安装手册
INSTALLATION MANUAL

适用机型
Applicable Model

NVX5060/40
NVX5080/40
NVX5100/40

适用数控装置
Applicable NC Unit

MSX-853IV
MSX-855IV

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请妥善保存这些手册，切勿遗失。

Before starting operation, maintenance, or programming, carefully read the manuals supplied by Mori Seiki, the NC unit manufacturer, and equipment manufacturers so that you fully understand the information they contain. Keep the manuals carefully so that they will not be lost.

MORI SEIKI
THE MACHINE TOOL COMPANY

IX-NVX5000_4-C0CSEN
2011.05.Y

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About Declaration of Conformity

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1. EC 指令
机械指令 2006/42/EC
EMC 指令 2004/108/EC
低电压指令 2006/95/EC

2. EN 标准
EN ISO 12100-1
EN ISO 12100-2
EN 50370-1
EN 50370-2
EN 60204-1
EN 12417

< 机床型号 >

因为本手册适用于多个机床型号，所以机床型号描述会被省略。

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1. EC directive
Machinery Directive 2006/42/EC
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Low Voltage Directive 2006/95/EC

2. EN standards
EN ISO 12100-1
EN ISO 12100-2
EN 50370-1
EN 50370-2
EN 60204-1
EN 12417

<Machine Model>

Description of machine models is omitted because this manual applies to multiple machine models.

<Manufacturer>

MORI SEIKI CO., LTD.
2-35-16 Meieki, Nakamura-ku, Nagoya City, Aichi 450-0002, Japan

<Contact Address for Inquiry Regarding Technical Files>

关于本机床
About the Machine

< 基本情况 >

本机床使用最新技术设计和制造，用于使用刀具加工工件。本机床的制造符合公认的安全法规、标准和规范。本机床可用于手动和自动运行。

< 刀具 >

本机床能够使用铣刀、钻头、丝锥和镗杆等普通刀具。请在使用磨削刀具或特殊刀具前致电森精机。

< 材料 >

本机床可用于加工金属、树脂和塑料。本机床不能用于加工镁、碳、陶瓷以及木材等材料。使用这些材料前请致电森精机。

<Basis>

This machine was designed and built using state-of-the-art technology for the purpose of machining workpieces with cutting tools. This machine complies with generally recognized safety regulations, standards and specifications at the time of manufacture. This machine is suitable for manual and automatic operation.

<Tools>

This machine is capable of using common tools such as milling cutters, drills, taps, and boring bars. Contact Mori Seiki before using grinding tools or special tools.

<Materials>

This machine is designed for machining metal, resin, and plastics. It was not intended for the machining of materials such as magnesium, carbon, ceramics, and wood. Contact Mori Seiki before using these materials.

关于本手册
About this Manual

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- 重要注意事项汇编于单独印制的保养手册中的“机床安全操作”章节。在进行任何机床相关操作前，必须阅读此部分。
- 本手册使用以下的数字格式：
  千位分隔符：“,”（逗号）
  小数分隔符：“.”（句号）

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- Various manuals and documents are supplied with the machine in addition to this manual. Keep them close to the machine to enable easy reference.
- The important precautions are compiled in the “FOR SAFE MACHINE OPERATION” section in the MAINTENANCE MANUAL published separately. You must read this section before performing any operations relating to the machine.
- The following number formatting is used in this manual:
  Thousand separator: “,” (comma)
  Decimal separator: “.” (period)

信号词定义
Signal Word Definition

危险

表示会立即产生危害的情况，如果不避免，将导致死亡或严重伤害。

警告

表示具有潜在危害的情况，如果不避免，将导致死亡或严重伤害。

注意

表示具有潜在危害的情况，如果不避免，将导致人员轻微受伤或机床损坏。

[ ] 违反预防措施 （危险、警告和注意）将会导致方括号 [ ] 内所示的危险、人身伤害或机床故障。

附注

表示必须加以考虑的项目。

表示需要参考的项目。

表示提示。

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or damage to the machine.

[ ] Failure to observe the precautions (hazards, warnings and cautions) will lead to the hazards indicated in square brackets [ ], injuries or machine trouble.

NOTE

Indicates items that must be taken into consideration.

Indicates items to be referred to.

Indicates hints.

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安装

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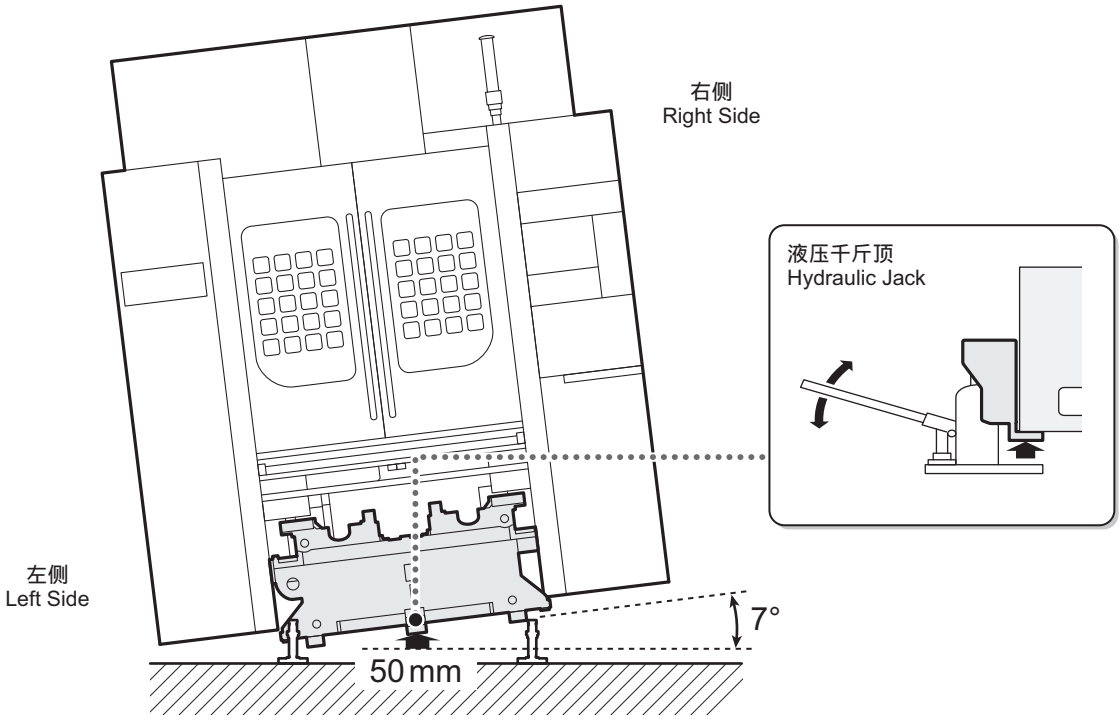
1 搬进机床的注意事项 PRECAUTIONS WHEN CARRYING THE MACHINE IN

⚠ 危险

使用液压千斤顶时，将机床提升不超过 50 mm。在图中箭头所示位置使用液压千斤顶的挂钩在床身的中央附近将机床顶起 50 mm 时，机床将会向左倾斜 7 度。如果把机床提升超过 50 mm，则机床会翻倒。在平整、牢固的地面上顶起机床，注意保持机床平衡。
[机床翻倒 / 人身伤害]

⚠ DANGER

When using hydraulic jacks, jack up the machine no higher than 50 mm. When the machine is jacked up by 50 mm near the center of the bed with the hook of the hydraulic jack applied at the position of the arrow in the figure, the machine will tilt to the left at an angle of 7 degrees. If the machine is jacked up beyond 50 mm, the machine will topple over. Jack up the machine on level, firm ground, paying due attention to its balance.
[Machine toppling over/Injury]



2 储存机床 STORING THE MACHINE

当运输机床时，应注意以下几点。如果运输有包装的机床，检查包装的外部框架。如果运输无包装的机床，则检查机床的外表。

When the machine is delivered, pay attention to the following points. If the machine is delivered in a package, check the external frame of the package. If the machine is delivered without a package, check the external appearance of the machine.

⚠ 注意

1. **当运输机床或运输后没有立即安装时，则将机床保存在环境温度为 –20 到 60°C 以及湿度不超过 75% RH （无凝结）的场所。不遵守这些情况，会造成数控装置的电气系统以及外围设备发生故障，导致机床损坏。**

2. **如果运输后没有立即将机床移到安装位置，则不要将它暴露在灰尘、污物或油雾的场所。把机床放在这类场所会导致机床生锈或腐蚀。**

附注

如果包装框架损坏，在取出机床前请致电森精机。如果机床表面有损坏，请保持原样并致电森精机。

⚠ CAUTION

1. **When transporting the machine or if the machine is not installed immediately after its delivery, store it in a place where the ambient temperature remains within the range –20 to 60°C and the humidity does not exceed 75% RH (with no condensation). Failure to comply with these conditions could cause troubles in the electrical systems of the NC unit and peripheral devices and lead to machine faults.**

2. **If the machine is not moved to the installation site immediately after its delivery, keep it in a location not exposed to the elements and not subject to dust, dirt, or mist. Leaving the machine in such places will cause rusting or corrosion.**

NOTE

If the package frame is damaged, contact Mori Seiki before unpacking the machine. If the machine appearance shows damage, contact Mori Seiki, leaving the damage as it is.

3 安装总览 INSTALLATION OVERVIEW

安装条件

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安装流程

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4 安装条件 INSTALLATION CONDITIONS

4-1 环境条件 Environmental Conditions

⚠ 注意

1. **根据以下要求选择一个位置；**
- **没有灰尘、污物和油雾。**
- **不会被其他机床的切屑、水和油溅到。**
- **地基水平。**
- **地基足够坚固以支撑机床的总重。**
- **机床和数控装置不受阳光直射。**
- **不能位于由空调或户外空气引起的局部温差的地方。**
- **机床不能直接接触空调的送风或户外空气。 [机床热位移、机床精度下降]**

< 条件要求 >

条件		使用限制
环境温度	°C	10 - 35
允许的温度变化	°C/min	1.1
湿度	%	75 或以下 （没有凝结）
振动	m/s^2	4.9 或以下
海拔	m 海平面以上	1000 或以下

2. **提供足够的空间拆卸排屑器 （选项）和切削油箱，并能容易地打开和关闭电气柜门和其他门。**

关于安装图，参见 3 章 “ 安装图 ” （82 页）。

⚠ CAUTION

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]**

<Conditions Required>

Conditions		Usage Restrictions
Ambient Temperature	°C	10 - 35
Permissible Temperature Variation	°C/min	1.1
Humidity	%	75 or Less (No Condensation)
Vibration	m/s^2	4.9 or Less
Elevation	m Above Sea Level	1000 or Less

2. **Provided sufficient space to allow the chip conveyor (option) and coolant tank to be removed and the electric cabinet door and other doors to be opened and closed without difficulty.**

For the Installation Diagrams, refer to Chapter 3 “INSTALLATION DIAGRAMS” (page 82).

5 地基 FOUNDATIONS

5-1 吸收振动所必需的地基 Necessary Foundations for Vibration Absorption

一般地，厚度为 500 - 800 mm * 的混凝土地基足够支撑机床。但是，当地基不够强以及无法吸收来自其他机床的振动时，则需用附加的地基来辅助吸收振动。咨询资深工程师以决定支撑面的数量和深度，并根据地面条件的不同要求确定混凝土的厚度。

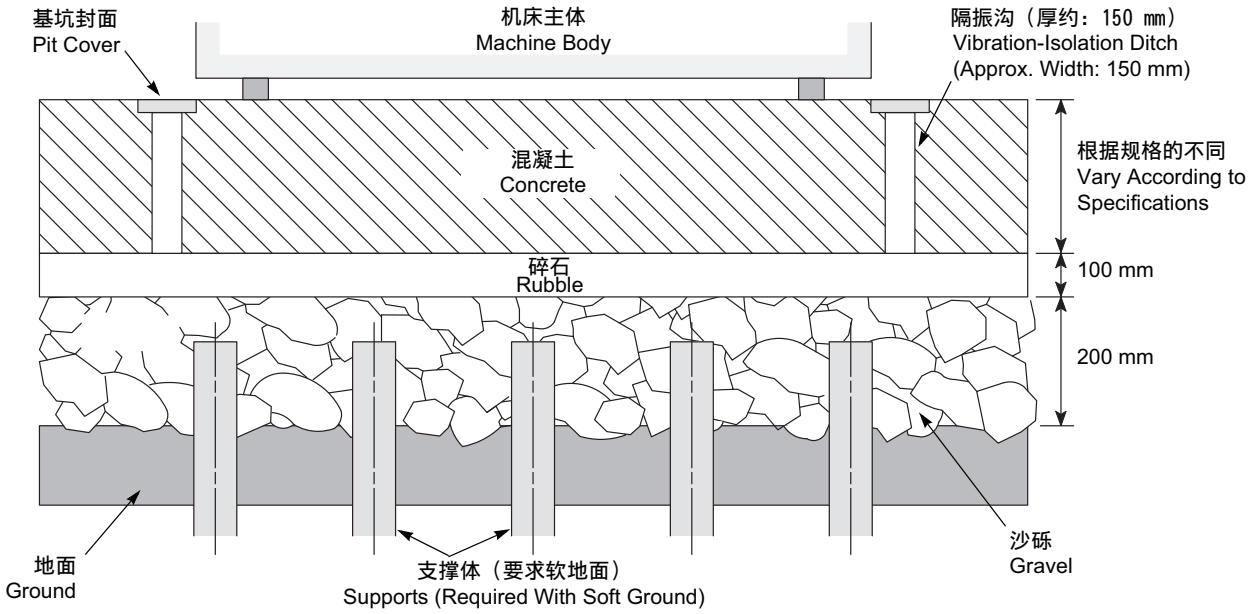
附注

1. * 根据规格而变化。 参见 “ 地基图 ” （88 页）。
2. 为了二次混凝土的便利供应，当混凝土半干时，选择混凝土和机床外侧接触约 100 mm 的区域。

Generally, a concrete foundation thickness of 500 - 800 mm * is strong enough to support the machine. However, when the foundations are of insufficient strength and are incapable of absorbing vibrations from other machines, additional foundation support to assist in vibration absorption is required. 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.

NOTE

1. * Vary according to specifications. Refer to “FOUNDATION DIAGRAMS” (page 88).
2. For easy supply of secondary concrete, chamfer the region where the concrete will contact the outside of the machine by about 100 mm, while the concrete is half-dried.



关于地基图，参见 3 章 “ 地基图 ” （88 页）。

For the Foundation Diagrams, refer to Chapter 3 “FOUNDATION DIAGRAMS” (page 88).

