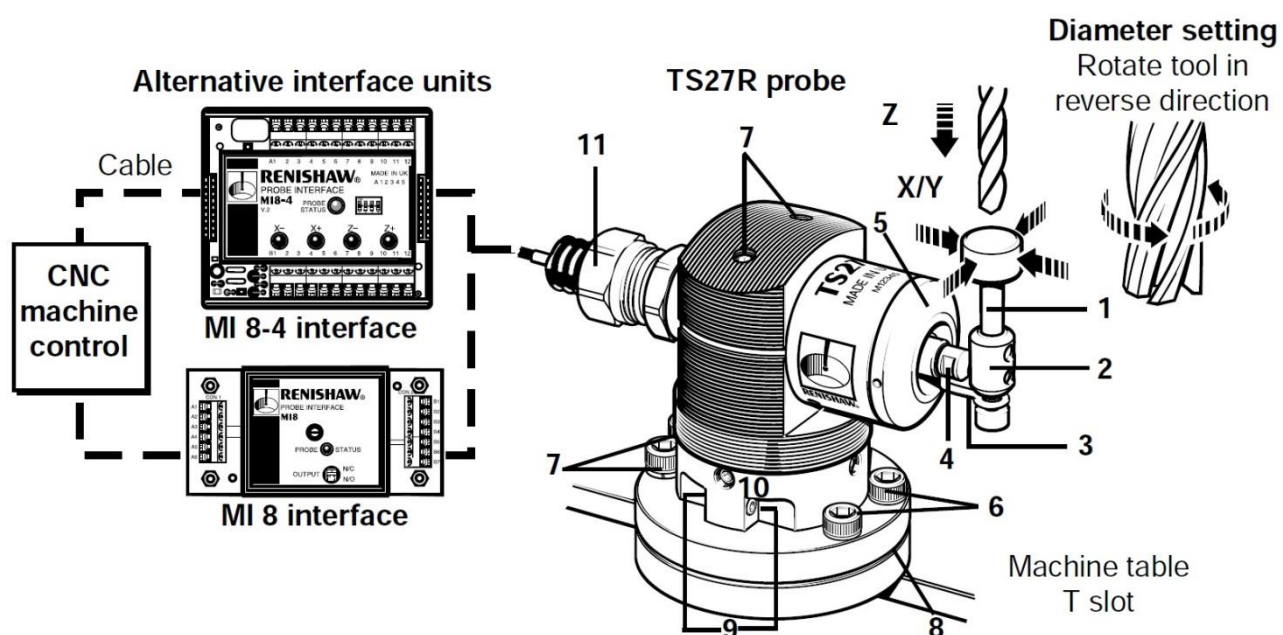


8.2. Oil Skimmer

Item	Parts Name	Specification	Q'ty
1	Oil Skimmer	Ø400mm (left)	1
2	Cover		1
3	Filter		1
4	Tank		1



8.3. Automatic Tool Measuring System



The TS27R probe is used for tool setting on CNC machining centres.

For tool length measurements and broken tool detection, the tool is driven against the probe's stylus in the Z axis. Rotating tools can be set in X and Y axes for tool radius offsets.

Screw adjusters allow the stylus to be aligned with the machine's axes.

An interface unit processes signals between the probe and the CNC control.

1. Stylus
2. Stylus holder for disc or square styli
3. Captive link
4. Break stem
5. Front cover
6. Probe's base holding screws
7. Stylus level alignment – adjusting screws
8. Plinth
9. Square stylus axes alignment – adjusting screws
10. Square stylus axes alignment – locking screws
11. Conduit adaptor



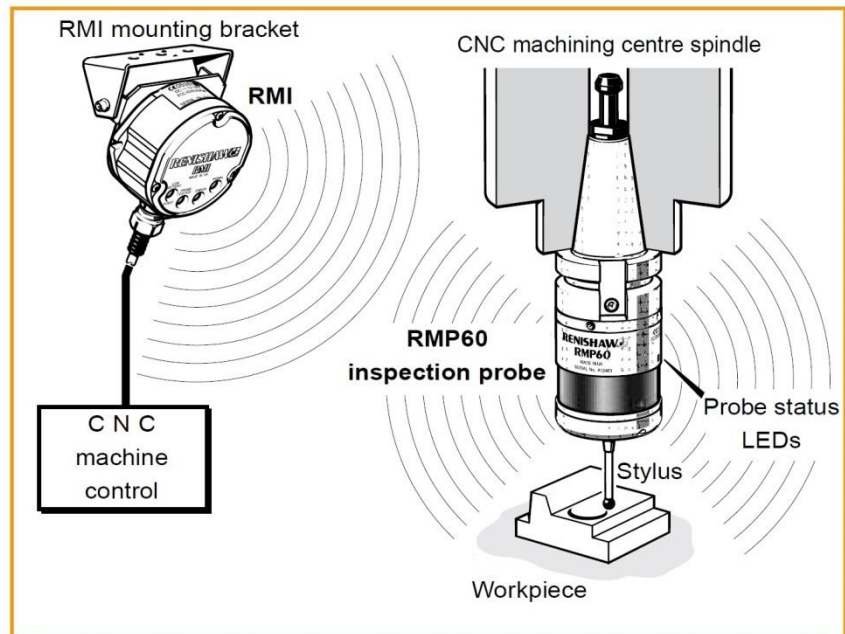
8.4. Automatic Workpiece Measuring System

