Chapter 3

Machine Specification

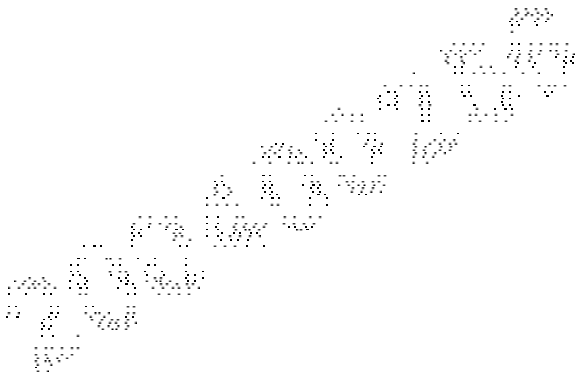
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3.1 Mechanical Specification

Machining Capacity

Description	Specification
Max. turning bar diameter (main/sub)	Φ 20.0 mm
Main spindle stroke (one chucking)	60.0 mm
Max. drilling diameter (front tool)	Φ 10.0 mm
Max. tapping capacity (front tool)	M8
Max. milling capacity (cross tool)	Φ 7.0 mm
Max. slotting capacity (cross tool)	1.5 mm (W) x 4.0 mm (D)

General Data

Description		Specification
Operating position		Right-hand operation
Combination type		Single type combining mechanical and electric parts
Dimension	L x W x H	2,258 x 1,490 x 1,758
	Center height	1,050 mm
	Gross weight	3,200 kg

Main Spindle

Description	Specification
Main spindle speed	8,000 rev/min
Speed command	S code + 4-digit command
Revolution control	Built-in spindle motor used
Resolution	1/1000 degree
Motor power	4.3 kW
Through diameter	Φ 24.0 mm

Tool

Description		Specification
No. of tools	Turning	6
	Front	5
	Back	4
	Cross driven tool	4
	Off-center drill	2
Tool shank (mm)		□12x85
Cross Driven Tool unit	Speed	6,000 rev/min
	Speed command	S code + 4-digit command
	Motor power	1.6 kW
Back tool unit	Speed	6,000 rev/min
	Speed command	S code + 4-digit command
	Motor power	1.6 kW

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Collet Chuck

Description		Specification
Collet chuck	Main spindle	HANWHA specification
	Sub-spindle	U.S.A./Europe : 145E (NP17 for Korea)

Coolant Unit

Description	Specification
Installation type	Standalone
Coolant tank capacity	170ℓ
Coolant pump power	0.4 kW
Interlock	Flow rate detector in pipe
Coolant type	Non-water soluble

Lubricant Unit

Description	Specification
Lubrication position	Ball screw, LM guide, etc.
Lubricant displacement (consumption)	4.0 cc/30 Min
Lubricant tank capacity	1.8ℓ
Lubricant pump power	5w
Interlock	Continuous level detector
Lubricant type	Viscosity : ISO VG68

Sub-spindle

Description	Specification
Max. chucking capacity	Φ 20.0 mm
Max. front ejection capacity	70.0 mm
Spindle speed	8,000 rev/min
Revolution control	S code + 4-digit command
Motor power	3.8 kW
Through diameter of spindle	Φ 24.0 mm

Front Tool

Description	Specification
No. of tools	5
Max. drilling capacity	Φ 10.0 mm [ER16M]
Max. tapping capacity	M8 [ER16M]

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Cross Driven Tool

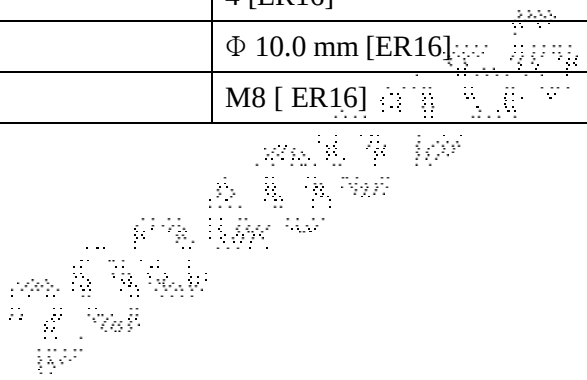
Description	Specification
No. of tools	4 [ER16M]
Max. drilling capacity	Φ 10.0 mm [ER16M]
Max. tapping capacity	M6 [ER16M]
Slotting capacity	1.5 mm (W) x 4.0 mm (D)

