

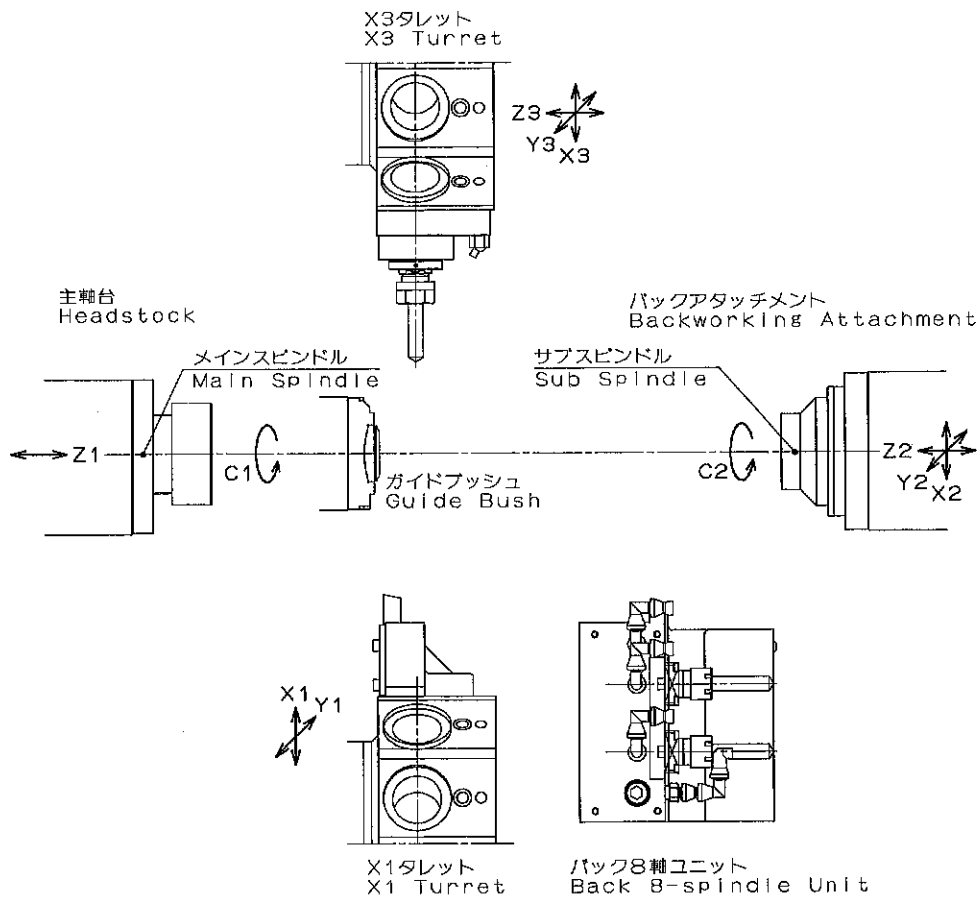
■ Caution for coolant use

**NOTICE**

- Use a coolant according to directions of a coolant oil maker about the quality, degradation, and exchange time of coolant, and carry out abandonment processing whether water soluble or non-water soluble.
- In case of generating much coolant mist according to material or machining condition, install a mist collector to exhaust mist to outside of machine. In addition, concerning the installation of mist collector, refer to the installation manual "4-3 Installation of the Optional Accessories ■ Reference dimensional drawing for mist collector".
- This machine performs sealing to a rotation part etc. and invasion of the coolant may be prevented so that water-soluble coolant can be used. However, as compared with the case of using non-water-soluble coolant, the life of bearing which is being used for power-driven tool unit or revolving guide bush unit becomes short. In addition, when you stop a machine for a long period, please remove the coolant from the main part of a machine, each unit especially a rotation part and guide way, and rustproof those parts.

### 3. Operation Principles

This is the sliding headstock type CNC automatic lathe and it is composed of the following main attachments.



#### ■ Headstock

The headstock comprises the main spindle and sliding unit. The main spindle chucks a bar with the collet and gives it a rotary motion, and the sliding unit gives it reciprocating motion in the Z1-axis direction (longitudinal) with the CNC control. Feeding motion of a bar in the Z1-axis direction is given by the headstock during front machining.

#### NOTICE

- Front machining ..... The machining by the main spindle and X1 / X3 turret.
- Back machining ..... The machining by the sub spindle and the back 8-spindle unit or X3 turret.

## ■ Turret

Two turrets have 10 stations respectively to install tools and execute indexing.