RMP60 probe system with radio signal transmission.

When switched on, the probe transmits omnidirectionally for ease of operation on vertical, horizontal CNC machining centres and vertical turning lathes.

The RMI is fully described in a separate data sheet

- please see parts list on back page.



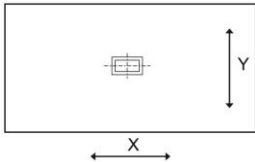
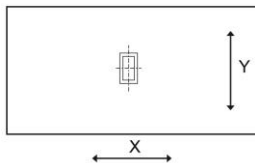
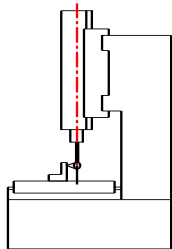
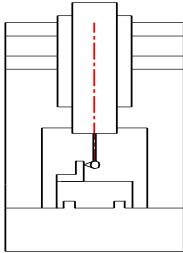
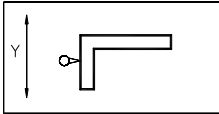
Features

- The RMP60 is a compact 3D touch-trigger probe ($\pm X$, $\pm Y$, $\pm Z$ sense directions) with radio transmission, used for workpiece set-up and inspection on small to large CNC machining centres and vertical turning lathes.
- The RMP60 transmits data omnidirectionally to a range of up to 15 m (49.2 ft).
- Ease of installation.
- A standard battery life of 140 hours continuous use, or the equivalent of approximately 100 days at 5 % usage is achievable. For applications requiring greater battery life, certain high capacity lithium thionyl chloride batteries can be used.
- Repeatability, 1.0 μm (40 μin) is certified at 480 mm/min (1.57 ft/min) with 50 mm stylus.
- Probe switch on is user configurable between M code, spin or shank.
- Probe switch off is user configurable between M code, time, spin or shank switch dependant on turn on method.
- Sealed to IPX8 for the machine tool environment, IPX5 with battery cassette removed.
- 2.4 GHz radio transmission, enables a single system for worldwide use.
- Interference-free channel hopping transmission.
- No channel selection required.
- RMP60 meets the radio regulations of:
 - Europe: CE 0536!
 - USA: FCC ID: KQGRMP60, FCC ID: KQGRMP60V2, FCC ID: KQGRMP60MV2
 - Japan: RMP60: 004NYCA0042, RMP60: 004NYCA0406, RMP60M: 004NYCA0407
 - Canada: IC: 3928A-RMP60, IC: 3928A-RMP60V2
 - Australia, China, Israel, New Zealand, Russia, Switzerland, India, South Africa, Thailand, Korea, Turkey, Indonesia, Malaysia, Mexico, Brazil, Taiwan
- Partner RMP60 and RMI systems allow interference-free multiple probe installations.
- The RMP60 is suitable for use with Renishaw single and double touch probing cycles.
- User adjustable trigger force for long/cranked styli.
- A weak link is included in each kit to protect the probe in the event of excessive stylus overtravel, when using steel styli.

9. Accuracy report

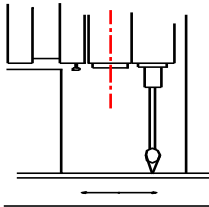
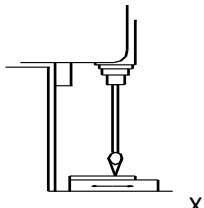
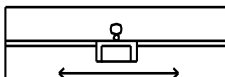
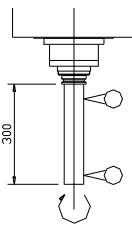
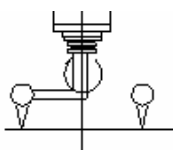
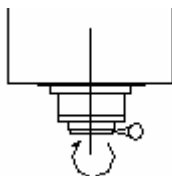
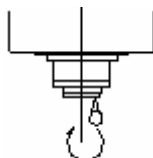
1. Geometric Accuracy Inspection