6 要求的电源 / 气源 REQUIRED POWER/AIR SOURCES

6-1 电源要求 Power Requirements

⚠ 危险

只有资深电工可以执行包括电源电缆连接的工作。
[触电]

⚠ 警告

忽视以下警告可能会导致火灾、人身伤害或机床损坏。

1. **对于电源电缆，直接从输入电源提供独立的电线。**

2. **通过精确计算供应侧的电量来选择主电源电缆。**

3. **不要将机床安装在主要电气噪音源的地方，如电焊工及电气放电机器。**

项目	范围
标称电源电压波动范围 (200/220 VAC)	+10%/–15%*
电压降	0.5 秒或更短时间，在标称电压的 15% 以内。
频率波动范围 (50/60 Hz)	±1 Hz
暂时的电源中断	少于 10 ms。
电压脉冲	用周期为 1.5 ms 的脉冲时，线性电压的峰值是有效值的 200% 或以下 （rms 值）。
交流电压的波形畸变	7% 或以下
线性电压的不平衡	5% 或以下， 10 V 以内

附注

1. * 主轴或伺服系统加速期间电压波动 （电压降）必须小于 7%。

   伺服系统加速 / 减速期间，如果电压小于 200 V，则实际加速 / 减速时间会比显示值要长。

2. 对于 220 VAC 50 Hz，必须安装降压变压器。

⚠ DANGER

Only qualified electrical technicians are to perform work involving power cable connections.
[Electric shock]

⚠ WARNING

Disregard for the warnings below may lead to fire, injury, or damage to the machine.

1. **For power cabling, provide isolated wiring directly from the input power supply.**

2. **Select a primary power cable by accurately calculating the power supply capacity at the supply side.**

3. **Do not install the machine close to major sources of electrical noise, such as electric welders and electrical discharge machines.**

Item	Range
Nominal Power Source Voltage Fluctuation Range (200/220 VAC)	+10%/–15%*
Voltage Drop	Within 15% of normal voltage for 0.5 seconds or less.
Frequency Fluctuation Range (50/60 Hz)	±1 Hz
Momentary Power Failure	Less Than 10 ms.
Voltage Impulse	Peak value is 200% or less of effective value (rms value) of line voltage with pulse duration of 1.5 ms.
Waveform Distortion of AC Voltage	7% or Less
Imbalance in Line Voltage	5% or Less, or Within 10 V

NOTE

1. * Voltage fluctuation (drop) during spindle or servo system acceleration must be less than 7%.

   If voltage is lower than 200 V during servo system acceleration/deceleration, actual acceleration/deceleration time may be extended beyond values indicated.

2. In the case of 220 VAC 50 Hz, it is necessary to install a step-down transformer.

6-2 电缆尺寸 （根据断路器的容量指定）
Cable Size (Specified According to Breaker Capacity)

外框尺寸 Frame Size	额定电流 (A) Current Rating (A)	主断路器 Main Breaker		漏电保护断路器 （选项） Earth Leakage Breaker (Option)		拧紧扭矩 Tightening Torque
		零件号 Part No.	制造商类型 Manufacturer Type	零件号 Part No.	制造商类型 Manufacturer Type	
250AF	200	E58476	BW250RAGU-3P200F RA-02155	E58509	EW250JAGU-3P200BF RA-02745	10.5 N • m
	225	E58477	BW250RAGU-3P225F RA-02155	E58510	EW250JAGU-3P225BF RA-02745	

附注

1. 小于 100 A 的断路器需要耐温度为 60°C 或更高的电缆。
2. 100 A 或以上的断路器需要耐温度为 75°C 或更高的电缆。
3. 使用 UL486 端子来连接电源。
4. 使用铜电源电缆。

NOTE

1. A breaker less than 100 A requires a cable with a temperature resistance of 60°C or higher.
2. A breaker of 100 A or more requires a cable with a temperature resistance of 75°C or higher.
3. Use UL486 listed terminals for connecting power supply.
4. Use the copper power cables.

< 自适应端子 >

<Adaptive Terminal>

外框尺寸 Frame Size	额定电流 (A) Current Rating (A)	焊接端子 Solderless terminal		
		制造商 Manufacturer	最大可连接格式 Max. Connectable Format	允许电缆尺寸 Allowable Cable Size
250AF	200 225	JST Mfg. Co., Ltd. JST Mfg. Co., Ltd.	100-8	4/0 AWG
		DAIDO SOLDERLESS TERMINAL MFG. CO., LTD. DAIDO SOLDERLESS TERMINAL MFG. CO., LTD.		
		NICHIFU Co., ltd. NICHIFU Co., ltd.	R100-8	

6-3 所推荐的步减变压器 （机床符合 EN 标准）
List of Recommended Step-down Transformers (Machines Compliant with EN Standard)

森精机的数控装置要求 200 VAC 50/60 Hz 或 220 VAC 60 Hz 的电源。咨询当地的森精机技术中心以决定适当的降压变压器。推荐的变压器的制造商和型号如下。使用推荐容量的变压器和符合 EN 标准的带 EMC 指令兼容的 EMI 过滤器。

Mori Seiki's NC unit has a power requirement of 200 VAC 50/60 Hz or 220 VAC 60 Hz. Consult the local Mori Seiki Technical Center to decide the appropriate step-down transformer. The manufacturers and models of the recommended transformers are given below. Use a transformer with the recommended capacity and with an EMC Directive-compatible EMI filter that conforms to the EN standards.

零件号	制造商	型号	变压器容量	可用电源电压
E30014	Moeller Electric LTD.	DANF25 D04823B	25 kVA	380/400/420
E30015	Moeller Electric LTD.	DANF35 D03493B	35 kVA	380/400/420
E30035	Moeller Electric LTD.	DANF45 D03503B	45 kVA	380/400/420
E30016	Moeller Electric LTD.	DANF55 D03513B	55 kVA	380/400/420
E30017	Moeller Electric LTD.	DANF65 D04833B	65 kVA	380/400/420
E30036	Moeller Electric LTD.	DANF75 D03533B	75 kVA	380/400/420

零件号	制造商	型号	变压器容量	可用电源电压
E30018	Moeller Electric LTD.	DANF90 D04843B	90 kVA	380/400/420
E30019	Moeller Electric LTD.	DANF120 D04853B	120 kVA	360/380/400/415/440

Parts No.	Manufacturer	Model	Transformer Capacity	Applicable Source Voltage
E30014	Moeller Electric LTD.	DANF25 D04823B	25 kVA	380/400/420
E30015	Moeller Electric LTD.	DANF35 D03493B	35 kVA	380/400/420
E30035	Moeller Electric LTD.	DANF45 D03503B	45 kVA	380/400/420
E30016	Moeller Electric LTD.	DANF55 D03513B	55 kVA	380/400/420
E30017	Moeller Electric LTD.	DANF65 D04833B	65 kVA	380/400/420
E30036	Moeller Electric LTD.	DANF75 D03533B	75 kVA	380/400/420
E30018	Moeller Electric LTD.	DANF90 D04843B	90 kVA	380/400/420
E30019	Moeller Electric LTD.	DANF120 D04853B	120 kVA	360/380/400/415/440

6-4 车间侧电源 （断路器）
Plant-Side Power Source (Breaker)

对交流变换器使用一个断路器作为在车间侧电源的主断路器。如果使用其他类型的断路器，则会由于高频电流漏电使交流变换器跳闸。根据下列公式计算的电流消耗，通过咨询电气部件制造商选择断路器和电源分布板容量。

$$\text{输入电流(A)} = \frac{\text{总功率容量(kVA)} \times 1000}{\sqrt{3} \times 200\ (\text{V})} \times 1.25^{*}$$

* 选择的容许

Use a breaker for an AC inverter as the main breaker at the plant-side power source. If another type of breaker is used, it may be tripped by the high-frequency current leakage specific to AC inverters. Select the breaker and power distribution board capacities by consulting the electric part manufacturer based on the current consumption calculated by the following formula.

$$\text{Input Current (A)} = \frac{\text{Total Power Capacity (kVA)} \times 1000}{\sqrt{3} \times 200\ (\text{V})} \times 1.25^{*}$$

* Allowance for Selection

⚠ 注意

机床的断路器与电气泄漏检测功能不对应。必须进行电气泄漏检测时，增加车间侧断路器 (EN60204-1 7.7) 的电气泄漏检测功能。

关于总功率容量，参见 “ 功率容量表 ” （65 页）。

⚠ CAUTION

The breaker of the machine does not correspond to the electrical leakage detection function. When electrical leakage detection is necessary, add the electrical leakage detection function of the plant-side breaker (EN60204-1 7.7).

For the total power capacity, refer to “POWER CAPACITY TABLE” (page 65).

6-5 接地电缆
Grounding Cable

⚠ 危险

忽视以下警告会导致触电。

1. **确保执行了接地工作。**
2. **咨询电缆制造商选择最适合安装机床使用的接地电缆。**
3. **接地电缆必须尽可能短，且与输入电源电缆直径相同。**
4. **确保接地阻抗为 100 Ω 或更小。**

⚠ DANGER

Disregard for the warnings below may lead to electric shock.

1. **Ensure to carry out the grounding work.**
2. **Consult a cable manufacturer to select the most appropriate grounding cable for the machine to be installed.**
3. **Grounding cable must be as short as possible and have the same diameter as the input power cable.**
4. **Be sure the ground resistance is 100 Ω or less.**

5. 查看机床使用国家的应用规范。
6. 完成接地工作后，检查接地故障和短路。

⚠ 警告

1. 机床必须与其他机床独立接地。
2. 如果电焊机或电火花加工机床接地到工厂建筑的框架上，则不要将机床的接地电缆连接到工厂框架上。
3. 使用适合接地电缆的 M8 端子接线柱。

5. **Observe all regulations applicable to the country in which the machine is being used.**
6. **Check for earth faults and short circuits after completing the grounding work.**

⚠ WARNING

1. **Machine must be grounded independent of other machines.**
2. **If electric welders or electric discharge machines are grounded to the frame of the plant building, do not connect the ground cable of the machine to the plant frame.**
3. **Use the M8 terminal post appropriate for the grounding cable.**

6-6 压缩空气供应 Compressed Air Supply

条件	使用限制
压缩机压力设定	0.5 至 1.0 MPa
压力露点	10°C 或以下 (0.7 MPa)
机床的运行压力	0.5 MPa
流量	240 L/min <ANR>*

Conditions	Usage Restrictions
Compressor Pressure Setting	0.5 to 1.0 MPa
Pressure Dew Point	10°C or Less (0.7 MPa)
Operating Pressure of the Machine	0.5 MPa
Flowrate	240 L/min <ANR>*

附注

* 温度 20°C，绝对压力 101.3 kPa，相对湿度 65%。

NOTE

* Temp. 20°C, absolute pressure 101.3 kPa, and relative humidity 65%.

⚠ 注意

1. 咨询压缩机制造商，选择能够供应所要求的压缩空气体积的压缩气源。
2. 必须供应清洁干燥的没有有机溶剂或化学剂的压缩气源。
   [气动装置故障，机床损坏]
3. 注意，吹风功能的使用频率要求最小过余流量为 300 L/min<ANR>。
4. 如果必须使用含超过指定浓度的雾或油的压缩空气，则在气源和机床之间安装线性过滤器或烘干机。
5. 压缩机的压力设定必须小于 1.0 MPa。
   [气动装置损坏]

⚠ CAUTION

1. **Consulting a compressor manufacturer, select a compressed air source that can supply the required volume of compressed air at the required pressure.**
2. **The compressed air source must supply clean and dry air that contains no organic solvents or chemical agents.**
   [Malfunction of pneumatic devices, machine damage]
3. **Note that frequent usage of the air blow function requires a minimum surplus flow rate of 300 L/min <ANR>.**
4. **If necessary to use compressed air with a concentration of moisture or oil exceeding the specified range, install a line filter or dryer between the air source and the machine.**
5. **The pressure setting of the compressor must be lower than 1.0 MPa.**
   [Damage of pneumatic devices]

6-7 压缩空气排管 （软管）
Compressed Air Piping (Hoses)

根据用户环境条件和供应距离的不同，压缩空气排管 （软管）的需求也不同，咨询软管制造商选择最适合指定压力要求标准的排管。
压缩空气供应口尺寸：Rc 3/8

As compressed air piping (hose) requirements differ according to customer environmental conditions and supply distances, consult a hose manufacturer in order to select the most appropriate piping capable of withstanding the pressure requirements specified.
Compressed Air Supply Port Size: Rc 3/8

7 通过吊起搬运机床 CARRYING THE MACHINE BY HOISTING

通过吊起搬运机床时，遵守以下注意事项。

Observe the following cautions when carrying the machine by hoisting.

警告

1. 只有资深技工能执行机床的吊起工作。如果是不熟悉安全操作的人操作起重机或提升机，可能会导致严重伤害或机床损坏等事故。
2. 只能使用手册中指定尺寸的钢丝、钩环和夹具。 它们必须具有足够的强度以支撑机床的重量。 参考本手册中的规格检查机床的重量。 如果使用不能支撑机床重量的设备起吊机床，则会导致严重伤害或机床损坏。
3. 吊起机床时，务必注意机床的重心位置，并确保机床被吊起到地面上一点时在横向和纵向上均平衡。如果机床不平衡时继续将其吊起，则会导致严重伤害或机床损坏。
4. 如果 2 个或更多人一起提升机床，改变信号时要特别小心。如果没有注意到有人在机床内工作或靠近机床时操作机床或起重机，则会导致严重伤害。
5. 吊起机床前，检查是否有刀具、碎屑等留在机床内。提升机床时，这些物品会掉下来砸到人或损坏机床。
6. 吊起机床前，检查所有部件是否夹紧。当任一部件没有充分夹紧时提升机床，可能会损坏机床。
7. 如果用起重机吊起机床，当吊起过高时请不要搬运机床。搬运机床时提升过高会比较低位置增加潜在的危害。
8. 当用提升机移动机床时，不要提升高过地面。如果在这种情况下移动机床，机床可能会不平衡而掉落或提升机翻倒，导致严重伤害或机床损坏。
9. 使用能够支撑机床重量的起重机或提升机。如果使用没有足够能力支撑机床重量的起重机或提升机时，机床会掉落，导致严重伤害或机床损坏。

WARNING

1. **Only a qualified technician should perform machine hoisting work. Operation of the crane or forklift by a person unfamiliar with safe operation practices could lead to accidents involving serious injuries or damage to the machine.**
2. **Use only wires, shackles and jigs of the dimensions specified in the manual. They must be strong enough to support the mass of the machine. Check the mass of the machine by referring to the specifications in this manual. If the machine is hoisted using equipment that cannot bear its mass, it will fall, causing serious injuries or damage to the machine.**
3. **When hoisting the machine, always pay attention to the location of the center of gravity for the machine and make sure that the machine is well balanced in both the crosswise and lengthwise directions by hoisting it a little above the floor. If you continue to hoist the machine although it is not properly balanced, it will fall, causing serious injuries or damage to the machine.**
4. **If two or more people work together to lift the machine, they must work carefully while exchanging signals. If someone operates the machine or the crane inadvertently when other people are working inside or close to the machine, it could cause serious injuries.**
5. **Before hoisting the machine, check that no tools, rags, etc., have been left inside it. When the machine is lifted, these articles could fall out and injure plant personnel or damage the machine.**
6. **Before hoisting the machine, check that all of its parts are clamped. Lifting the machine while any of the parts is not clamped adequately could damage the machine.**
7. **If a crane is used to hoist the machine, do not carry the machine while it is lifted to an excessive height. Lifting the machine excessively high when carrying it will create more potential hazards than when carrying it at a lower height.**
8. **When moving the machine with a forklift, do not lift it high above the ground. If it is moved in this condition, it may become unbalanced and fall, or the forklift may topple over, causing serious injuries or damage to the machine.**
9. **Use a crane or forklift that can comfortably bear the mass of the machine. If a crane or forklift without sufficient capacity to lift the machine is used, the machine will fall, causing serious injuries or damage to the machine.**

附注

1. 用滚柱移动机床时，设定滚柱的数量以及滚柱的材料，确保其能支撑机床的重量。 同时，也要使用能够支撑机床重量的滑板和导板。如果不能支撑机床的重量，滚柱、滑板或导板可能会弯曲，使得机床无法移动。

NOTE

1. When moving the machine with rollers, set the number of rollers, and the material that they are made of, so as to ensure that they can support the mass of the machine. Also use skid and leading boards that can support the mass of the machine. If they cannot support the mass of the machine, the rollers, skid, or leading board may be distorted, making it impossible to move the machine.