Off-center Drill

Description	Specification
No. of tools	2
Max. drilling capacity	Φ 10.0 mm [ER16]
Max. tapping capacity	M8 [ER16]

Back Tool

Description	Specification
No. of tools	4 [ER16]
Max. drilling capacity	Φ 10.0 mm [ER16]
Max. tapping capacity	M8 [ER16]



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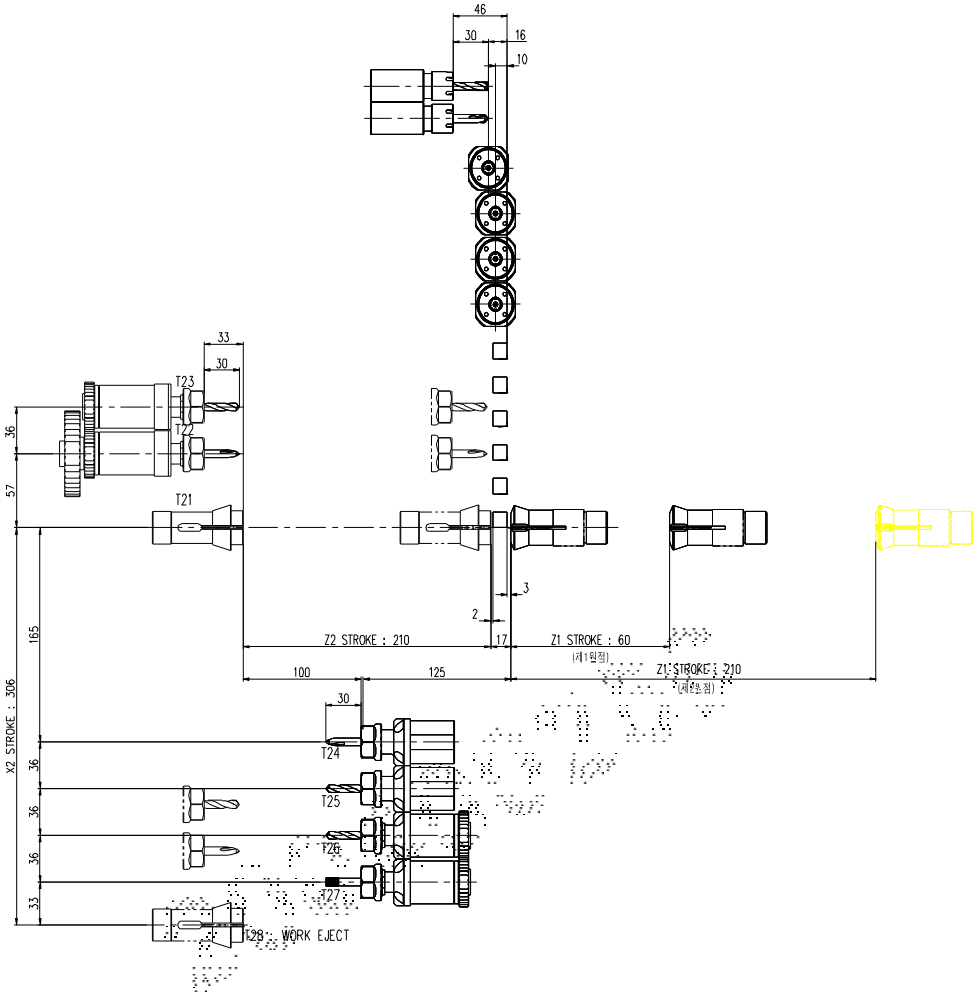
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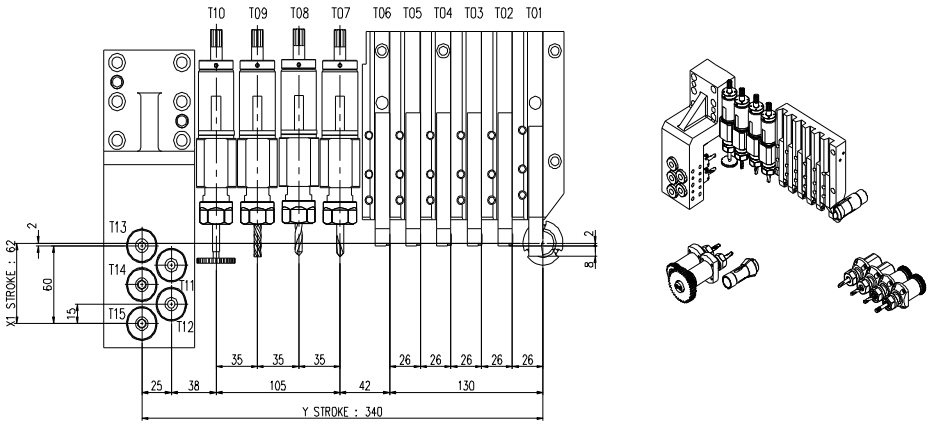
3.2 Electric Specification