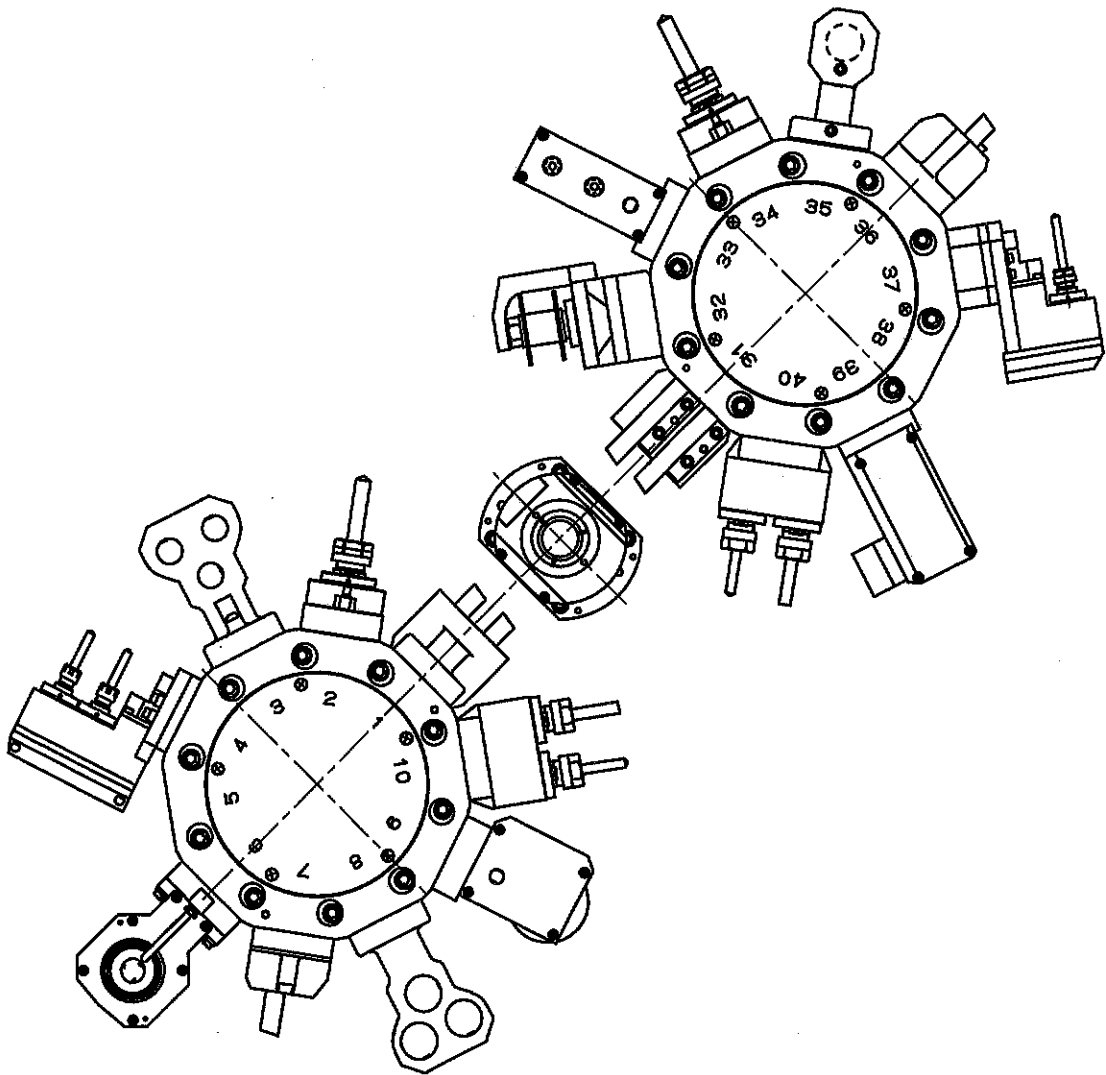
And each turret (X1 / X3) is equipped with a sliding unit that gives reciprocation motion by CNC control. Reciprocation motion is possible in the direction of X1-axis (diametric) and Y1-axis (vertical) at X1 turret, and also in the direction of X3-axis (diametric), Y3-axis (vertical) and Z3-axis (longitudinal) at X3 turret.

Turret feeds the material in direction of diametric and vertical when machining by turret. And Z3-axis can chose the machining point in longitudinal direction at X3 turret.

This unit makes the cutting tool contact the material to perform front/back machining cooperating with the headstock or the back attachment.

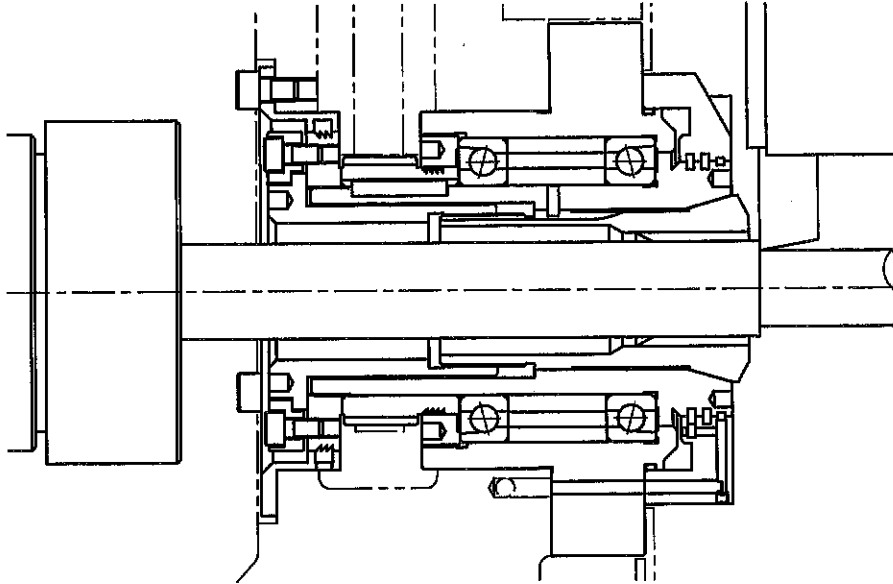
Power-driven tool and stationary tool unit, such as tool holder or sleeve holder will be attached to the turret. Cutting tools will be attached to the tool holder to perform turning.

Various sleeves will be attached to the sleeve holder to perform front/back side drilling, tapping, die cutting and boring. And drilling unit, tapping unit, milling unit and metal saw will attach to the power-driven tool to perform each machining (including skewed hole drilling and cross drilling) on front and backside.



## ■ Guide bush

The guide bush supports a bar near the machining position to prevent it from bending due to cutting load, and enables the high accurate machining. In this machine, the guide bush supports most of the cutting load of diametric direction in front machining, and the machining accuracy mostly depends on the clearance between the guide bush and bar. Therefore it's required to choose a bar having high-precise outer diameter. This machine is provided with the revolving guide bush that synchronizes with the main spindle.



## ■ Back attachment

The back attachment comprises the sub spindle and sliding unit.

The sub spindle chucks a bar which is being machined or machining completed at front with the collet and gives a rotary motion, and the sliding unit gives reciprocating motion in the direction of X2-axis (diametric), Y2-axis (vertical) and Z2-axis (longitudinal) by the CNC control. The back attachment feeds a bar in back machining and also feeds in the direction of X2-axis, Y2-axis in tool selection for back 8-spindle unit. A role of the back attachment is roughly classified as follows.

- Non-pip machining

The back attachment chucks a bar with the collet, proceeds a cutting off with performing a synchronous rotation with the main spindle. By doing this, it makes the cut-off surface without dowel.

- Z1-Z2 synchronous control

The back attachment chucks a bar with the collet simultaneously with the main spindle during front machining, and performs a synchronous movement in the Z1/Z2-axis direction. Also it rotates in the synchronization with a main spindle, so that prevents the bar from warping, expecting high precision machining and heavy machining.