2. 安装好机床后，必须使它水平。根据机床配带的精度测试结果图，调整机床的弯度和变形。如果正确执行此步骤，加工精度会受到不良影响。

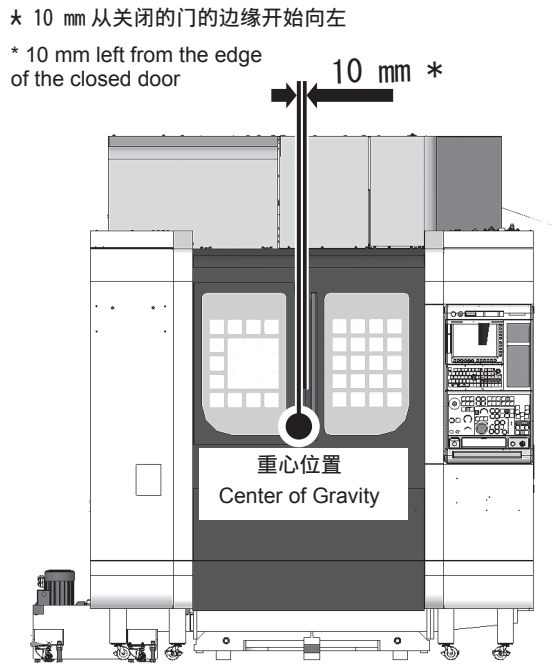
2. After the machine has been installed, it must be leveled. Adjust the machine's crown and distortion values according to the Accuracy Test Results Chart delivered with the machine. If this adjustment is not carried out properly, machining accuracy will be adversely affected.

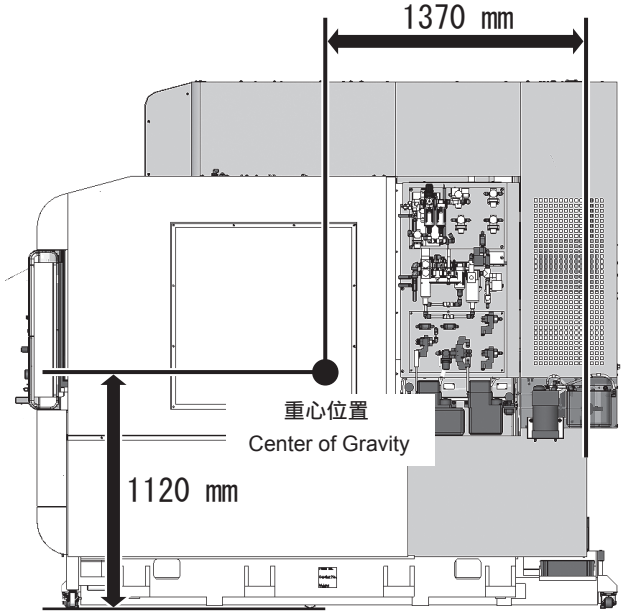
8 机床安装 MACHINE INSTALLATION

8-1 机床的重心位置 Center of Gravity of Machine

机床的重心位置如下：

The center of gravity of the machine is as follows:





8-2 当使用起重机时 When Using Crane

使用起重机时的注意事项

⚠ 警告

1. 只能使用手册中指定尺寸的钢丝、钩环和夹具，确保使用强度足够的设备以承受机床的总重。
2. 提升机床前，检查无刀具、碎屑等停留在机床内。
3. 当有两个和更多操作者参与提升操作时，请谨慎合作并保持沟通。
4. 将机床提升至转移高度前，需确定机床的重心位置。
5. 将机床提升离地一小段距离，以确认机床在横向和纵向上都可保持平衡。

Precautions when using the crane

⚠ WARNING

1. **Use only wires, shackles and jigs of the dimensions specified in the manual to ensure equipment used is strong enough to support the total weight of the machine.**
2. **Before hoisting the machine, check that no tools, rags, etc., remain inside the machine.**
3. **When two or more operators are involved in the hoisting process, careful cooperation and constant communication are essential.**
4. **Confirm the center of gravity of the machine prior to raising the machine to transfer height.**
5. **Raise the machine a short distance off the floor to confirm the machine is well balanced in both crosswise and lengthwise directions.**

提升机床

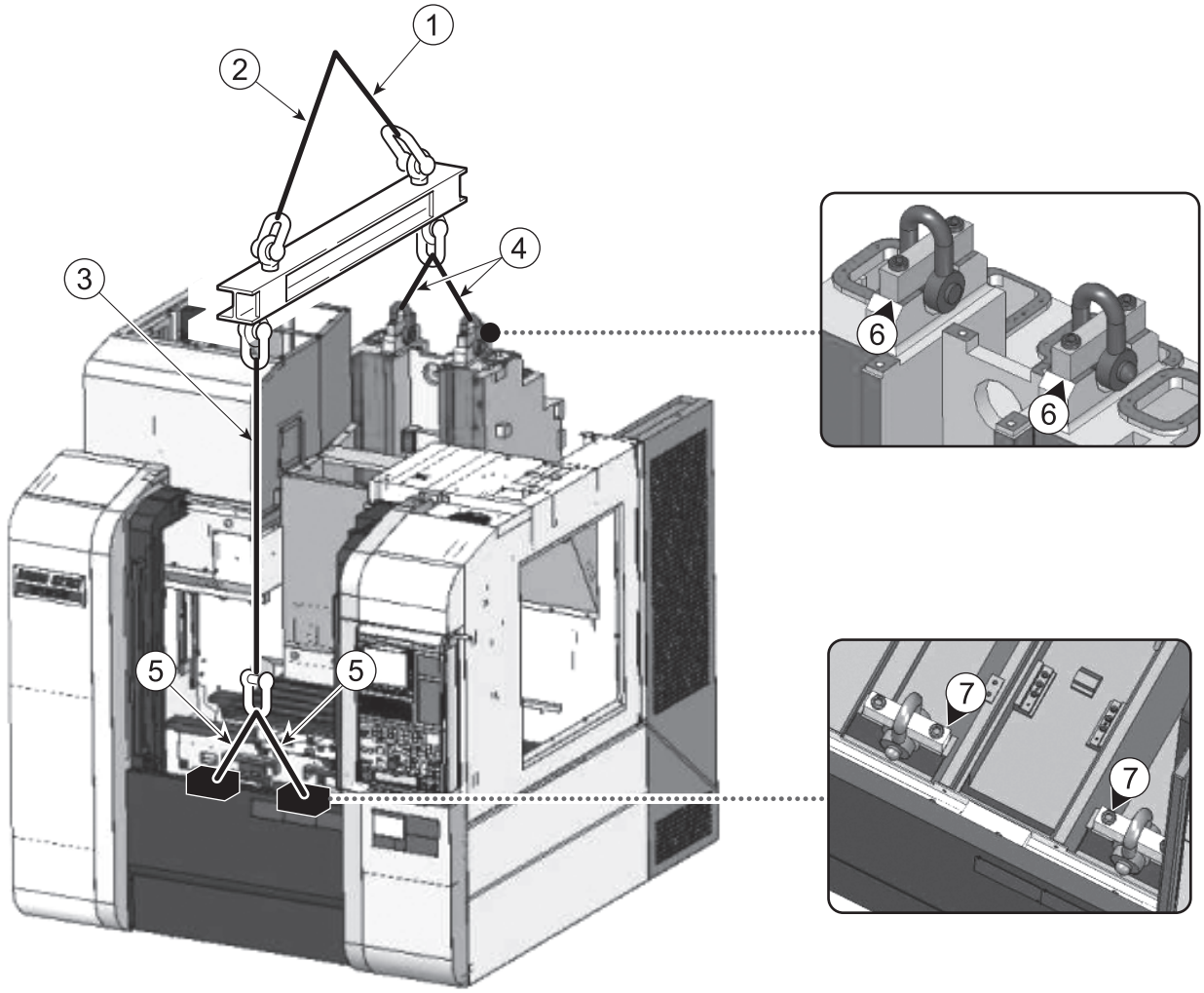
< 机床提升图 >

提升机床前请参考提供的图示。

Lifting Machine

<Machining Lifting Diagram>

Refer to the figure provided prior to lifting the machine.



机床质量
Machine Mass
NVX5060/40 6020 kg
NVX5080/40 30 把刀具刀库规格：6350 kg
NVX5080/40 30-Tool Magazine Specifications:6350 kg

< 所需物件 >

• 钢丝绳

<Necessary Tools>

• Wire Cable

记号 Symbols	长度 (mm) Length (mm)	直径 (mm) Diameter (mm)
①	1200	ϕ 30
②	1400	
③	1600	
④	650	ϕ 25
⑤	650	

• 钩环

• Shackles

负载能力 Load Capacity	件数 Pcs
4.8T	9

• 挡块

记号 Symbols	零件号 Part No.	件数 Pcs	螺栓种类 Bolt Type	螺钉数 No. of Screws
⑥*	B4700827	2	M20 × 70	4
⑦*		2	M20 × 70	4

附注

1. * 机床随附。
2. 妥善保管所有用来吊起机床的部件。

• Blocks

Symbols	Part No.	Pcs	Bolt Type	No. of Screws
⑥*	B4700827	2	M20 × 70	4
⑦*		2	M20 × 70	4

NOTE

1. * Shipped with the machine.
2. Store all the parts for hoisting in a secure location.

8-3 当使用叉式升降机时 When Using Forklift

当使用叉式升降机时的注意事项

危险

使用能够支撑机床重量的叉式升降机。

警告

1. **提升机床前，检查无刀具、碎布等遗留在机床内。**
2. **当有两个和更多操作者参与提升操作时，请谨慎合作并保持沟通。**
3. **提升机床前，确定所叉起机床的重心位置。**

“机床的重心位置”（15 页）

4. **将机床提升离地一小段距离，以确认机床在横向和纵向上都可保持平衡。**
5. **注意不要在搬运机床时让机床受到撞击。**

Precautions When Using Forklift

DANGER

Use a forklift that can bear the mass of the machine.

WARNING

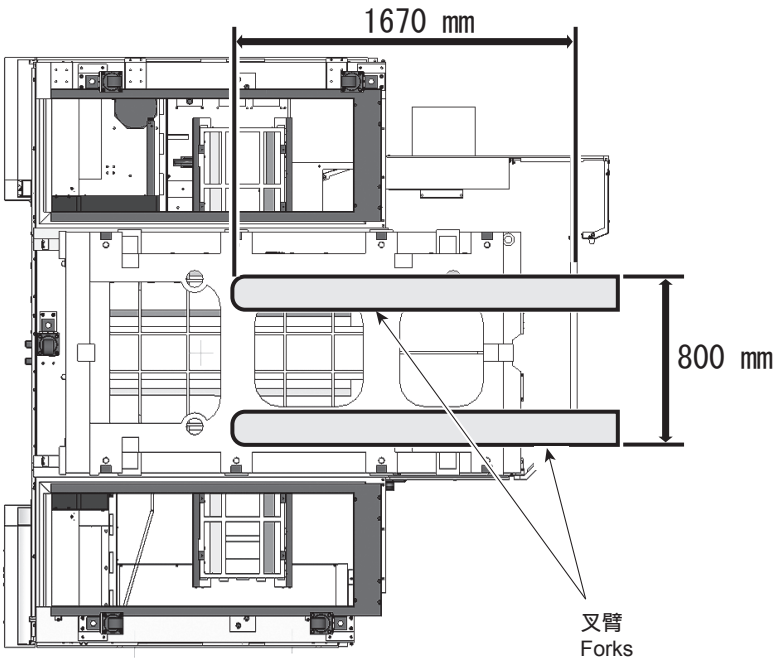
1. **Before hoisting the machine, check that no tools, rags, etc., remain inside the machine.**
2. **When two or more operators are involved in the hoisting process, careful cooperation and constant communication are essential.**
3. **Confirm the center of gravity of the machine gripped prior to lifting the machine.**

“Center of Gravity of Machine” (page 15)

4. **Lift the machine by a short distance off the floor to confirm the machine is well balanced in both crosswise and lengthwise directions.**
5. **Take care not to make an impact on the machine while transferring the machine.**

移动机床

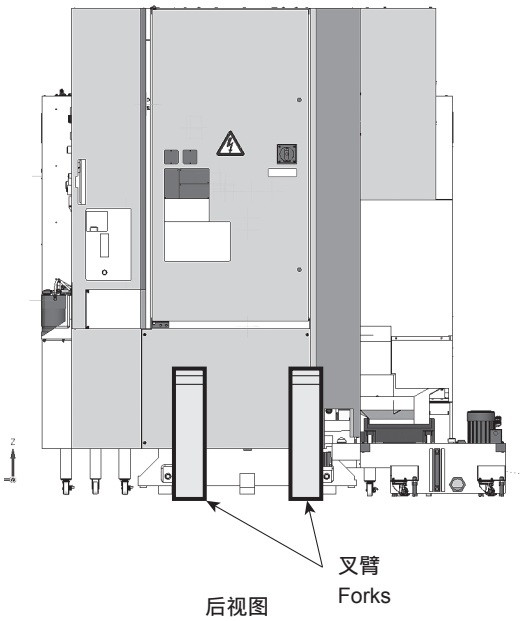
参见下图并将叉式升降机的叉臂插入标记位置。



底视图
Bottom View

Moving Machine

Refer to the following illustration and insert the forks of the forklift at the marked position.