No.	Description	Specification
1	Contol axis	Four axes by system
2	Simultaneous control axis	Two axes by system
3	Axis designation	X1, Z1, Y, X2, Z2
4	Spindle motor (main)	4.3 kW (Max. 8,000 rpm)
5	Spindle motor (sub)	3.8 kW (Max. 8,000 rpm)
6	X1, Z1, Y, X2 and Z1 servo motors	0.94 kW
7	Min. setting unit	0.001 mm, 0.001 degree, 0.0001 inch
8	Min. setting unit	0.0001 mm, 0.0001 degree, 0.00001 inch
9	Max. command value	±8 columns
10	Interpolation	Linear/circular
11	Rapid feed speed (Z1, Z2, Y, X2)	32.0 m/min
12	Rapid feed speed (X1)	20.0 m/min
13	Feed speed override	0-150% (10% step)
14	Dwell	G04 0-9999.999 sec
15	Machine/work coordinate	○
16	Optional block skip	○
17	Single block	○
18	Dry run	○
19	No. of tool compensation	32
20	Actual speed display	○
21	Program number search	○
22	Sequence number search	○
23	Feed hold	○
24	Machine lock	○
25	Manual feed (jog)	○
26	Alarm indication	○
27	Program protection	○
28	Memory (tape memory)	80M
29	Buil-in test function	○
30	Overtravel check	○
31	Auxiliary function (M code)	M+3 columns
32	Main spindle function (S code)	S+4 columns
33	Sub-spindle function (S code)	S+4 columns
34	Tool function (T code)	T+4 columns
35	Indication of run time/number of parts	○
36	Work counter	M97
37	Automatic shutdown	○
38	Bar feed unit interface	○
39	3-stage indicator	Red/Yellow/Green
40	Door safety switch	○
41	Inch/metric conversion	○
42	MDI operation	○
43	Worklight	○
44	Background edit	○
45	Constant surface speed control	○
46	Threading cycle	○

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3.3 Tool Layout





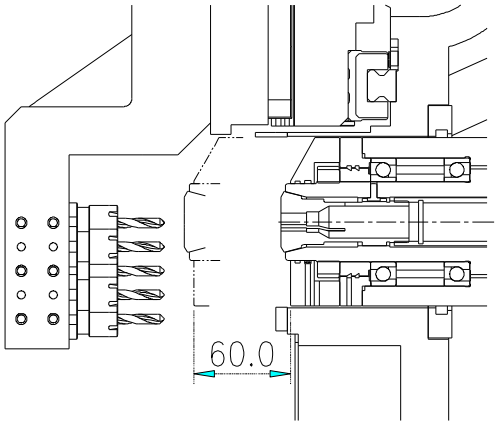
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3.4 Stroke