Unit: mm

No.	Item		Method	Illustration	Tolerance	Measured result
1	Straightness of table (X-axis)	XZ plane	● Move the table to the middle of X-axis stroke. ● Move the spindle head to the middle of Y-axis stroke. ● Place a level gauge on the center of table. Reset the level gauge.		1000-2000 0.05 2000-3000 0.06 3000↑ 0.07	
		YZ plane	● Move the table (along X-axial direction) to measure the straightness at three positions, center and both edges, at least. ● The maximal difference obtained is the measured result.			
2	Squareness between linear movement	XZ plane	● Move the table to the middle of X-axis stroke. ● Move the spindle head to the middle of Y-axis stroke. ● Place a square gauge parallel to X-axial direction on the table ● Fix a dial gauge on the spindle head and let its stylus touch the square gauge. ● Reset the dial gauge. ● Move spindle head along Z-axial direction and observe the variation of it. ● The maximal difference obtained is the measured result.		0.02/400	
		YZ plane	● Move the table to the center of X-axis travel. ● Move the spindle head to the center of Y-axis travel. ● Place a square gauge parallel to Y-axial direction on the table ● Fix a dial gauge on the spindle head and let its stylus touch the square gauge. ● Reset the dial gauge. ● Move spindle head along Z-axial direction and observe the variation of it. ● The maximal difference obtained is the measured result.			
		XY plane	● Move the table to the middle of X-axis stroke. ● Move the spindle head to the middle of Y-axis stroke. ● Place a square gauge parallel to X-axial direction on the table. ● Fix a dial gauge on the spindle head and let its stylus touch the square gauge. ● Reset the dial gauge. ● Move spindle head along Y-axial direction and observe the variation of it. ● The maximal difference obtained is the measured result.			



Unit: mm

No.	Item	Method	Illustration	Tolerance	Measured result
3	Parallelism between table and axis motion.	● Fix a dial gauge on the spindle head, and let its stylus touch the table surface. ● Reset this dial gauge. ● Move spindle head along Y-axial direction, and observe the variation of it. ● The maximal difference obtained is the measured result.	 Y	1000-2000 0.04 2000-3000 0.05 3000↑ 0.06	
4	Parallelism between the spindle and the X-axis motion.	● Fix a dial gauge on the spindle head, and let its stylus touch the table surface. ● Reset this dial gauge. ● Move the table along X-axial direction, and observe the variation of it. ● The maximal difference obtained is the measured result.	 X		
5	Parallelism between table movement along X-axis motion and T-slot side of the table.	● Fix a dial gauge on the spindle head, and let its stylus touch the side of T-slot on the table. ● Move the table. ● The maximal difference obtained is the measured result.		1000-2000 0.04 2000-3000 0.05 3000↑ 0.06	
6	The run-out of internal taper of the spindle	● Fix a test bar in the taper on the spindle. ● Place a dial gauge at the nearest position of spindle, and place another dial gauge at a 300mm distance from the first position. ● Reset this dial gauge. ● Rotate the spindle and observe the variation of the gauge. ● The maximal difference obtained is the measured result.	 A. the nearest position B. 300mm away A position	A: 0.005 B: 0.02	
7	Perpendicularity between spindle and table surface.	● Move the table to the middle of X-axial stroke and Y-axial travel. Fix a dial gauge on the spindle head, and let its stylus touch the table surface. ● Rotate the spindle and observe the variation of the gauge. ● The maximal difference obtained is the measured result.	 XZ Plane YZ plane	0.02/400 0.02/400	
8	Run-out of the spindle nose	● Place a stylus dial gauge to touch the surface of the outside edge of the spindle. ● Rotate the spindle and observe the variation of the gauge. The maximal difference obtained is the measured result.		0.01	
9	Run-out of the spindle face	● Place a stylus of dial gauge to touch the surface of the spindle end. ● Rotate the spindle and observe the variation of the gauge. The maximal difference obtained is the measured result.		0.01	