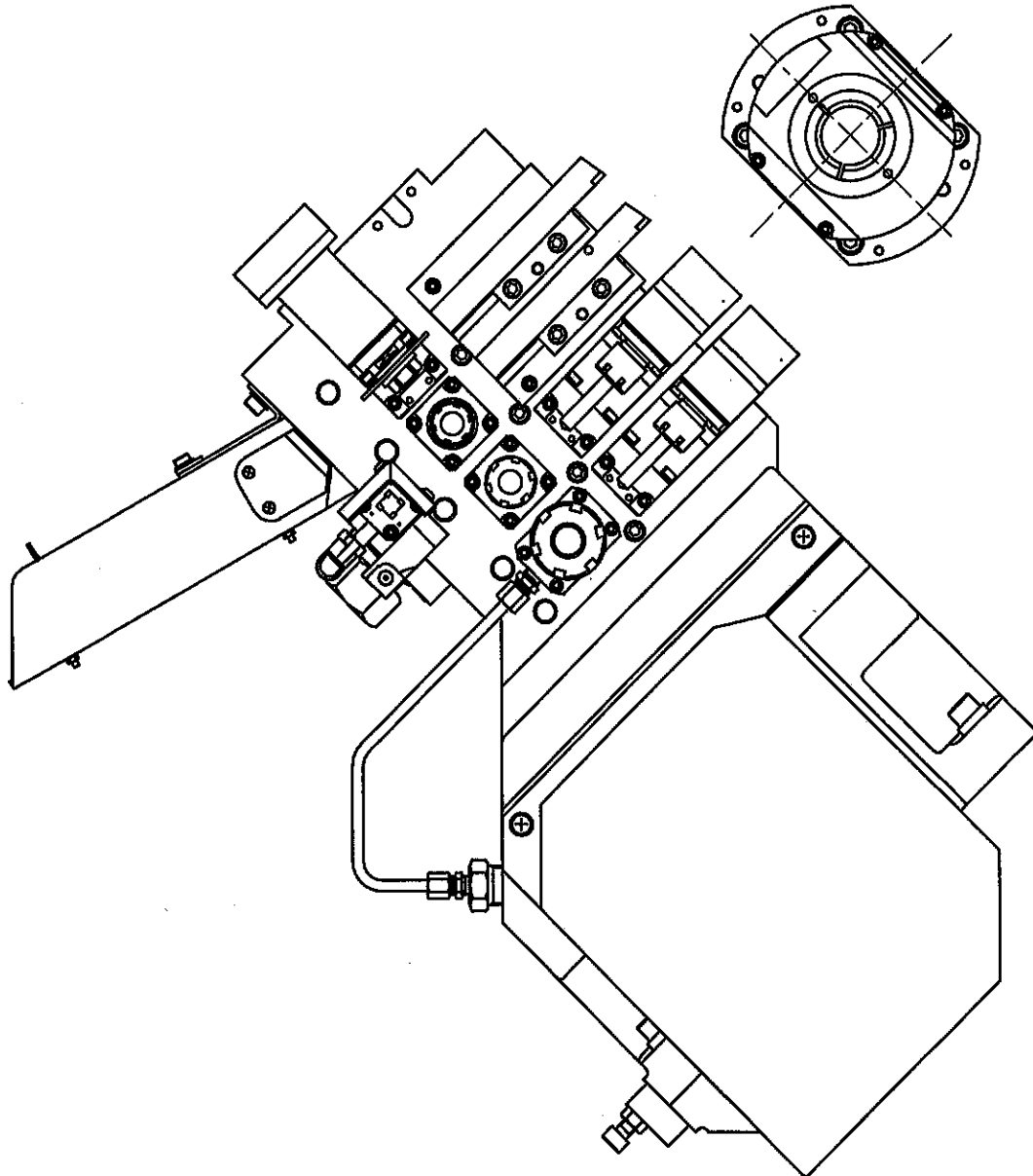
- Back machining

The back attachment performs the back machining for the cutting-end surface and periphery of it cooperating with X3 turret and the back 8-spindle unit.

### ■ Back 8-spindle unit

This has 8 stations to install tools, and performs the back machining at cut-off surface and around that cooperating with the back attachment. Stationary tool units such as tool holders and sleeves and power-driven tools can be attached to this unit. Turning is possible by using the tool holder (back). Various tools can be attached to the sleeve to perform drilling, tapping, boring at back. Drilling unit, tapping unit, milling unit and metal saw will attach to the power-driven tool to perform each machining on backside.