后视图
Rear View

9 调整机床水平 ADJUSTING MACHINE LEVEL

⚠ 危险

当必须使用液压千斤顶调平机床时，在水平牢固的地面上进行，注意保持机床平衡以防止机床翻倒。
[机床翻倒 / 人身伤害]

⚠ 注意

安装机床后，确保调整机床水平。如果机床水平调整不正确，机床可能倾斜或扭曲，导致机床精度下降。

附注

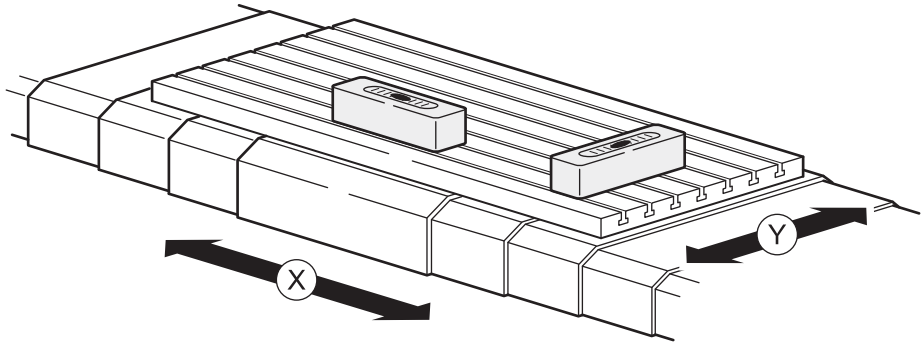
机床的重量将导致安装机床后，地基水平面下沉。用千斤顶螺栓确认和调整机床水平后，重新检查机床水平以确定是否机床精度受到了不良影响。该重新检查的时间因根据地基的实际状况有所不同。

< 临时水平调整步骤 >

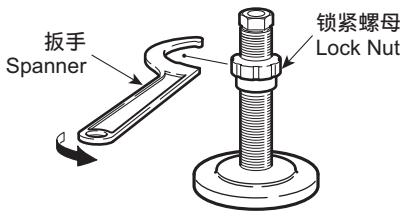
⚠ 注意

临时水平调整之前，先切断电源并拆除固定夹板。

1) 在托盘或工作台中心的 X 轴和 Y 轴方向上放置水平仪。



2) 松开紧固千斤顶螺栓的锁紧螺母。



3) 使用水平仪确定机床的水平度，用千斤顶螺栓调整机床的水平。

⚠ DANGER

When it is necessary to level the machine using hydraulic jacks, do so on level firm ground, paying due attention to the balance of the machine in order to prevent the machine from toppling over.
[Machine toppling over/Injury]

⚠ CAUTION

After machine installation, be sure to level the machine. If the machine is not properly leveled, it may tilt or twist, resulting in a reduction in machining accuracy.

NOTE

The machine weight will cause the ground level to sink right after machine installation. After confirmation and adjustment of the machine level with the jack bolts, recheck the machine level to determine if the machine accuracy is adversely affected. The timing of this rechecking differs according to the actual condition of the ground.

<Procedure for Provisional Level Adjustment>

⚠ CAUTION

Make the provisional level adjustment with the electric power unplugged and the transit clamps removed.

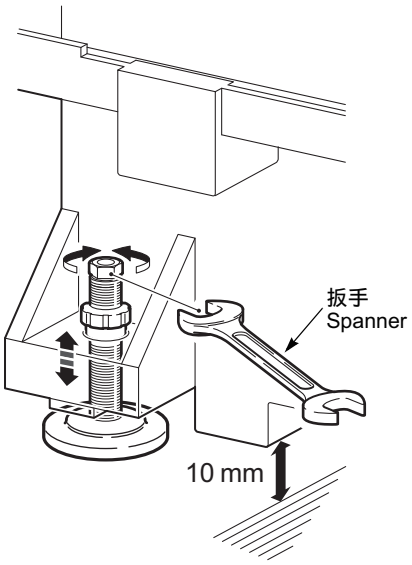
1) Position spirit levels in the X- and Y-axis directions in the center of the pallet or the table.

2) Loosen the lock nuts securing the jack bolts.

3) Using the spirit levels for confirmation, adjust the machine horizontal level with jack bolts.

4) 进行调整，以确保地板和机床下表面的高度为下图所示数据。

4) Adjust to ensure the height between the floor and the machine undersurface is as shown in the figure below.



⚠ 注意

1. **小心确保千斤顶螺栓一致调整。**
[加工精度降低]

2. **不要旋松千斤顶螺栓太过。**
[加工精度降低]

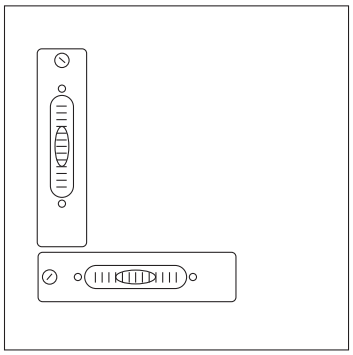
⚠ CAUTION

1. **Take care to ensure jack bolt adjustments are uniform.**
[Reduction in machining precision]

2. **Do not unscrew the jack bolts too far.**
[Reduction in machining precision]

5) 调整机床的水平度，直到水平仪如下图所示。

5) Adjust the horizontal level of the machine until the spirit levels indicate as shown on the figure below.



图A
Figure A

< 机床水平调整步骤 >

⚠ 注意

确认以下要点后，调整机床水平。

- **“ 拆卸固定夹板 ”（22 页）**
- **“ 润滑 ”（36 页）**
- **“ 第一次开启电源前的检查 ”（41 页）**
- **“ 连接电源 ”（37 页）**
- **“ 连接气源 ”（40 页）**

1) 打开主电源。

2) 移动 Y 轴并用四个千斤顶螺栓 ① 调整机床的扭曲，并在观察水平度时，调整机床水平。

<Procedure for Machine Level Adjustment>

⚠ CAUTION

Adjust the machine level after confirming the following.

- **“Removing Transit Clamp” (page 22)**
- **“LUBRICATION” (page 36)**
- **“Checks before Turning ON Power for First Time” (page 41)**
- **“CONNECTING POWER” (page 37)**
- **“CONNECTING AIR SOURCE” (page 40)**

1) Turn ON the main power.

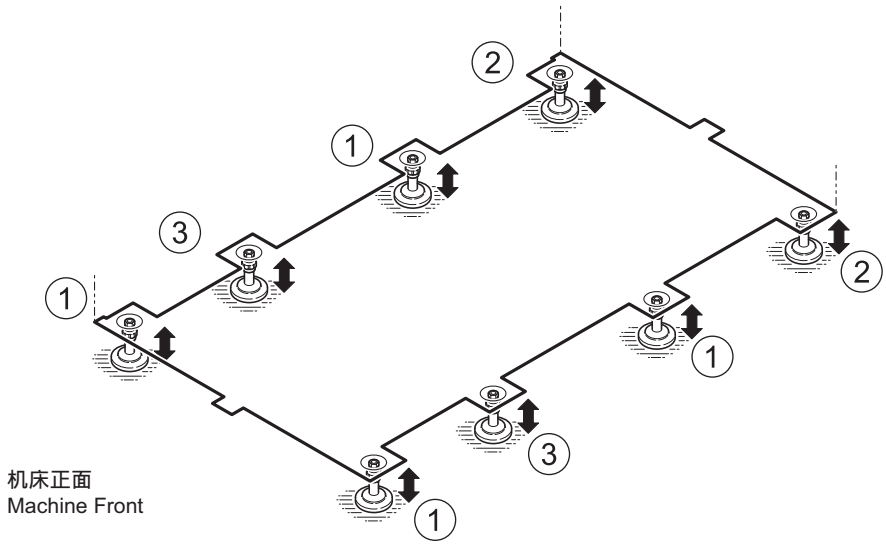
2) Move the Y-axis and with the four ① jack bolts adjust twisting and the horizontal level of the machine while observing the level.

3) 旋转两个 ② 千斤顶螺栓，调整机床纵向的倾斜度。

4) 轻压两个 ③ 千斤顶螺栓。

3) Adjust the inclination of the machine in longitudinal direction by turning the two ② jack bolts.

4) Lightly apply the two ③ jack bolts.



附注

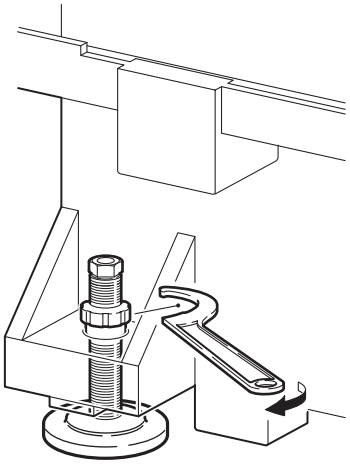
关于调整精度值的详情，参考随机床附带的精度测试结果表。

NOTE

For details on adjustment precision values, refer to the Accuracy Test Results Chart supplied with the machine.

5) 拧紧锁紧螺母以固定千斤顶螺栓。

5) Tighten the lock nuts to secure the jack bolts.



10 拆卸 / 安装固定夹板 REMOVING/MOUNTING TRANSIT CLAMP

10-1 拆卸固定夹板 Removing Transit Clamp

夹板 Clamp	安装点 Mounting Points	零件号 Part No.	螺栓种类 Bolt Type	螺钉数目 No. of Screws
①	刀库门 （选项） Magazine Door (Option)	H1601637	M8 × 16	4
②	操作面板 Operation Panel	H8101422	M8 × 16	
③	鞍座，Y 轴保护装置 Saddle, Y-axis Protector	B6801252	M12 × 30	4
④	两个轴 （X 和 Y 轴） Two Axes (X- and Y-axes)	＜ 公制规格 ＞* <Metric Specification>* B6801257	M20 × 45 带垫圈 (Y70020) 和 S 垫圈 (Y71020) With Washer (Y70020) and S Washer (Y71020)	2
			M16 × 45 带垫圈 (Y70223) 和 S 垫圈 (Y71016) With Washer (Y70223) and S Washer (Y71016)	4
		＜ 英制规格 ＞* <Inch Specifications>* B6801257	M20 × 45 带垫圈 (Y70020) 和 S 垫圈 (Y71020) With Washer (Y70020) and S Washer (Y71020)	2
			Y29029 (1/2 × 1-1/2) 带垫圈 (Y70224) 和 S 垫圈 (Y71007) With Washer (Y70224) and S Washer (Y71007)	4
⑤	刀库踏步 （选项） Magazine Step (Option)	H8101320	M8 × 20	4

* 对于高栏和附加轴：B6801575

＜ 步骤 ＞

1) 安装完成后，打开主电源前拆下固定夹板。

附注

取下操作面板的固定夹板 ② 以后，安装图中 Ⓐ 部件。

关于安装位置，参考下页的图解。

2) 在主电源打开后，应立即拆下没有电源无法拆卸的固定夹板。

3) 在手动模式下分别移动每个进给轴，目测确认所有轴的固定夹板都已拆除。

* For high column and additional axis: B6801575

<Procedure>

1) After installation, remove transit clamps prior to turning ON the main power.

NOTE

After removing the transit clamp ② of the operation panel, mount the Ⓐ parts in the illustration.

For the mounted positions, refer to the figure on the next page.

2) Transit clamps that cannot be removed without power supplied are to be removed immediately after the main power is turned ON.

3) Move each feed axis individually in handle mode to confirm visually that all axis transit clamps have been removed.

⚠ 注意

在固定夹板拆除前，请勿移动轴。
[机床损坏]

4) 重新安装前门挡块。

附注

1. * 打开前门两侧时，两侧碰到挡块并且门停止。出厂时没有安装固定夹板，而是将挡块取出并固定到前门上挡块的位置。

2. ** 对于英制规格，为 4-1/2 × 1-1/2 （参见上表中的 ④ 栏）

⚠ CAUTION

Do not move axes prior to removal of the transit clamps.
[Machine damage]

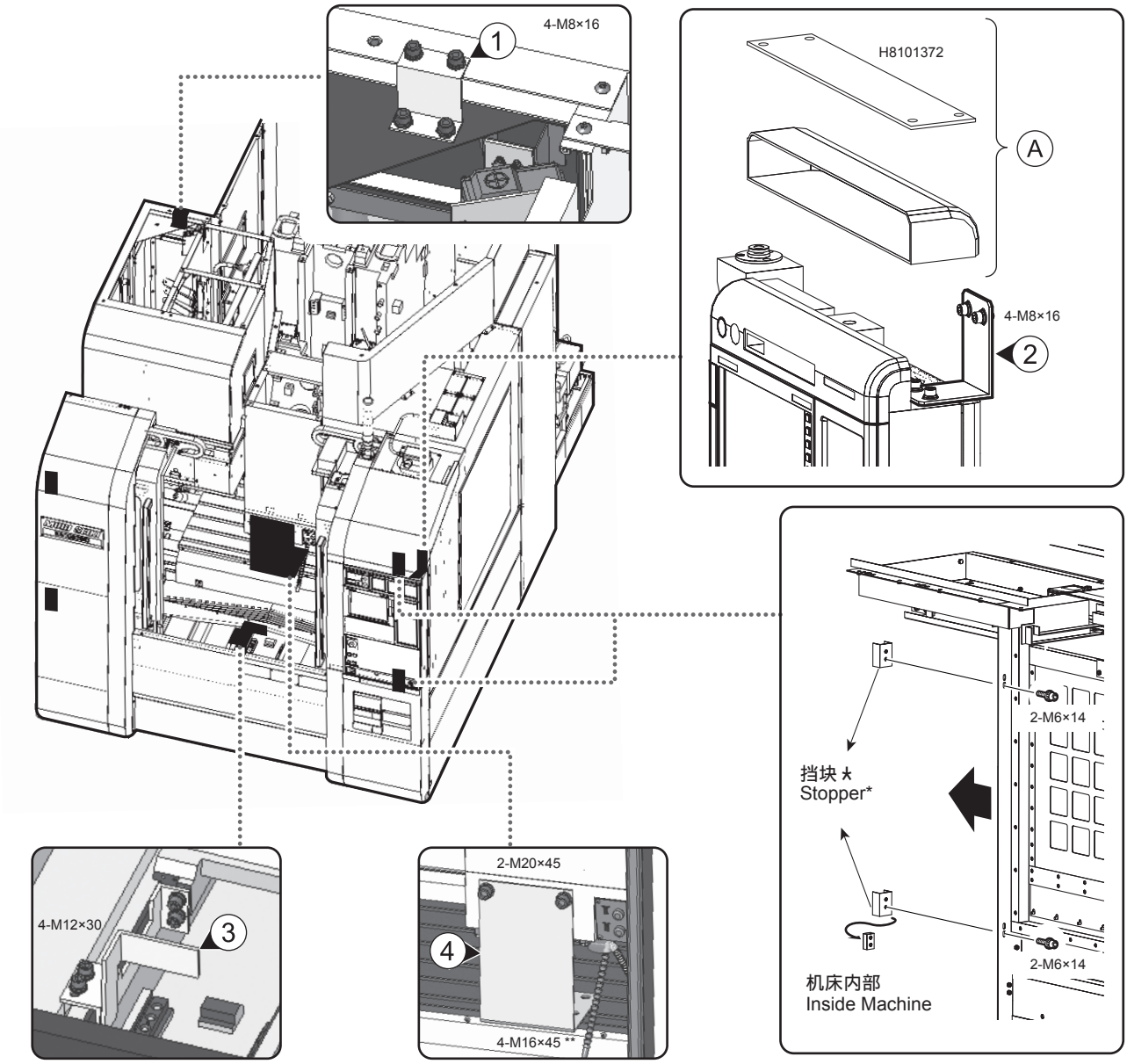
4) Remount the stopper of the front door.