3.4.1 Main Spindle Stroke

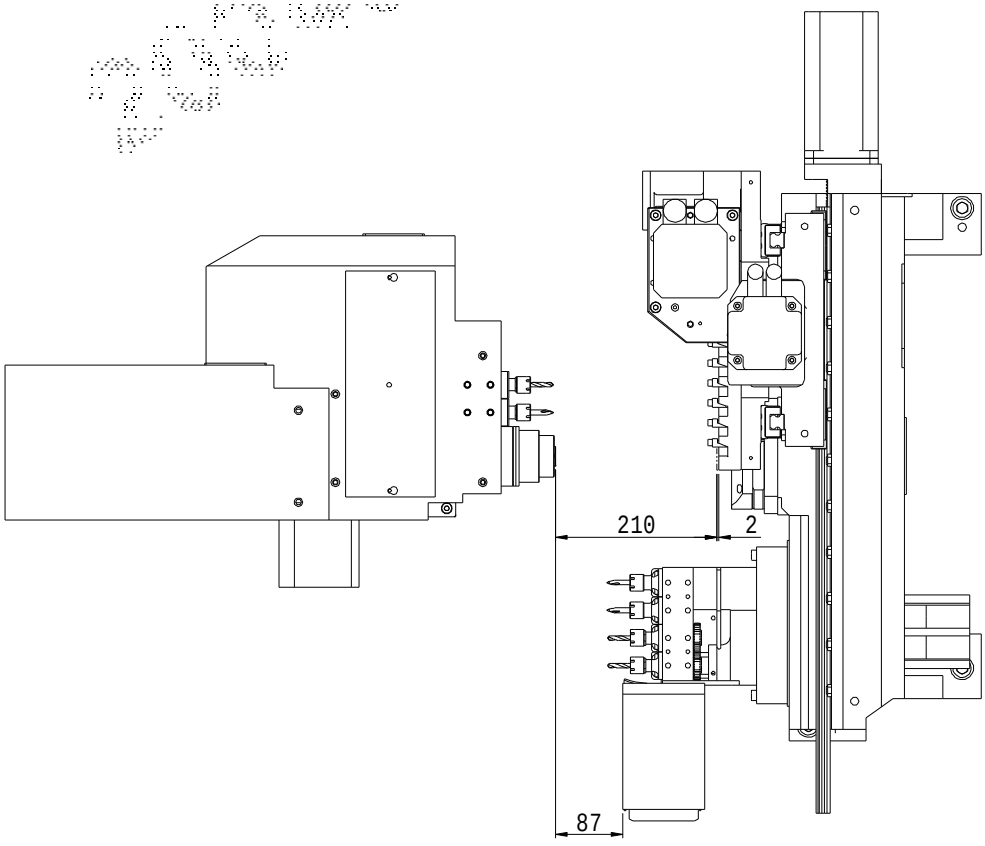
A stroke for the use of full stroke main spindle is 60mm.



3.4.2 Sub-spindle Stroke

3.4.2.1 Cut-off or Work Ejection

A stroke of the sub-spindle is 210 mm. The sub-spindle provides a stroke of 87 mm up to the work receiver during work ejection. The point where Z2 axis is zero is 2 mm away from the width of a bite to avoid collision.

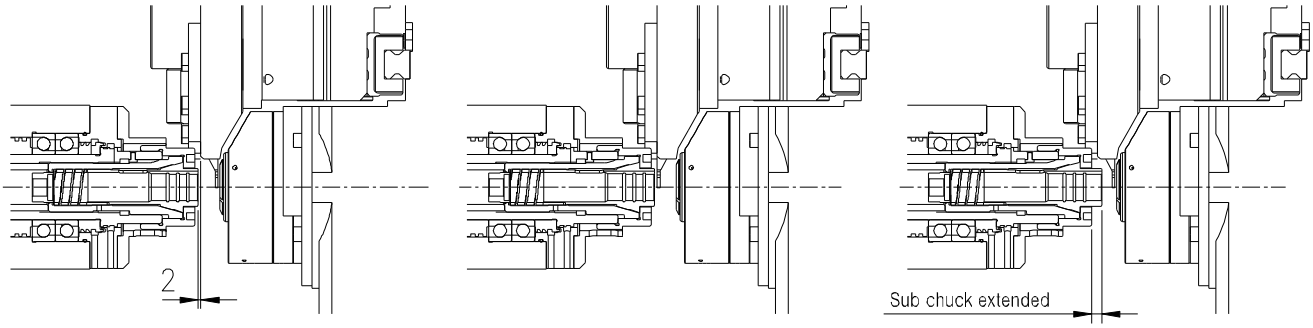


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There are two ways to cut off a workpiece whose whole length is shorter than the width of a bite:

1) Cut off a workpiece with the bite separated from the end of the main collet.
2) Cut off a workpiece in a single piece with the end of the sub chuck extended.