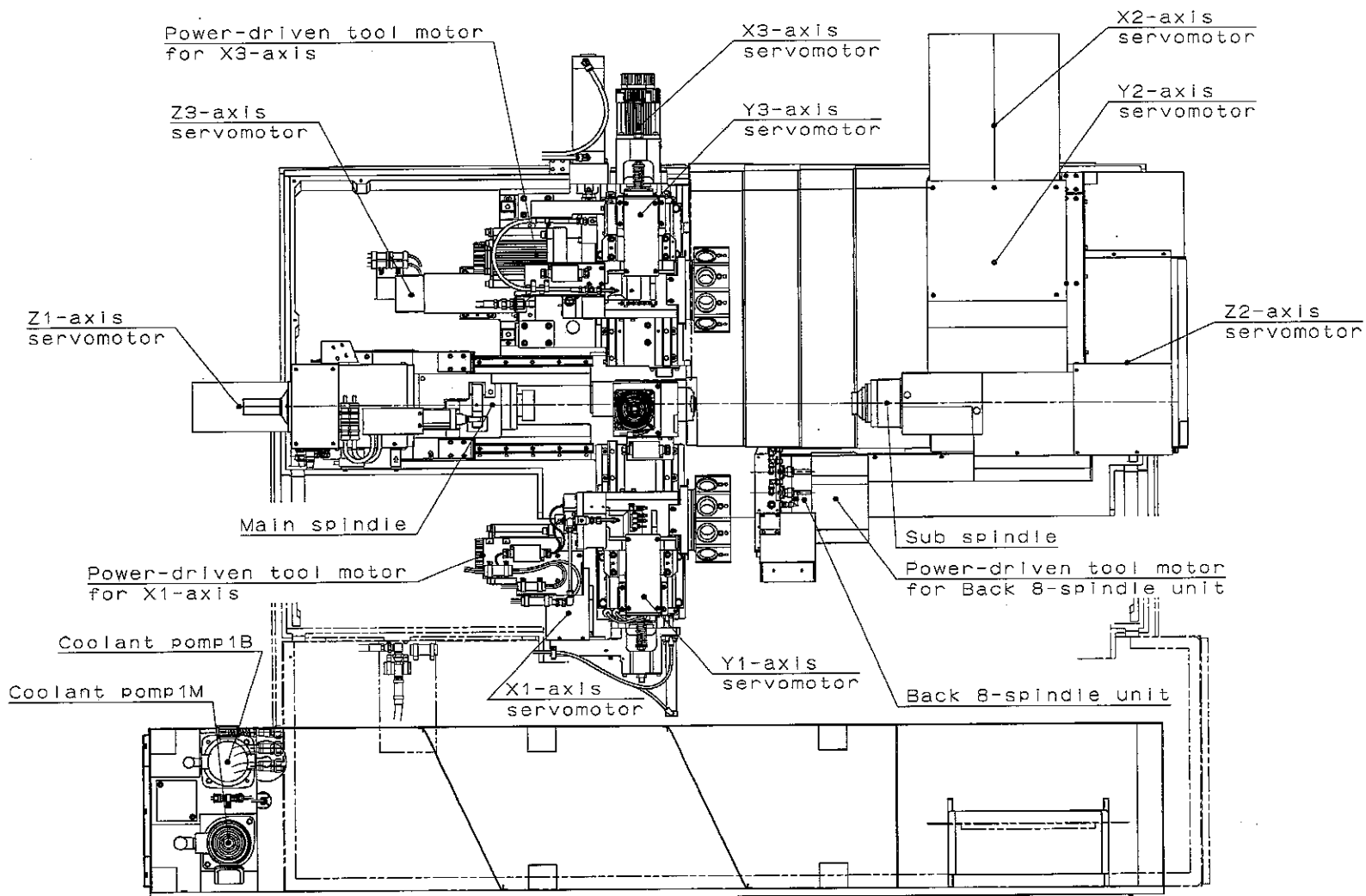
The sub spindle gives a rotary motion for a material and the tool selection is performed at X2 and Y2-axis.



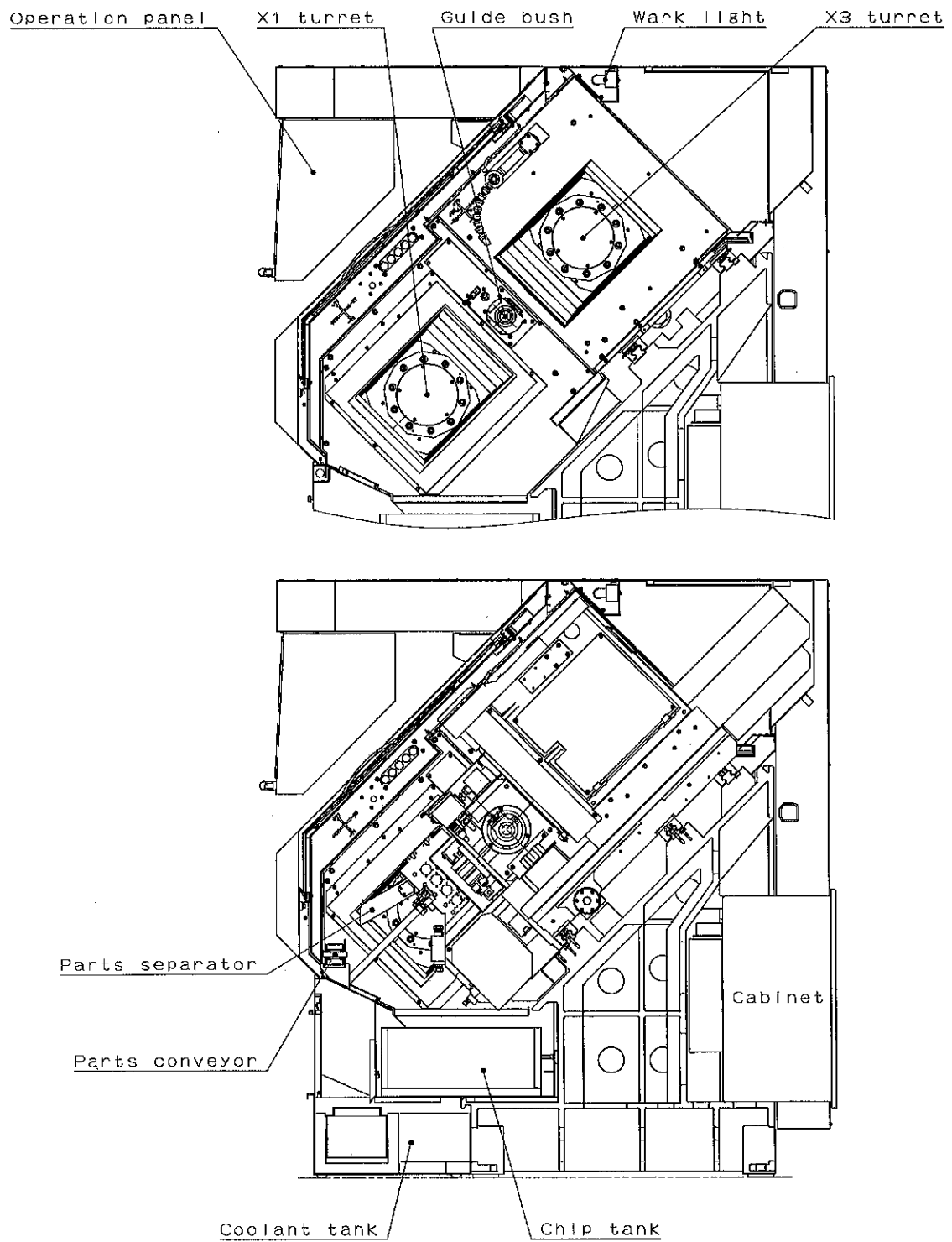
# 4. Product Functions and Specifications