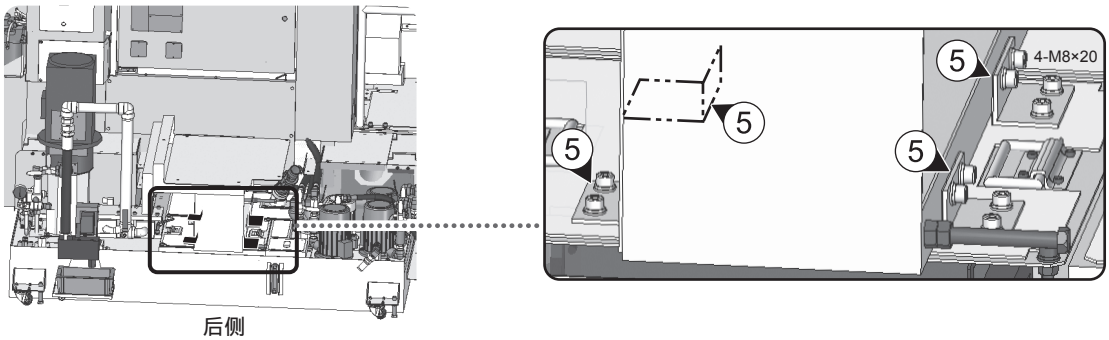
NOTE

1. * When opening the both sides of the front door, the sides touch the stoppers and the door stops. Instead of mounting the transit clamps, the stoppers are removed and fixed to the front doors on the position of the stoppers at the time of shipment.
2. ** For the inch specifications, 4-1/2 × 1-1/2 (refer to column ④ in the list above)

3. 请将从机床上拆除的所有固定夹板保存在安全位置。

3. Store all transit clamps removed from the machine in a secure location.





后侧
Rear Side

10-2 安装固定夹板 Mounting Transit Clamp

< 步骤 >

1) 将轴移动到如下所示的位置。
X: –400
Y: –450
Z: –505

2) 关闭主电源。

3) 安装固定夹板。

<Procedure>

1) Move the axes to the following positions.
X: –400
Y: –450
Z: –505

2) Turn OFF the main power.

3) Mount the transit clamps.

11 装置的安装 UNITS INSTALLATION

11-1 提升切削油箱 （切屑车规格） Lifting Coolant Tank (Chip Bucket Specification)

< 机床提升图 >

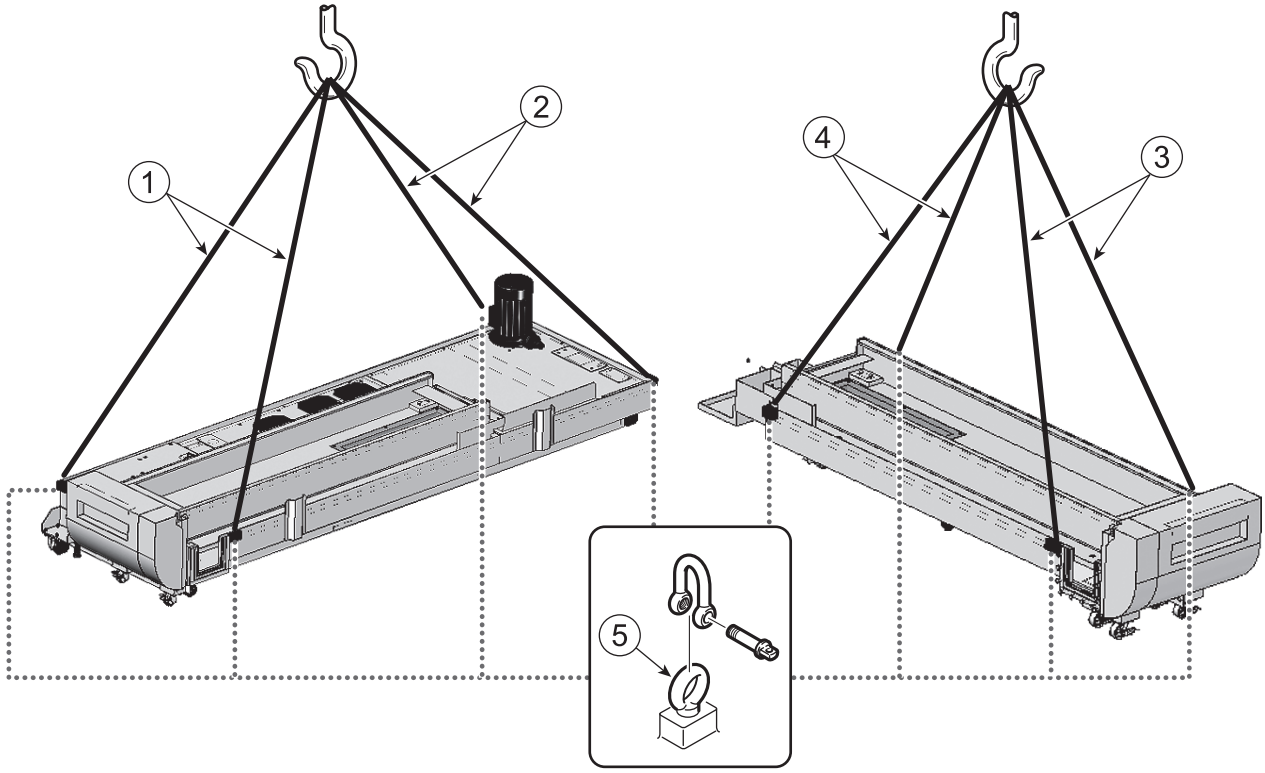
提升切削油箱以前，参见下图。

<Machining Lifting Diagram>

Refer to the following figure before lifting the coolant tank.

切削油箱（左侧）
Coolant Tank (Left)

切削油箱（右侧）
Coolant Tank (Right)



切削油箱 （左侧）总质量
- NVX5060/40: 126 kg
- NVX5080/40: 130 kg
- NVX5100/40: 150 kg

切削油箱 （右侧）总质量
- NVX5060/40: 50 kg
- NVX5080/40: 60 kg
- NVX5100/40: 75 kg

Coolant Tank (Left) Total Mass
- NVX5060/40: 126 kg
- NVX5080/40: 130 kg
- NVX5100/40: 150 kg

Coolant Tank (Right) Total Mass
- NVX5060/40: 50 kg
- NVX5080/40: 60 kg
- NVX5100/40: 75 kg

< 所需工具 >
- 钢丝绳

<Necessary Tools>
- Wire Cable

记号 Symbols	长度 (mm) Length (mm)
①	1600
②	1900
③	1500
④	1800

• 吊环螺栓

• Eyebolt

记号 Symbol	尺寸 Size	数量 Q'ty
⑤	M12	8

11-2 切削油箱安装 （切屑车规格）
Coolant Tank Installation (Chip Bucket Specification)

< 步骤 >

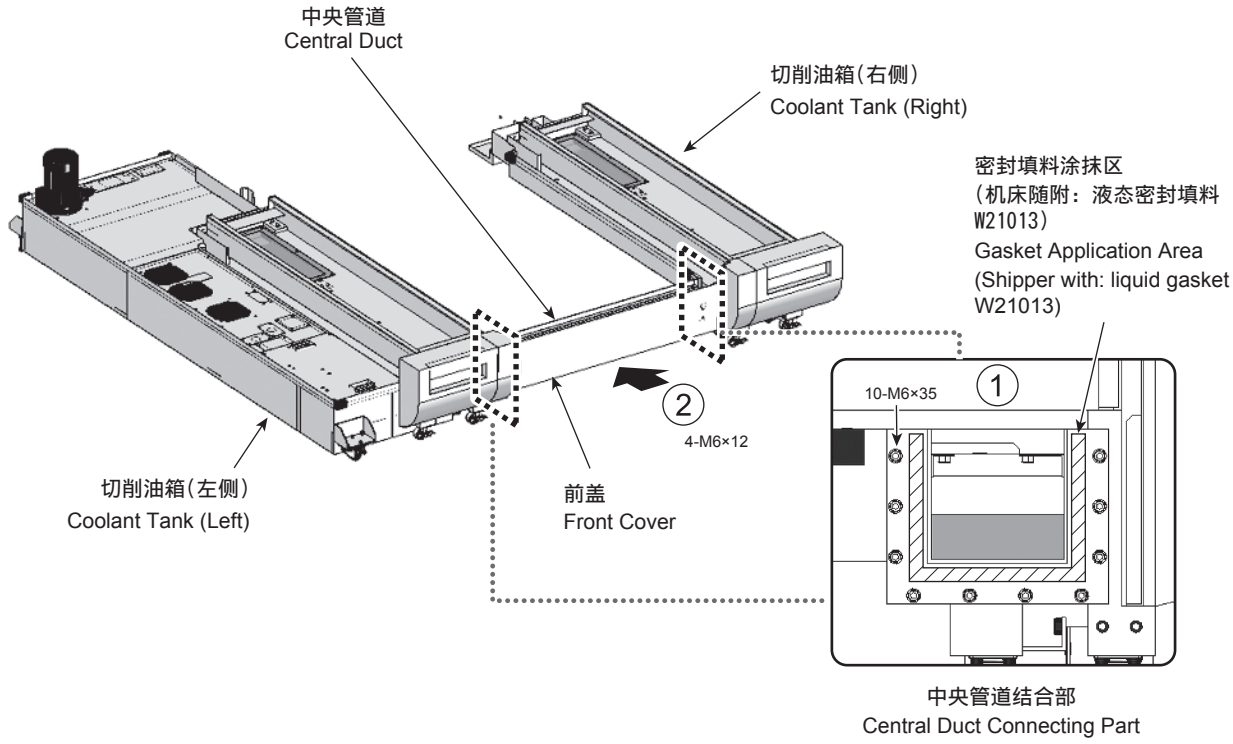
1) 装配左侧和右侧的切削油箱以及中央管道 （①）。

2) 将前盖安装到中央管道 （②）。

<Procedure>

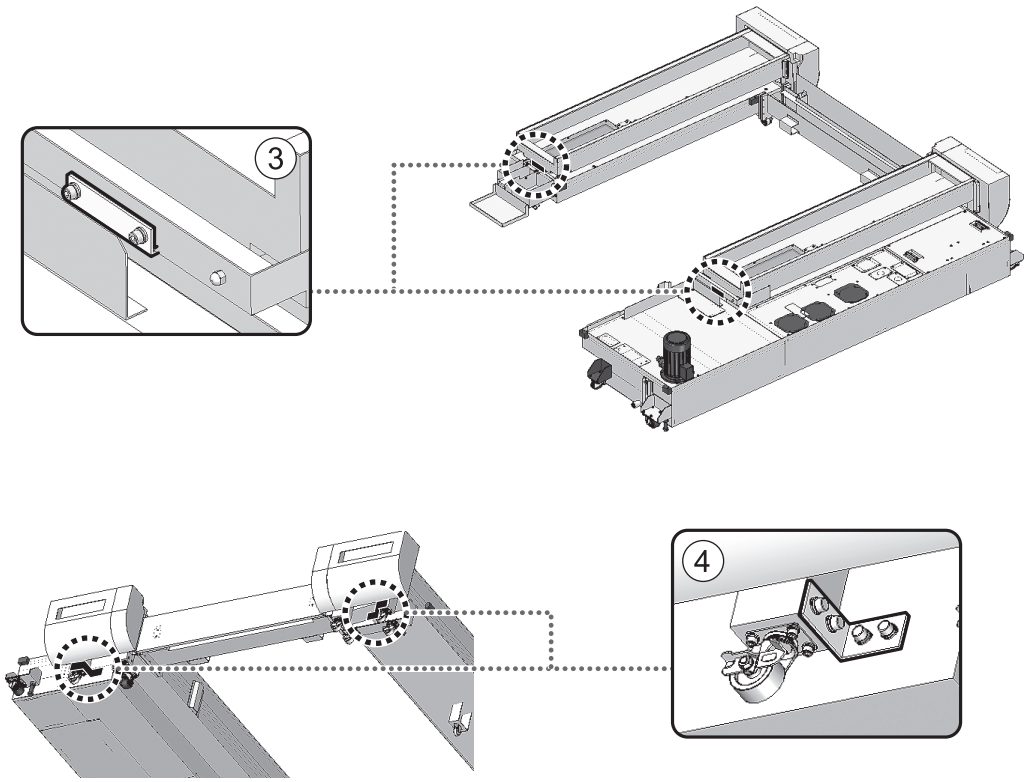
1) Assemble the left and right coolant tanks and the central duct (①).

2) Mount the front cover to the central duct (②).



3) 拆下夹板 （③ 和 ④）。

3) Remove the clamps (③ and ④).