2. Positioning Accuracy Inspection

Unit: mm

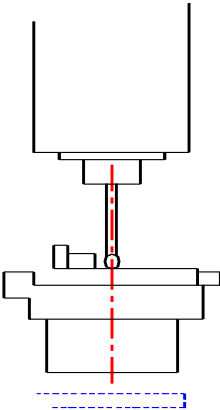
No.	Item	Method	Illustration	Tolerance	Measured result									
1	Positioning accuracy inspection	● Move the machine (spindle or table) to positive (negative) position and then stop it. ● Take this position as the norm, move the spindle to the same direction at 50% of the highest feedrate and then measure the accuracy. ● According to the table below, select specified measuring intervals and measure the difference between the actual moving distance from the norm position and the specified moving distance. ● Calculate the maximal difference within the normal distance. ● Based on the method, the maximal difference obtained is the measured result. Then, do this measurement in X, Y, and Z axial directions respectively. <table><tr><th>Motion range</th><th>Measured distance</th><th>Normal distance</th></tr><tr><td>Less than 1000</td><td>50</td><td rowspan="2">300</td></tr><tr><td>Above 1000</td><td>100</td></tr></table>	Motion range	Measured distance	Normal distance	Less than 1000	50	300	Above 1000	100		±0.015/Full stroke	X	
			Motion range	Measured distance	Normal distance									
			Less than 1000	50	300									
			Above 1000	100										
			Y											
			Z											
		Please refer to P values list for DX series in Table 1.		X										
Y														
Z														
	● Do this measure to three axes at 50% of the highest federate. There should be 6 points on every meter to measure at least. Do this measurement five times continuously. ● Analyze the obtained values statistically.													

Table 1: P values list for DX series

Model	P value(VDI 3441)(mm)	Model	P value(VDI 3441)(mm)
DX-2216	0.03	DX-3216	0.035
DX-2220	0.03	DX-3220	0.035
DX-2716	0.03	DX-4216	0.035
DX-2720	0.03	DX-4220	0.035



3. Repeatability Accuracy Inspection

Unit: mm

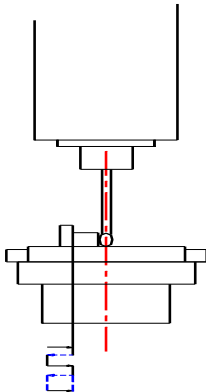
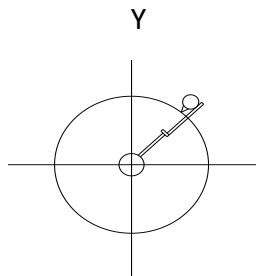
NO.	Item	Method	Illustration	Tolerance		Measured result	
1	Repeatability accuracy	- At least, Select three points (at the middle, and two ends) as normal points. - Move the spindle at 50% of the highest federate under the same setting conditions (direction). Do positioning accuracy inspections 7 times. - Find the obtained maximal differences. - Divide the maximal obtained value. It is the measured result.		±0.003	X		
					Y		
					Z		
		The same as positioning accuracy test.		Please refer to Ps values list for DX series in Table 2.	X		
					Y		
					Z		

Table 2: Ps values list for DX series

Model	Ps value (VDI 3441) (mm)	Model	Ps value (VDI 3441) (mm)
DX-2216	0.025	DX-3216	0.028
DX-2220	0.025	DX-3220	0.028
DX-2716	0.025	DX-4216	0.028
DX-2720	0.025	DX-4220	0.028

4. Circularity Inspection

Unit: mm

NO.	Item	Method	Illustration	Tolerance		Measured result
1	Circularity inspection	- Place the double bar (DDB) test device on the center of the table. - At 2000 mm/min feedrate speed and with 150mm radius, do this measurement when spindle rotates a circle CW and CCW respectively. - The difference between the maximal measured diameter and the minimal measured diameter is the measured result.		0.03/300	XY Plane	