## 4-1 General Structure

General structure-1

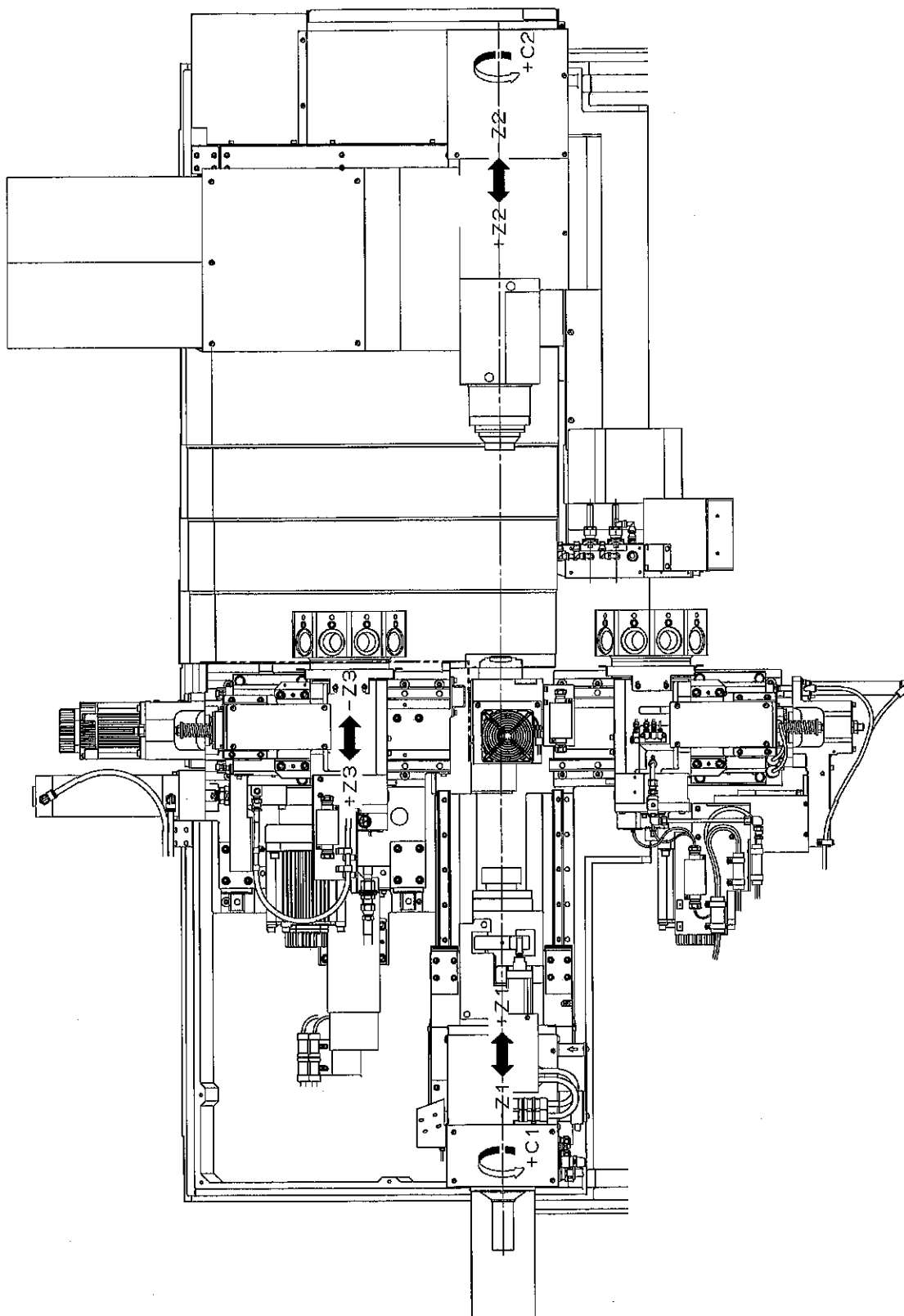


## General structure-2