切削油箱底部
Bottom of Coolant Tank

记号 **Symbol**	零件号 **Parts No.**
③	H8101868
④	H1501004

4) 将切削油箱插入机床，直至接触床身 （按照 ⑤ 和 ⑥ 的顺序）。

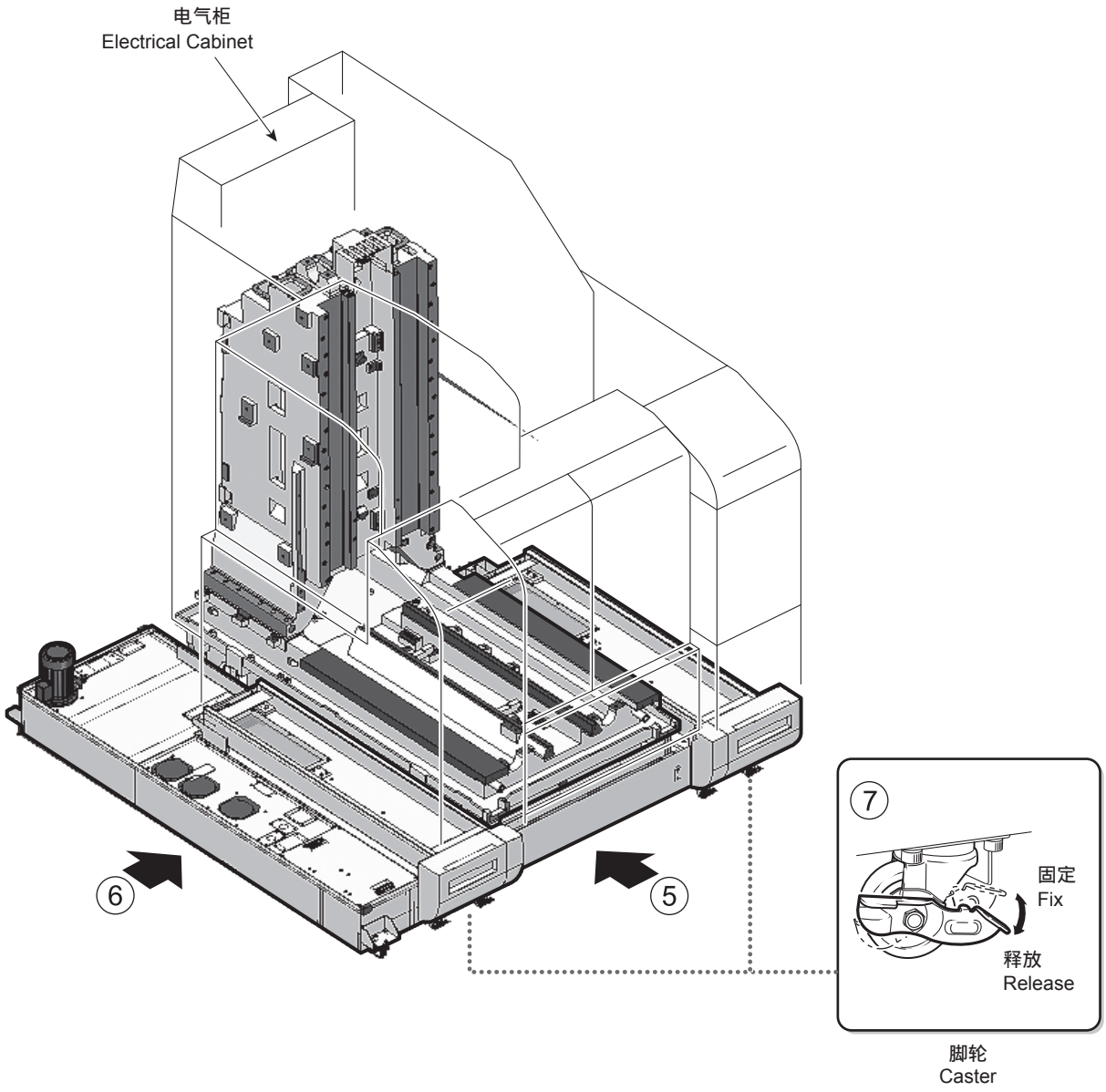
4) Insert the coolant tank into the machine until it touches the bed (in the order of ⑤ and ⑥).

⚠ 注意

如果切削油箱没有顶住床身铸铁表面牢固放置，切削油会从机床溅出，导致操作员严重受伤。

⚠ CAUTION

If the tank is not positioned securely against the cast iron surface of the bed, coolant splashes from the machine, resulting in serious injury to operators.



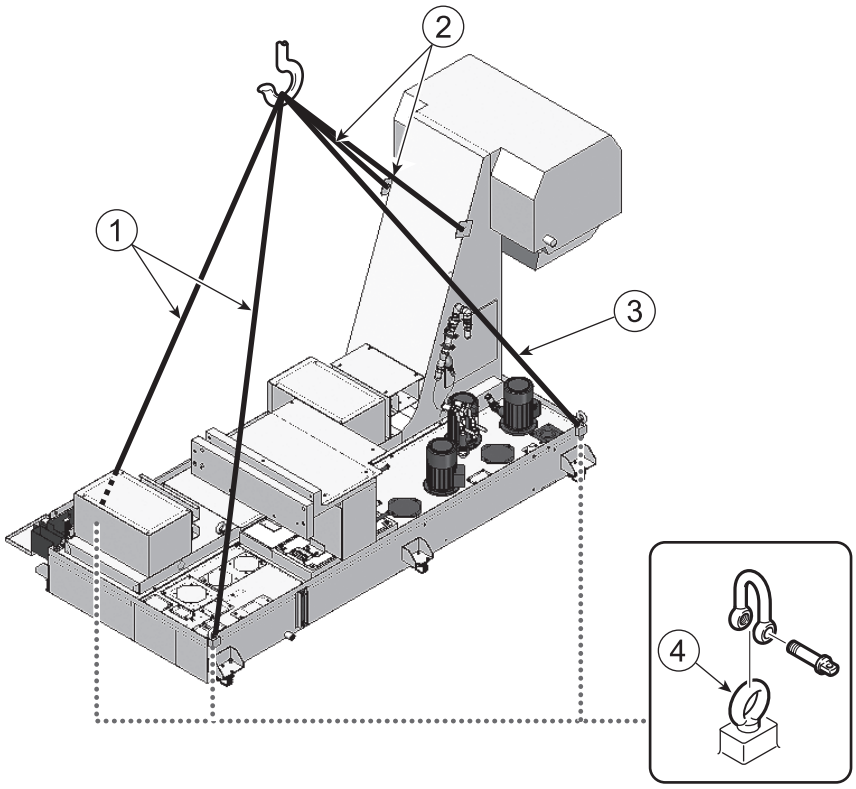
5) 连接软管和电缆。

5) Connect the hoses and cables.

11-3 提升排屑器和切削油箱 （排屑器规格）
Lifting Chip Conveyor and Coolant Tank (Chip Conveyor Specification)

< 机床提升图 >
提升排屑器和切削油箱以前，参见下图。

<Machining Lifting Diagram>
Refer to the following figure before lifting the chip conveyor and the coolant tank.



总质量

1. 铰链鼓式过滤器式排屑器
- NVX5060/40: 700 kg
- NVX5080/40: 700 kg
- NVX5100/40: 750 kg

2. 铰链式排屑器
- NVX5060/40: 385 kg
- NVX5080/40: 385 kg
- NVX5100/40: 435 kg

3. 铰链式排屑器 （EN 标准）
- NVX5060/40: 415 kg
- NVX5080/40: 415 kg
- NVX5100/40: 465 kg

4. 磁刮板式排屑器
- NVX5060/40: 315 kg
- NVX5080/40: 315 kg
- NVX5100/40: 355 kg

5. 磁刮板式排屑器 （EN 标准）
- NVX5060/40: 345 kg
- NVX5080/40: 345 kg
- NVX5100/40: 385 kg

< 所需工具 >
- 钢丝绳

Total Mass

1. Hinge drum filter type chip conveyor
- NVX5060/40: 700 kg
- NVX5080/40: 700 kg
- NVX5100/40: 750 kg

2. Hinge-type chip conveyor
- NVX5060/40: 385 kg
- NVX5080/40: 385 kg
- NVX5100/40: 435 kg

3. Hinge-type chip conveyor (EN standard)
- NVX5060/40: 415 kg
- NVX5080/40: 415 kg
- NVX5100/40: 465 kg

4. Magnet scraper-type chip conveyor
- NVX5060/40: 315 kg
- NVX5080/40: 315 kg
- NVX5100/40: 355 kg

5. Magnet scraper-type chip conveyor (EN Standard)
- NVX5060/40: 345 kg
- NVX5080/40: 345 kg
- NVX5100/40: 385 kg

<Necessary Tools>
- Wire Cable

记号 Symbols	长度 (mm) Length (mm)
①	2500
②	1200

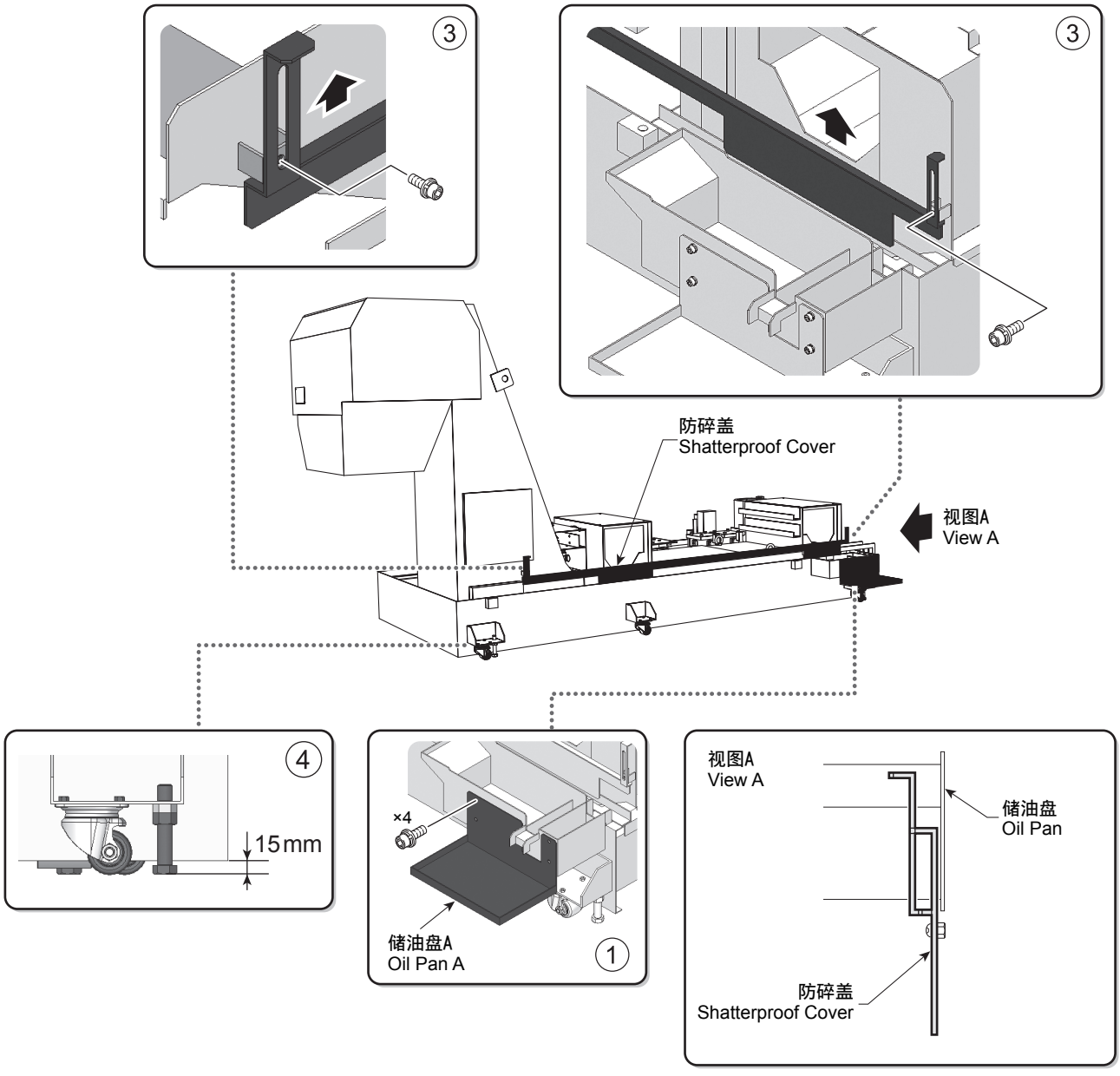
记号 Symbols	长度 (mm) Length (mm)
③	2200

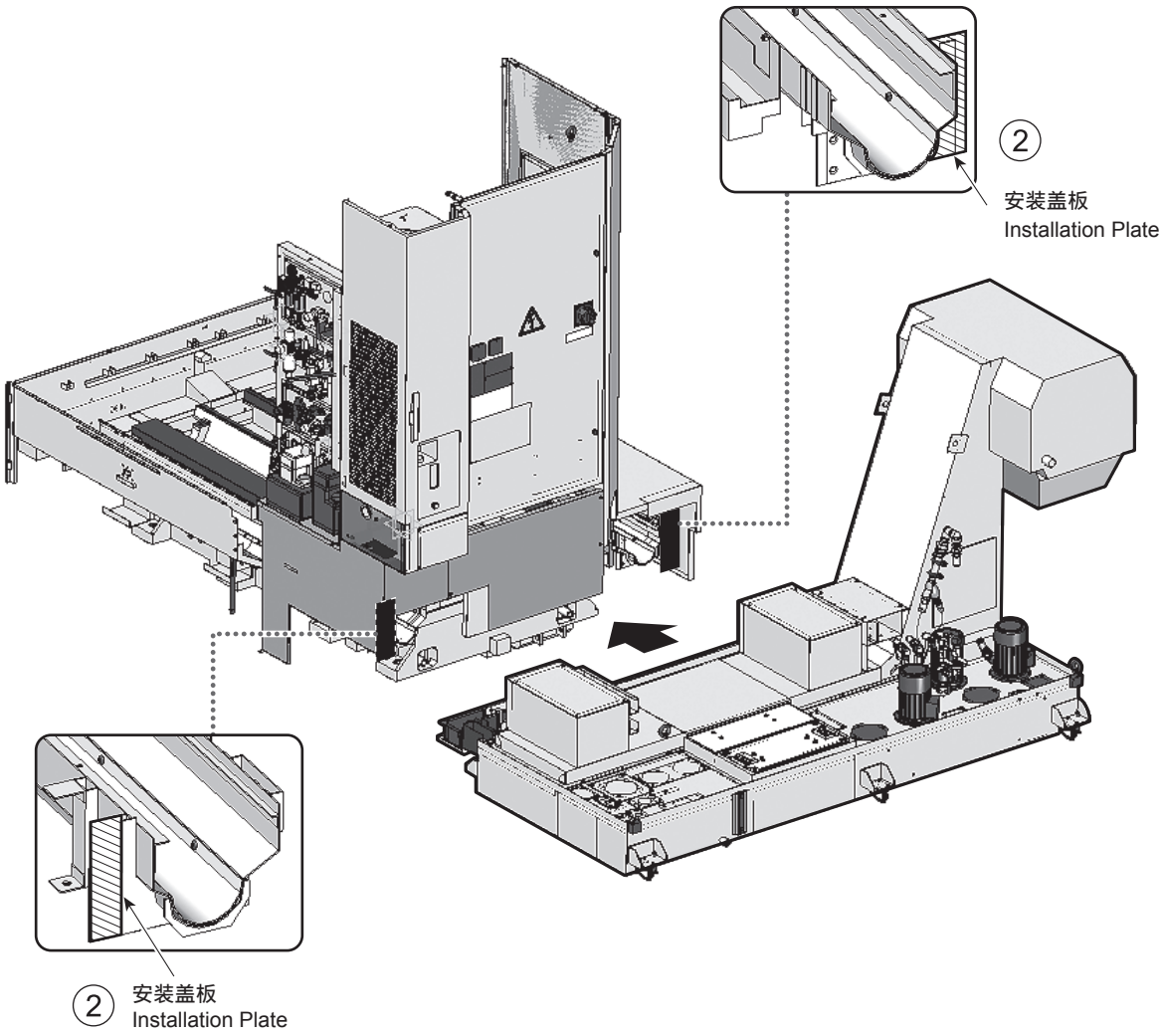
• 吊环螺栓

• Eyebolt

记号 Symbol	尺寸 Size	数量 Q'ty
④	M16	3

11-4 切削油箱和排屑器的安装 Coolant Tank and Chip Conveyor Installation





< 步骤 >

1) 将储油盘 A 安装至切削油箱，并放置接油盘。(①)