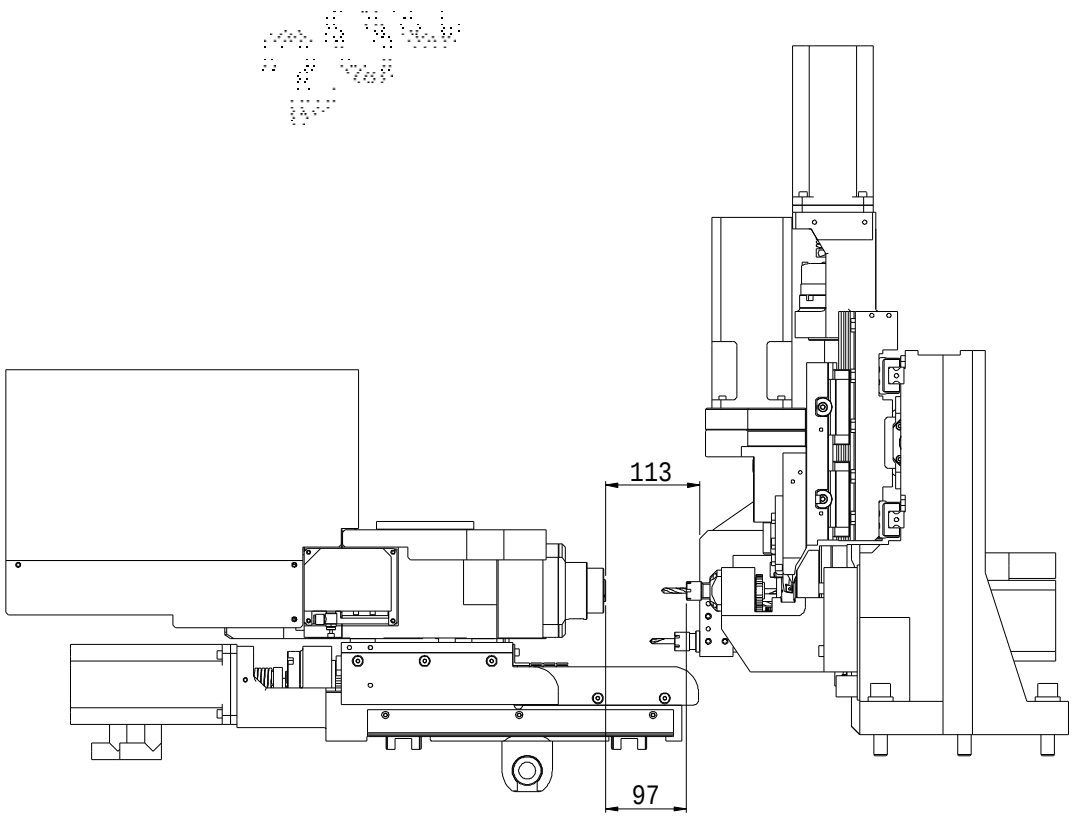


Standard Bite | Backward Bite | Special Sub Chuck

Whole length is longer than 14mm. | Whole length is shorter than 14mm

3.4.2.2 Back Machining with Sub-spindle

The strokes of the sub-spindle for the front and back tool posts are 113 mm and 97 mm respectively. Thus, actual cutting distance is shorter than the distance when back cutting is performed with a workpiece cut from the sub-spindle. In consideration of an extrusion length of the drill holder and a workpiece length fixed to the sub-spindle, the cutting distance is even shorter than their strokes. Take care of the distance when setting or programming is performed.



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3.4.3 Tool Post Stroke

3.4.3.1 X1 Axis Stroke

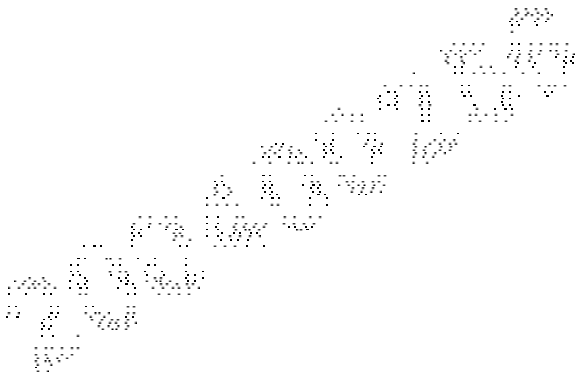
As the figure shown below, a whole stroke for OD and ID tools is 62 mm. For each distance among tool posts, see Chapter 3 Tool Layout.

3.4.3.2 Y Axis Stroke

A total distance among tool posts is 340 mm. For each distance among tool posts, see Chapter 3 Tool Layout.

3.4.3.3 X2 Axis Stroke

A total distance among tool posts is 306 mm. For each distance among tool posts, see Chapter 3 Tool Layout.