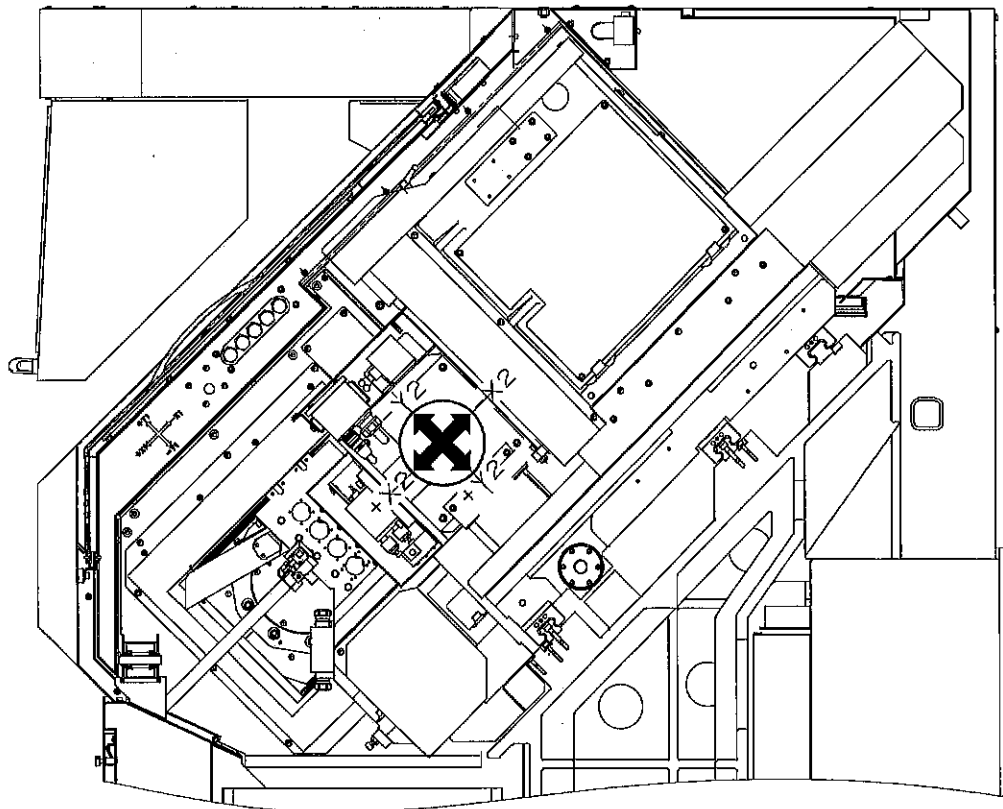
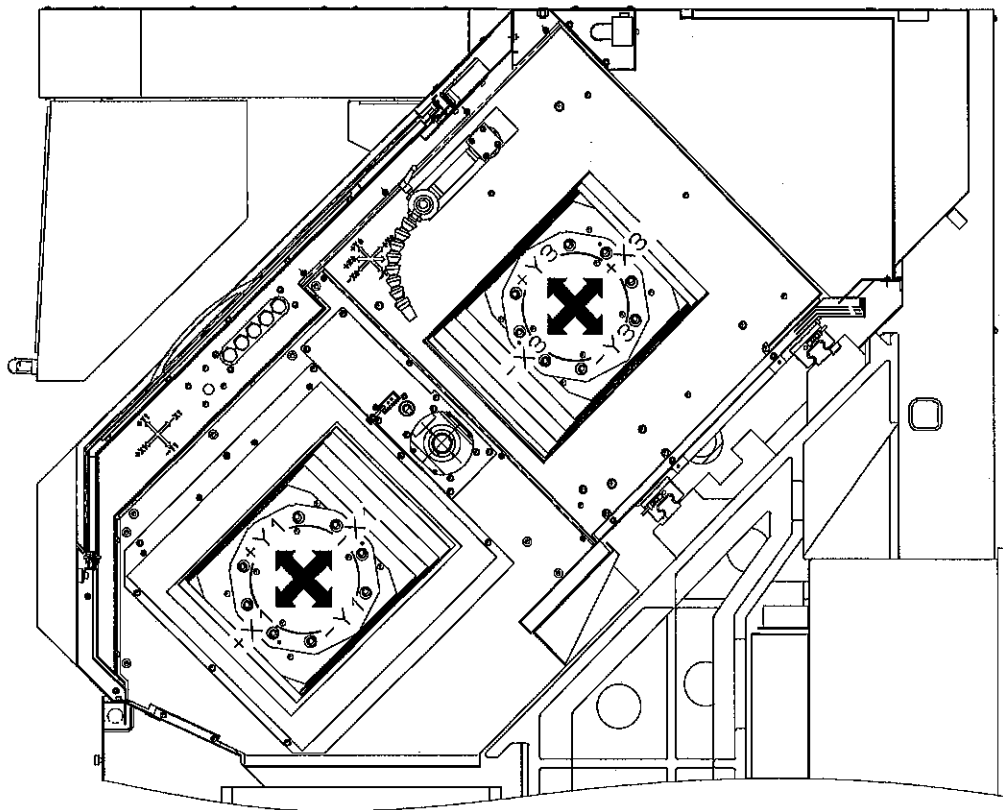
## 4-2 Control Axis Configuration Diagram