2) 将排屑器从后面插入机床，直至排屑器接触安装盖板。(②)

3) 向上滑动防碎盖直至接触储油盘 B，然后用螺栓紧固。(③)

附注

固定防碎盖，让其位于储油盘外侧。（视图 Ⓐ）

4) 让切削油箱与储油盘的接油盘板对齐。

5) 将切削油箱和地面之间的距离调节为 15 mm。(④)

6) 调节千斤顶螺栓将装置固定至地面。

7) 将切削油软管连接至切削油泵。

8) 将软管和电缆连接到主电气柜上。

- 切削油泵：XS406
- 喷淋切削油泵：XS413
- 油枪泵：XS400
- 上提贯穿主轴切削油泵：XS402
- 切削油箱上贯穿主轴切削油泵：XS404
- 切屑冲洗切削油泵：XS412
- 鼓式过滤器清洁泵：XS227

<Procedures>

1) Attach the oil pan A to the coolant tank, and place the drain pan as well. (①)

2) Insert the chip conveyor into the machine from the rear side until the chip conveyor touches the installation plate. (②)

3) Slide up the shatterproof cover until it touches the oil pan B, then secure it with the bolts. (③)

NOTE

Secure the shatterproof cover so that it can be located outside of the oil pan. (View Ⓐ)

4) Position the coolant tank in alignment with the drain pan plate of oil pan.

5) Adjust the space between the coolant tank and the floor to 15 mm. (④)

6) Adjust the jack bolts to secure the unit to the floor.

7) Connect the coolant hoses to the coolant pumps.

8) Connect the hoses and cables to the main electrical cabinet.

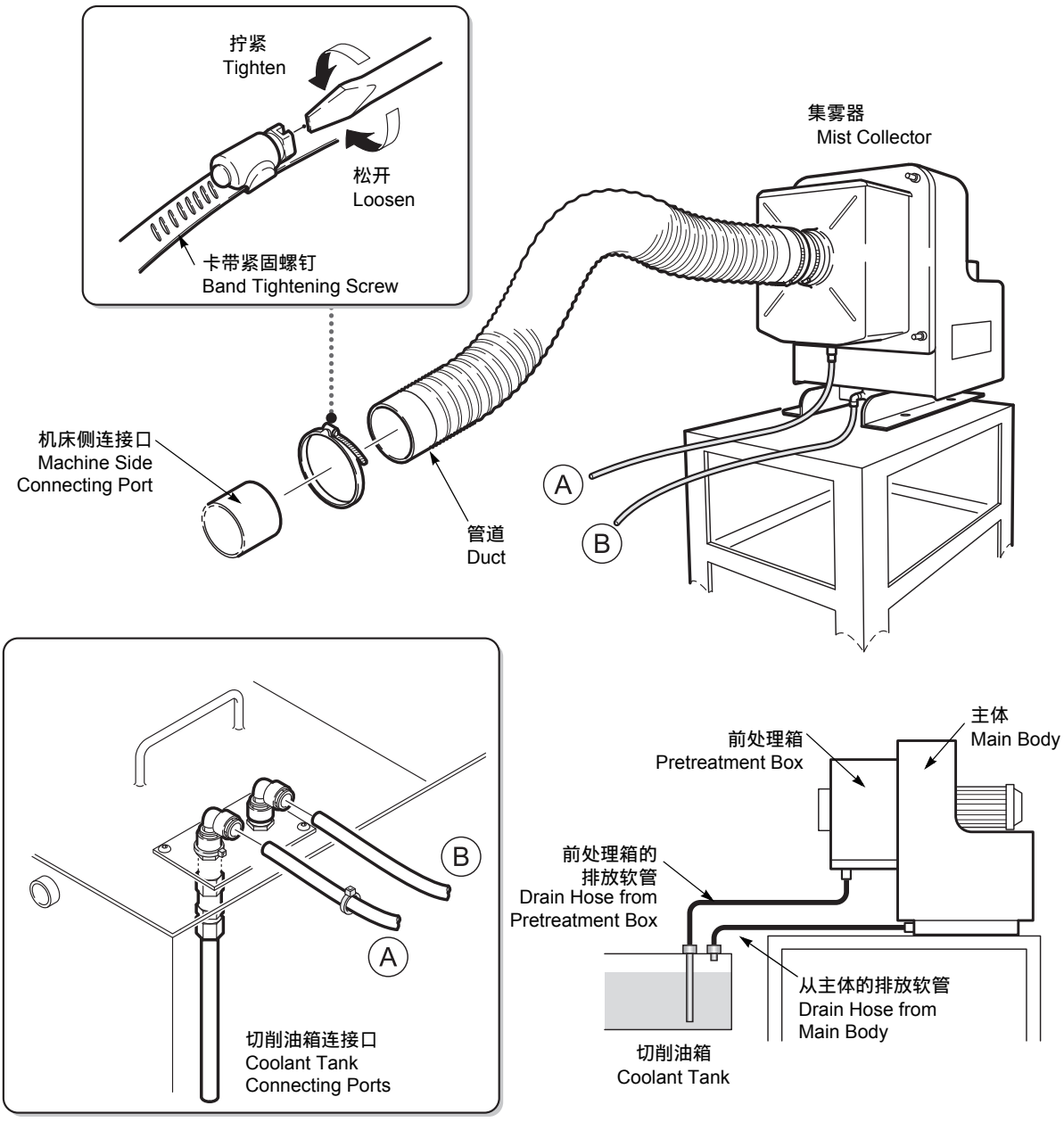
- Coolant pump : XS406
- Shower coolant pump : XS413
- Coolant gun pump : XS400
- Drawing up through-spindle coolant pump : XS402
- Through-spindle coolant pump on coolant tank : XS404
- Chip flushing coolant pump : XS412
- Drum filter cleaning pump : XS227

- 切削油循环泵：XS842
- Coolant circulating pump : XS842

11-5 安装集雾器 （选项）
Mounting the Mist Collector (Option)

集雾器是收集在加工时机床内产生的雾和烟，并且防止它们泄漏出去的装置。 按照下列步骤安装集雾器：

The mist collector is a device which collects mist and smoke generated inside the machine during machining and prevents them from leaking outside. Mount the mist collector using the following procedure:



< 步骤 >

1) 在支架上安装集雾器。

2) 连接管道。

3) 用钢管将排放软管 Ⓐ 从前处理箱连接到切削油箱上的连接口。

4) 不使用钢管将排放软管 Ⓑ 从主体连接到切削油箱上的连接口。

<Procedure>

1) Mount the mist collector on the rack.

2) Connect the duct.

3) Connect the drain hose Ⓐ from the pretreatment box to the connecting port with the steel pipe on the coolant tank.

4) Connect the drain hose Ⓑ from the main body to the connecting port without the steel pipe on the coolant tank.

⚠ 注意

如果排放软管 Ⓐ 和 Ⓑ 连接到错误的连接口，则不能正确排出累积的排放物。 排放软管使用颜色区分。 连接前要进行检查。

附注

1. 用螺丝刀或扳手转动紧固螺钉。
2. 管道和排放软管的安装位置在每台机床上都略有不同。
3. 有关详情，参见单独印制的集雾器使用说明书。

⚠ CAUTION

If drain hoses Ⓐ and Ⓑ are connected to the wrong connecting ports, accumulated drainage will not be discharged properly. The drain hoses are color-coded. Check before connection.

NOTE

1. Turn the band tightening screw using a screwdriver or a spanner.
2. The mounting positions of the duct and the drain hoses differ slightly for each machine.
3. Refer to the mist collector instruction manual published separately for details.

11-6 安装 / 拆卸附加轴 （回转工作台规格）
Mounting/Removing Additional Axis (Rotary Table Specifications)

安装附加轴

< 步骤 >

1) 关闭主电源。

2) 连接信号电缆、电源电缆和刹车软管。

3) 打开主电源。

4) 打开数控电源。

5) 改变数控参数 （仅附加轴）。

数控参数	
#1070 的“A”	将“1”改为“0”
#8201 的“A”	

附注

1. “A”表示附加轴。
2. 对于两个附加轴规格，对第二个附加轴以和第一个附加轴相同的方式更改参数“B”。

6) 关闭数控电源，然后再将其打开。

7) 如果屏幕左上方显示数控警报‘Z70 ABS. ILLEGAL 0001 X’，请设定零点位置。

可以通过在手动归零模式中执行卡爪式归零设定零点位置。

附注

通过一个附加轴和两个附加轴，轴名称改变如下。

第一个附加轴 （旋转轴）的名称为 <A>。
第二个附加轴 （旋转轴）的名称为 <B>。

8) 如下设定零点位置。

a) 按下功能选择键 [SYSTEM] **(系统)**→**[NC 系统]**

b) 可以设定和显示系统参数。

c) 按下菜单选择键 **[<]**。

d) 按下 **[Mainte]**。

e) 按下 **[To Abs pos]**。

f) 按住 **[Next axis]** 直到屏幕右上方显示“C”。

Mounting Additional Axis

<Procedures>

1) Turn OFF the main power.

2) Connect the signal cable, power cable and brake hose.

3) Turn ON the main power.

4) Turn ON the NC power.

5) Change the NC parameters (only additional axis).

NC Parameter	
“A” of #1070	Change “1” to “0”
“A” of #8201	

NOTE

1. “A” indicates the additional axis.
2. For two additional axes specifications, change parameters “B” for the second additional axis in the same manner as with the first additional axis.

6) Turn OFF the NC power and turn it ON again.

7) If the NC alarm ‘Z70 ABS. ILLEGAL 0001 X’ is displayed at the top left of the screen, set the zero point position.

You can set the zero point position by executing a dog type zero return in the manual zero return mode.

NOTE

With one additional axis and two additional axes, the axis names change as follows.
The name of the first additional axis (rotary axis) is <A>.
The name of the second additional axis (rotary axis) is <B>.

8) Set the zero point position is as follows.

a) Press Function selection key [SYSTEM] **(SYSTEM)** → **[NC SYSTEM]**

b) The system parameters can be set and displayed.

c) Press menu selection key **[<]**.

d) Press **[Mainte]**.

e) Press **[To Abs pos]**.

f) Until displaying “C” on the right upper side screen, press **[Next axis]**.

⚠ 注意

注意不要选错轴。

9) 确认实际位置设定屏幕为卡爪。

附注

如果设定不是“DOG”，请确认在实际位置设定屏幕上设定的轴的参数 #2049 设定值为“3”。如是不是，请设定为“3”。

10) 执行手动归零。

一旦到达零点，将建立参照机床坐标系，固定绝对位置，并完成零点初始设定。‘状态’处的显示变为‘Complete’。

附注

1. 如果卡爪式归零操作被中断 （例如通过重新设置而中断），‘状态’处的显示将显示中断前一刻的状态（‘Complete’或‘NG’）。
2. 建立绝对位置的同时，必要的数据被保存到存储器中。
3. 对于卡爪式归零操作，即使当‘状态’显示‘Complete’时，也可以执行其它归零。

11) 关闭数控电源，然后再将其打开。

拆卸附加轴

1) 按下表更改数控参数。

数控参数	
#1070 的“A”	将“0”改为“1”
#8201 的“A”	

附注

1. “A”表示附加轴。
2. 对于两个附加轴规格，对第二个附加轴以和第一个附加轴相同的方式更改参数“B”。

2) 关闭数控电源。

3) 拆下信号电缆、电源电缆和刹车软管。

4) 打开数控电源。

⚠ CAUTION

Be careful not to select the wrong axes.

9) Confirm the Actual Position Setting screen is dog.

NOTE

If the setting is not “DOG”, check that the value set for parameter #2049 is “3” for the axes, set on the Actual Position Setting screen. If it is not, set “3”.

10) Perform the manual zero return.

Upon reaching the zero point, the reference machine coordinate system is established, the absolute position is fixed, and zero point initial setting is completed. The display at ‘STATE’ becomes ‘Complete’.

NOTE

1. If the dog type zero return operation is interrupted, for example by resetting, the display at ‘STATE’ shows the status immediately before the interruption (‘Complete’ or ‘NG’).
2. At the moment the absolute position is established, the necessary data is stored in the memory.
3. With the dog type zero return operation, another zero return can be performed even when ‘STATE’ shows ‘Complete’.

11) Turn OFF the NC Power and turn it ON again.

Removing Additional Axis

1) Change the NC parameters as follows.

NC Parameter	
“A” of #1070	Change “0” to “1”
“A” of #8201	

NOTE

1. “A” indicates the additional axis.
2. For two additional axes specifications, change parameters “B” for the second additional axis in the same manner as with the first additional axis.

2) Turn OFF the NC power.

3) Remove the signal cable, power cable and brake hose.

4) Turn ON the NC power.

12 润滑
LUBRICATION

12-1 推荐用油
Recommended Oils

使用以下推荐用油。使用其他型号的油会降低机床性能。

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

⚠ 注意

客户直接从润滑油制造商获得的 MSDS （材料安全性数据表）。工作环境管理及油的存储和处理是客户的唯一责任。务必注意 MSDS 中讲述的润滑油对人体的影响。

⚠ CAUTION

Receive the MSDS (MATERIAL SAFETY DATA SHEET) from the lubricant manufacturer directly yourself as the customer. Work environment management and the storage and disposal of oils are the sole responsibility of the customer. Take careful note of the effects on the human body described in the MSDS.