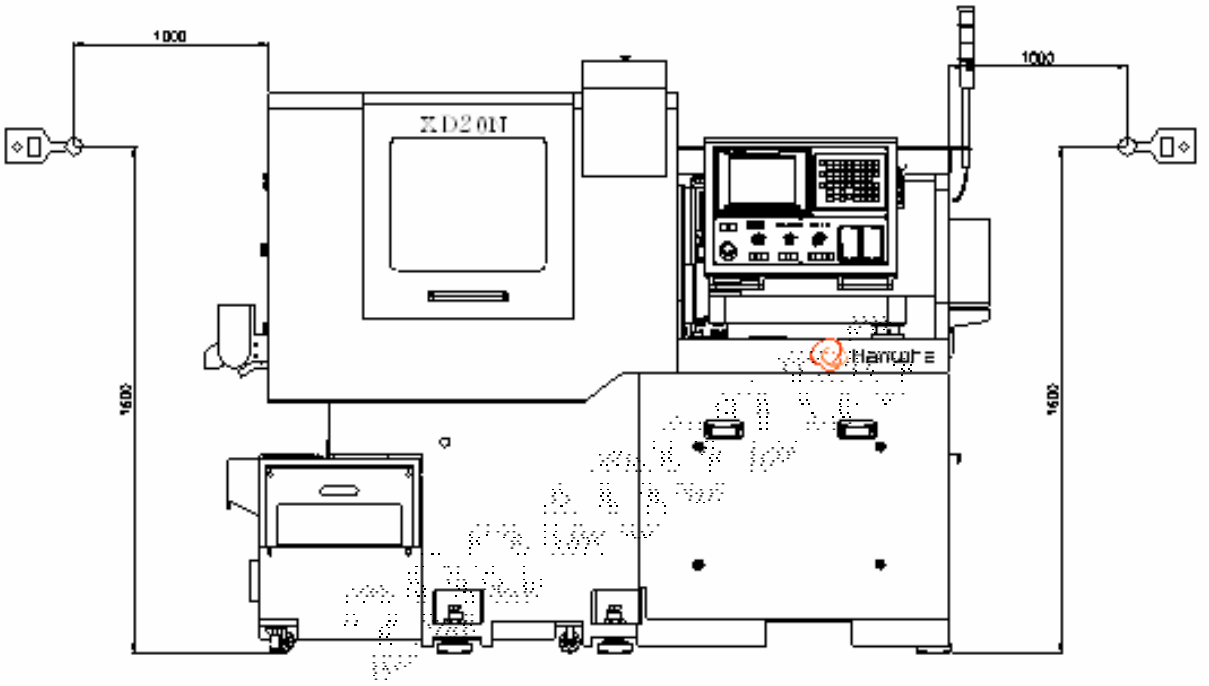
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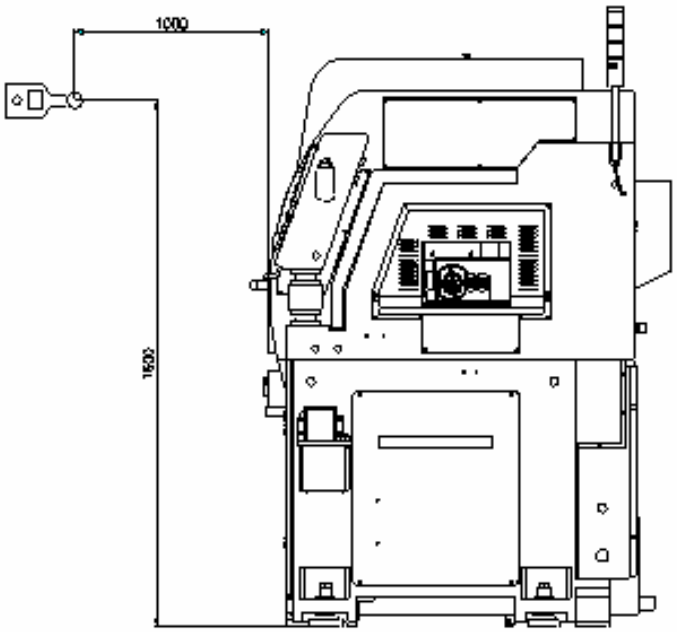
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3.5 Noise Criteria

The following provides the inspection criteria and methods under zero load condition.

- Inspection condition : 10,000 rpm.
- Inspection position of measuring device : Straight distance of 1,000 mm from four sides of the machine
  Height of 1,600 mm from the floor which the machine is installed on.
- Inspection result (criteria) : below 70 dB





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