Control axis configuration diagram-1



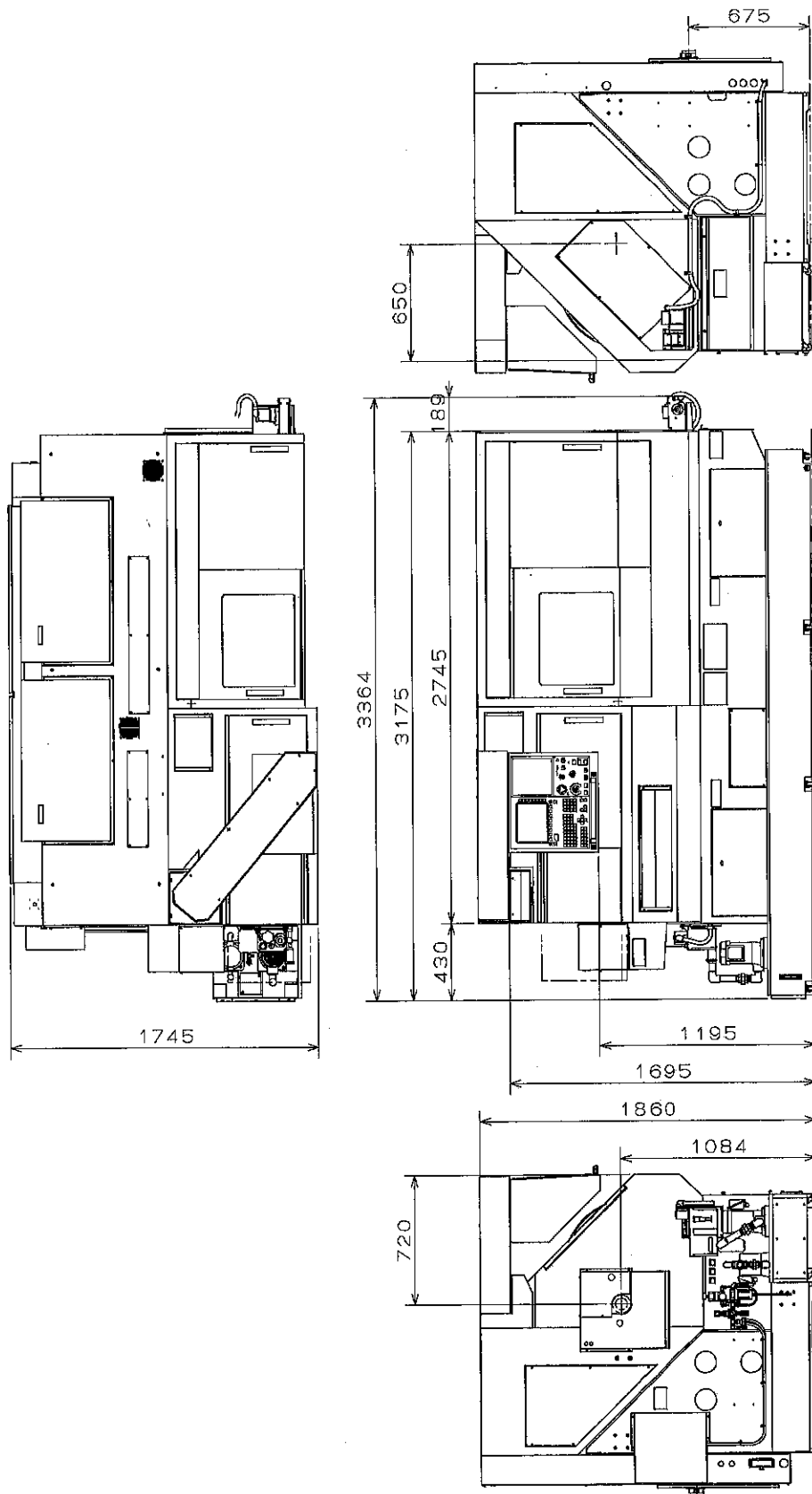


Control axis configuration diagram-2

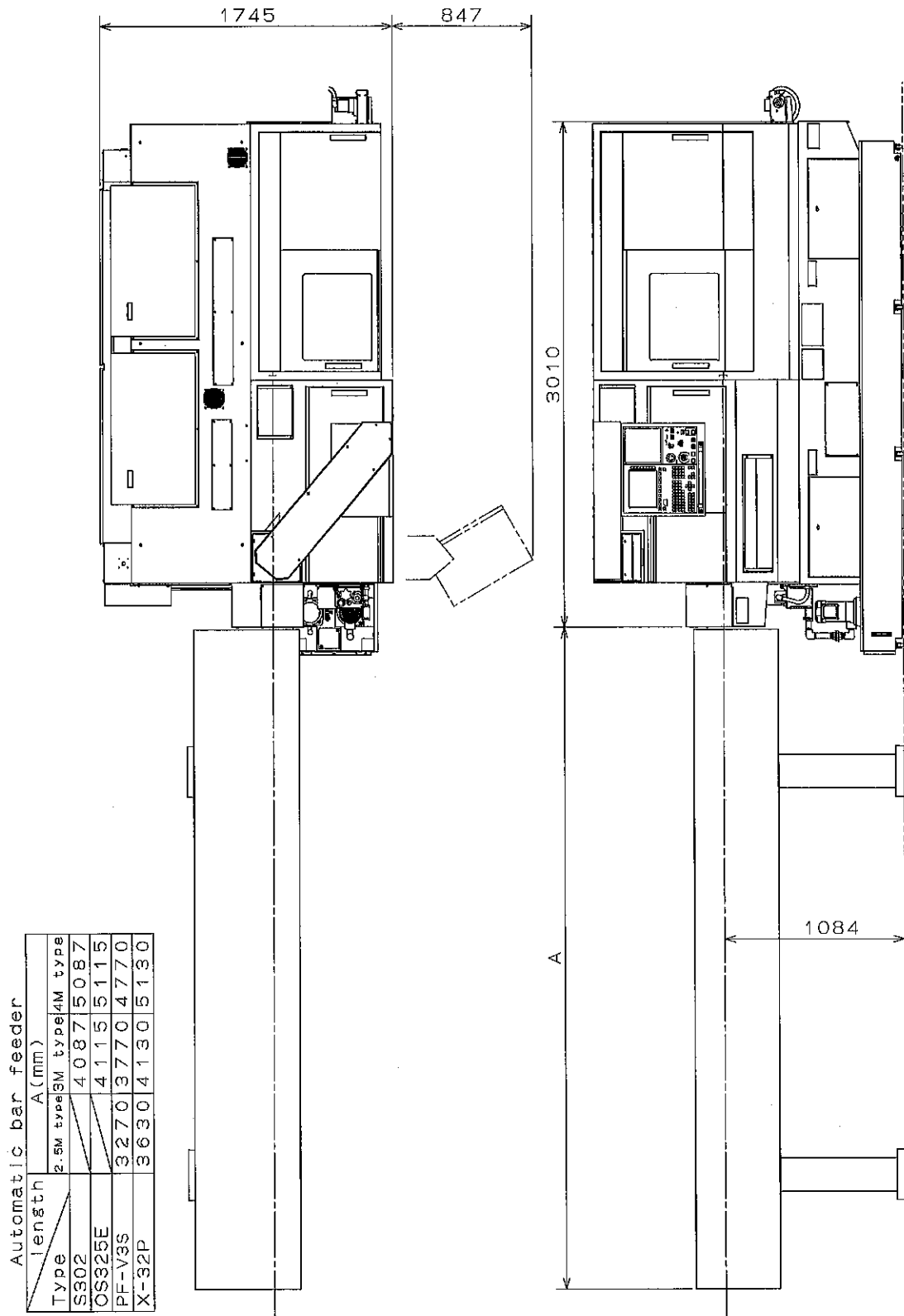


### 4-3 External Dimensions

External dimensions-1



# External dimensions-2



## 4-4 Machine Specifications

### ■ Control axis specifications

Item	Specifications	
Rapid feed rate	X1, X2, X3, Y2, Z1, Z2, Z3,	20000mm/min
	Y1, Y3	15000mm/min
	C1, C2	194400°/min (540min <sup>-1</sup> )
Maximum turning feed rate	X1, Y1, Z1, , X2, Y2, Z2, X3, Y3, Z3	10000mm/min
	C1, C2	10000°/min (27.8min <sup>-1</sup> )
Minimum input increment	X1, X2, X3	0.001mm/0.0001inch (diameter)
	Y1, Y2, Y3	0.001mm/0.0001inch
	Z1, Z2, Z3	
	C1, C2	0.001°

### ■ Machining capability

#### NOTICE

- The following machining capabilities apply to SUS 303 material (Stainless steel).
- The machining capabilities may differ from the listed data depending on the machining conditions such as the material or tools to be used.
- Tool units are optional.