10. Shipping requirement

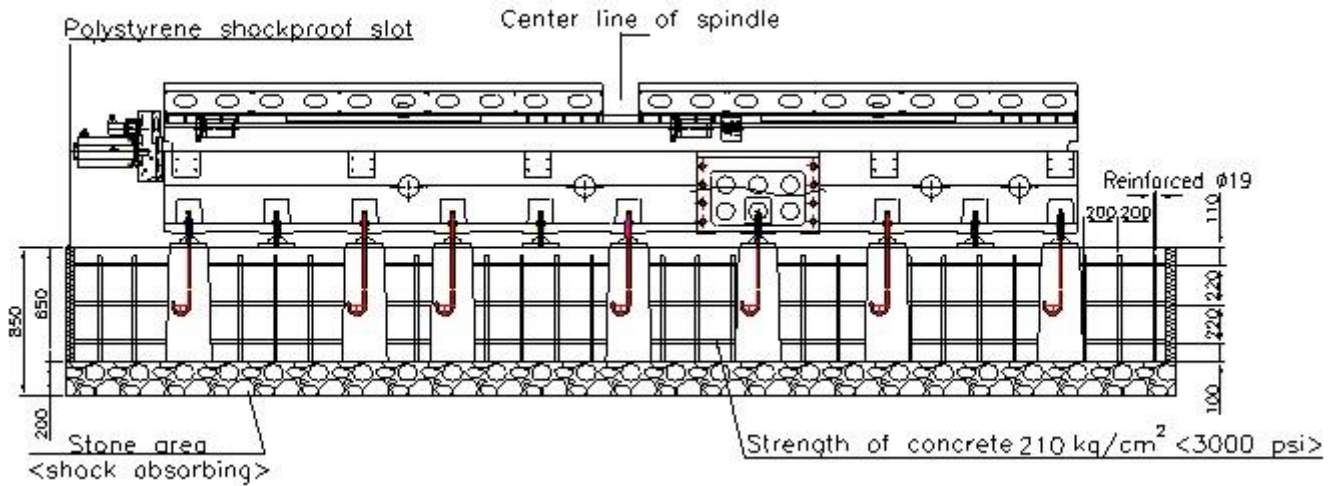
Model	Dimension (mm)			Gross weight (tons)	Container type
	Length	Width	Height		
DX-2216	6700	3650	3800	25	1x40' FR
DX-2716	8000	3650	3800	26.5	1x40' FR
DX-3216	8700	3650	3800	27	1x40' FR
DX-4216	10700	3650	3800	29	1x40' FR
DX-2220	6700	4200	3800	26	1x40' FR
DX-2720	8000	4200	3800	27.5	1x40' FR
DX-3220	8700	4200	3800	28	1x40' FR
DX-4220	10700	4200	3800	30	1x40' FR



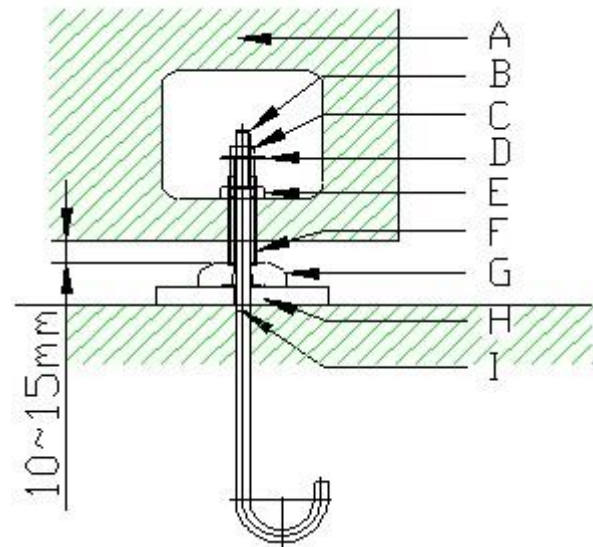
11.Foundation Plan

11.1. J Bolt

Unit: mm

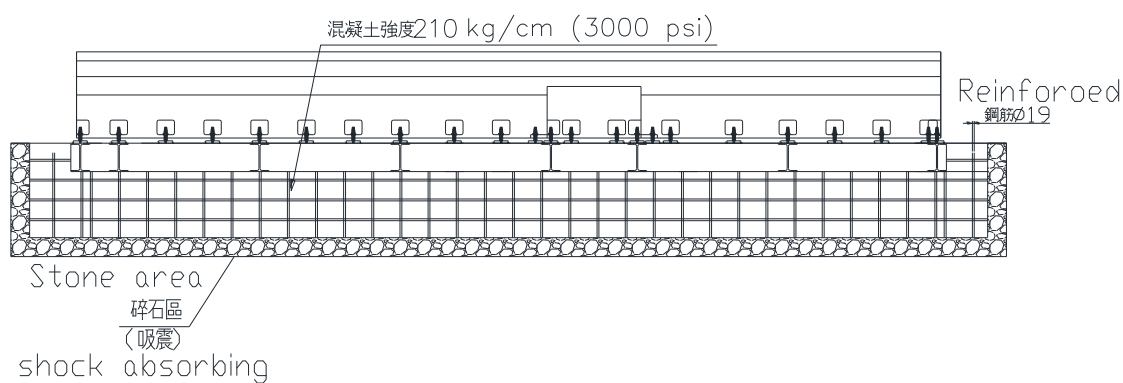


J bolt components introduction	
A	Machine base
B	J Bolt
C	M16 nut
D	M16 pad
E	M32 nut
F	Leveling screw
G	Leveling block (small)
H	Leveling block (big)
I	C-ring



11.2. H Beam

Unit: mm



H Beam components	
A	Machine Base
B	M16 Bolt
C	M16 Nut
D	M16 Pad
E	M36 Nut
F	Leveling screw
G	Leveling block (small)
H	Leveling block (big)
I	H Beam