Item	Specifications	Remarks
Maximum machining diameter	φ32mm (1-1/4 inch)	
Maximum headstock stroke (Z1-stroke)	standard	1 chuck stroke
	Rotary Magic Guide Bush attached	
Maximum drilling capability	Stationary tool	In case of over φ13mm, preparing hole φ8mm or more required.
	Power-driven tool	
Maximum tapping capability	Stationary tool	In case of over M8, use the tap for deep hole.
	Power-driven tool	
Maximum milling capability	φ 12mm (1/2 inch)	
Maximum die cutting capability	M12×P1.75	
Maximum slotting capability	2mm width×10mm depth	1 cutter use

### ■ Machine configuration

Item	Specifications	Remarks	
Operation mode	Right-handed machine		
Machine configuration	Integrated mechanical/electrical/hydraulic structure		
Dimensions	L×W×H	Incl. leveling pad	
	Center height		1084mm
	Weight		Approx. 5700kg

■ Main spindle

Item	Specifications	Remarks
Spindle speed	Max.7000min <sup>-1</sup>	
Speed control	S code + direct 4-digit command.	
Main spindle rotational control	AC spindle drive	
Indexing Angle	0.01° (C-axis control)	
Main spindle motor	5.5kW (CONT.) / 7.5kW (5 min/50%ED)	

■ Tool post

**NOTICE**

- Tool units are optional.

Item		Specifications	Remarks
Type		10 stations turret × 2	
Number of tools	Cutting tool	Max.2-tools per 1 station (□16mm · 5/8inch)	Refer to the Tooling system
	Sleeve	Max.3-tools per 1 station	
	Power-driven tool	Max.2-tools per 1 station (installable on all 10 stations)	
Tool selection		Servo motor (Short cut indexing)	
Power driven tool	Spindle speed	Max.5700 min <sup>-1</sup>	
	Speed control	S code + Direct 4-digit command.	
	Rotational control	AC servo drive	
	Motor	1.8kW	

## ■ Back attachment

### NOTICE

- The following machining capabilities apply to SUS303 material (Stainless steel).
- The machining capabilities may differ from the listed data depending on the machining conditions such as the material or tools to be used.
- Tool units are available as option.

Item		Specifications	Remarks	
Pickup capability	Maximum chucking diameter	φ32mm (1-1/4 inch)		
	Maximum pickup part length	150mm (5-7/8 inch)		
	Maximum part projection length	100mm (3-15/16 inch)	Distance from the sub spindle cap end	
	Maximum part insert length	125mm (4-29/32 inch)		
Spindle specifications	Spindle speed	Max.7000min <sup>-1</sup>		
	Speed control	S code + Direct 4-digit command		
	Rotational control	AC spindle drive		
	Minimum Indexing angle	0.01° (C-axis control)		
	Sub spindle motor	2.2 kW (CONT.) / 3.7 kW (15min/50%ED)		
Machining capability	Number of tool		8 tools	
	Cutting tool		Max.4-tools (□16mm·5/8inch)	
	Maximum drilling capability	Stationary tool	φ13mm (1/2 inch)	Refer to the Tooling system
		Power-driven tool	φ 8mm (5/16 inch)	
	Maximum tapping capability	Stationary tool	M10 × P1.5	
		Power-driven tool	M6 × P1.0	
	Maximum milling capability		φ10mm (25/64inch)	
	Power-driven tool	Spindle speed	Max.6000min <sup>-1</sup>	In case of over M8, use the tap for deep hole.
		Speed control	S code + Direct 4-digit command	
		Rotational control	AC servo drive	
Drive motor		1.3kW		

## ■ Coolant unit

Item	Specifications	Remarks
Installation method	Separately installed outside the machine	
Coolant tank capacity	230 L	
Coolant motor	0.4 kW	For turrets
	0.25kW	For the back 8-spindle unit
Safety device	Coolant level detector	Detecting the shortage of coolant in the tank
	Coolant flow detector	Detecting the shortage of coolant flow <[58459] Option>
Coolant	Water-soluble/Non water-soluble	

■ Hydraulic unit specifications for Turrets

Item	Specifications	Remarks
Installation method	Installed on machine body	
Coolant tank capacity	2.0L	
Normal air pressure	0.1MPa	
Safety device	Hydraulic oil level detector	Detects the lack of Hydraulic oil in the tank
	Hydraulic pressure detection switch	Detects the lack of pressure in the tank
Hydraulic oil	Mineral hydraulic oil Viscosity grade: ISO VG10	Recommended oil: Mobil Velocity oil No.6

■ Pneumatic unit

Item	Specifications	Remarks
Normal pressure	0.5MPa	User supplies compressed air source.
Piping bore	Rc1/4	
Air consumption	4.1m <sup>3</sup> /h (ANR)	This is based on a value in case of 10 sec. air blow per minute and air purge use. It dose not include a value used at the bar feeder.

■ Lubrication unit

Item	Specifications	Remarks
Lubrication parts	Rectilinear guide bearing portion, Sliding part, Ball Screw	
Oil discharge amount	5.5 cm <sup>3</sup> /30 min	
Tank capacity	4.0 L	Effectual capacity: 3.0L
Pump motor	3W	
Safety device	Lubrication oil level detector	Detects the lack of lubricating oil in the tank
Lubrication oil	Sliding surface lubricant: Viscosity grade: ISO VG68	Recommended oil: Mobil Vactra oil No. 2SLC

■ Power supply

Item	Specifications	Remarks
Power supply	Voltage	3 phase AC200V ±10%
	Frequency	50/60Hz ±1Hz
	Capacity	Average 8.0KVA

## 4-5 Standard Accessories

- CNC unit (Yaskawa Siemens 840DI)
- Operation panel & 10.4inch color TFT display
- Manual pulse generator
- Pneumatic unit
- Stand-alone-type coolant tank
- Coolant level detector (Low level)
- Automatic centralized lubrication unit with oil level detector
- Door interlock unit
- C-axis control unit (Main spindle, Sub spindle)
- Spindle clamp unit (Main spindle, Sub spindle)
- Broken cutoff tool detector
- Back attachment
- Back 8-spindle unit (Backworking Tool Post)
- Sub spindle Air Blow Unit
- Parts Ejection Detector
- Main/Sub collet (MR32)
- Revolving Guide Bush Unit/Drive Unit for Revolving Guide Bush
- Air Purge Unit for Revolving Guide Bush
- Guide Bush (MR32)
- Drive system for power-driven tool (Turret, Back 8-spindle unit)
- Parts Separator
- Parts Conveyor
- Leveling bolt & leveling pad
- Work lights (Cutting room & Headstock room)
- Leakage breaker (Rated sensitivity current : 30mA)
- Tool kit (1 set)