关于其它润滑油的详细信息，参见单独保养手册“同等油液”。

For details on other oils, refer to the separate volume, MAINTENANCE MANUAL “Oil Equivalents”.

润滑点	类型	油量 (L)
润滑装置油箱 （用于主轴）	Idemitsu 黛芬妮多效能机械油 32	2
润滑装置油箱 （用于导轨和滚珠丝杠螺母）	Shell 通拿 S68 导轨油	4.2
ATC 装置油箱	Shell 给力高强力齿轮油 80W-90	6.4
风扇冷却器油箱	Idemitsu 黛芬妮超级多效能机械油 2M	7
松开装置油箱	Shell 得力士油 SX-Z46	0.5

Lubricating Point	Type	Quantity (L)
Lubricating Unit Tank (for Spindle)	Idemitsu Daphne Mechanic Oil 32	2
Lubricating Unit Tank (for slideways and ball screw nuts)	Shell Tonna Oil S68	4.2
ATC Unit Tank	Shell Gelco Power Gear 80W-90	6.4
Fan Cooler Tank	Idemitsu Daphne Super Multi Oil 2M	7
Unclamp Unit Tank	Shell Tellus Oil SX-Z46	0.5

13 连接电源 CONNECTING POWER

危险

1. 仅能由合格的电气技师执行电源电缆连接。
2. 必须接地以防止触电。
   [触电]

警告

1. 请务必注意接地电缆，否则漏电电流可能会超过 10 mA。
2. 用相位旋转指示器检查输入电压 L1、L2、L3 (R、S、T) 的相序。
3. 机床必须与其他机床独立接地。此外，如果电焊机或电火花加工机床接地到工厂建筑的框架上，则不要将机床的接地电缆连接到工厂框架上。
4. 使用适合接地电缆的 M8 端子接线柱。
5. 用线管或柔性管保护电源电缆。
6. 用连接器或其他方法将线管或柔性管紧固至控制面板，防止灰尘和液体进入控制面板。
7. 如果不使用线管或柔性管，请使用电缆接头，确保灰尘和液体无法进入控制面板。

从车间侧电源连接一条电缆至机床。

< 步骤 >

1) 断开车间侧电源 （断路器）。
2) 从 L1、 L2 和 L3 接线盒以及从主电气柜中的 PE 端子连接电源电缆至车间侧电源 （断路器）。

附注

在额定电压不是 200 V 和 220 V 的地区，从降压变压器连接电源电缆和接地电缆至车间侧电源 （断路器）。

3) 连接接地电缆。
4) 按下列步骤，确认 200 VAC 接地和短路。
   a) 关闭主断路器 (QF1)。
   b) 拆下 QF1 二次侧 （下侧）端子罩。
   c) 使用检测器，确认地和 QF1 二次侧各相 (L11、 L12、 L13) 之间没有导通。
   d) 使用检测器，确认 QF1 二次侧各相 (L11、 L12、 L13) 之间没有导通。
5) 确认后，重新安装端子罩。

DANGER

1. Only licensed electrical technicians are to perform power cable connections.
2. Grounding must be performed to prevent electrocution.
   [Electric shock]

WARNING

1. Be sure to pay careful attention to the ground cable as the leak current may exceed 10 mA.
2. Check the phase order of the input voltages L1, L2, L3 (R, S, T) using a phase rotation indicator.
3. Machine must be grounded independent of other machines. Furthermore, if electric welders or electric discharge machines are grounded to the frame of the plant building, do not connect the ground cable of the machine to the plant frame.
4. Use the M8 terminal post appropriate for the grounding cable.
5. Protect the power cable with a conduit or a flexible tube.
6. Secure the conduit or flexible cable to the control panel with a connector or other means to prevent the entry of dust and liquids inside the control panel.
7. If you don't use a conduit or flexible tube, use a cable gland and ensure that dust and liquids cannot enter inside the control panel.

Connect an electrical cable from the plant-side power supply to the machine.

<Procedure>

1) Disconnect the plant-side power supply (breaker).
2) Connect the power cable from the L1, L2, and L3 terminal blocks and from the PE terminal in the main electrical cabinet to the plantside power supply (breaker).

NOTE

In areas where the voltage rating is other than 200 V and 220 V, connect the power cable and the earth cable from the step-down transformer to the plant-side power supply (breaker).

3) Connect the grounding cable.
4) Confirm 200 VAC grounding and shorting according to the following procedure.
   a) Turn OFF the main breaker (QF1).
   b) Remove the QF1 secondary side (lower side) terminal cover.
   c) Using a tester, confirm there is no continuity between the earth and each of the QF1 secondary side phases (L11, L12, L13).
   d) Using a tester, confirm there is no continuity between each of the QF1 secondary side phases (L11, L12, L13).
5) Reinstall the terminal cover following confirmation.

附注

确认重新安装端子罩需要额外小心。

6) 使用检测器，确认主电气柜中的 100 VAC 和 24 VDC 端子接地。

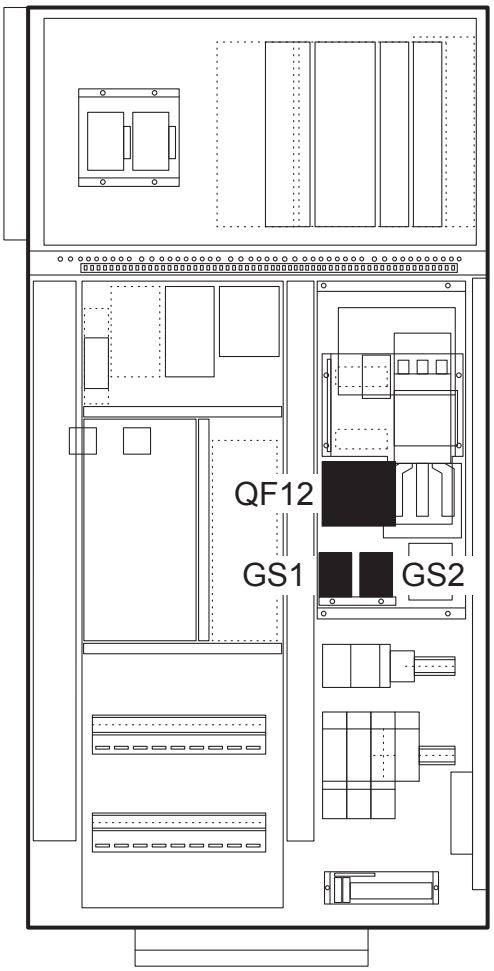
- 位于电气柜中“ QF12 ”的 R11 (100 VAC) 和地之间的电阻值不是 0 Ω。
- 位于电气柜中“ GS1 ”的 NC24 (24 VDC) 和地之间的电阻值不是 0 Ω。
- 位于电气柜中“ GS2 ”的 P24 (24 VDC) 和地之间的电阻值不是 0 Ω。

NOTE

Extra care is to be taken to ensure the terminal cover is reinstalled.

6) Using a tester, confirm grounding of 100 VAC and 24 VDC terminals in the main electrical cabinet.

- The resistance value between R11 (100 VAC) in “QF12” located in the electrical cabinet and the earth is not 0 Ω.
- The resistance value between NC24 (24 VDC) in “GS1” in the electrical cabinet and the earth is not 0 Ω.
- The resistance value between P24 (24 VDC) in “GS2” in the electrical cabinet and the earth is not 0 Ω.



7) 连接车间侧电源 （断路器）。

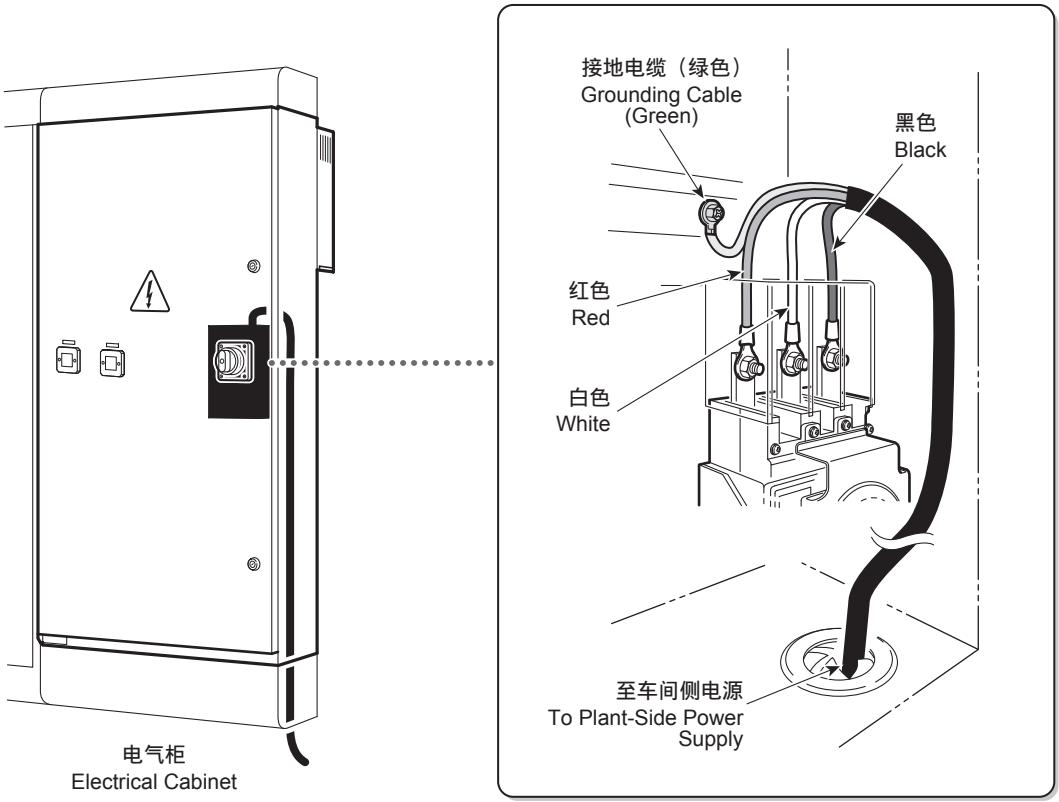
8) 检查输入电压。

9) 使用相位旋转指示器检查相序。

7) Connect the plant-side power supply (breaker).

8) Check the input voltage.

9) Check the phase order using a phase rotation indicator.

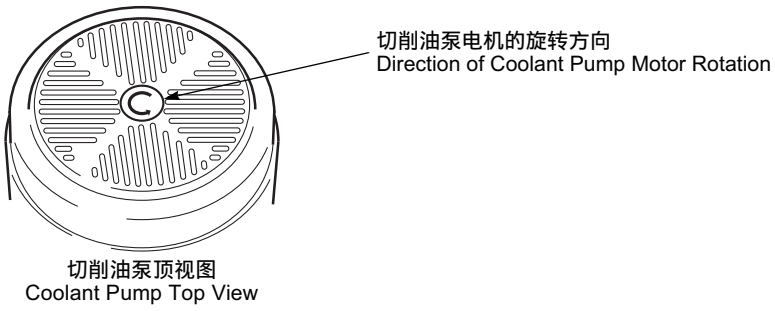


附注

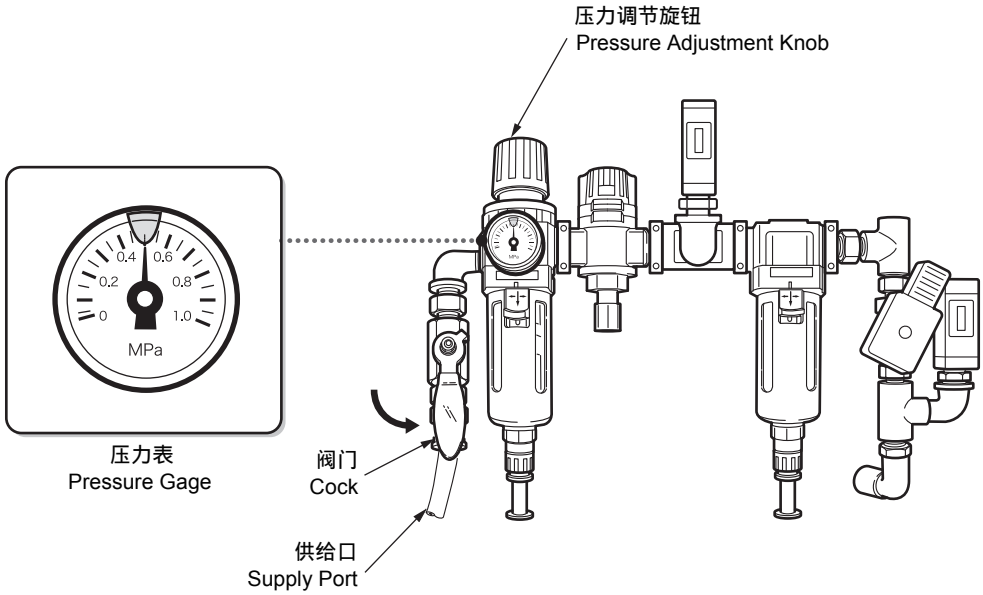
如果不使用相位旋转指示器，通过检查切削油泵电机旋转的方向是否对应切削油泵顶部的箭头来确认相序。

NOTE

If a phase rotation indicator is not available, confirm the phase order by checking if the direction of the coolant pump motor rotation corresponds to that of the arrow on top of the coolant pump.



14 连接气源 CONNECTING AIR SOURCE



< 步骤 >

1) 关闭主电源。

2) 从气源连接压缩空气供给软管至空气装置上的供气口 (Rc 3/8)。

关于空气装置上供气口的详细信息，参见 " 安装图 " （82 页）。

3) 开启压缩机供应压缩空气。

4) 确认软管接头处和气动执行器没有发生空气泄露。

5) 使用下列步骤，执行压缩空气的压力设置 (0.5 MPa)；

a) 旋转阀门至垂直位置以开启压缩空气的供给。

b) 目测检查压力表的读数，确认供应的正确气压为 (0.5 MPa)。

c) 如果供应的气压不正确，按照步骤 ***d)*** - ***f)*** 进行调整。

d) 向上拉压力调节旋钮以打开锁。

e) 旋转压力调节旋钮，设置压力至 0.5 MPa。

< 增加压力 >
顺时针旋转压力调节旋钮。
< 减小压力 >
逆时针旋转压力调节旋钮。

附注

如压力不能调节，检查车间侧气源。

f) 按照设定步骤，向下推压力调节旋钮以锁紧。

<Procedure>

1) Turn OFF the main power.

2) Connect the compressed air supply hose from the air source to the air supply port on the air panel (Rc 3/8).

Refer to “INSTALLATION DIAGRAMS” (page 82) for details on the air supply port on the air panel.

3) Start the compressor to supply compressed air.

4) Confirm air leakage is not occurring at the hose joints and from the pneumatic actuators.

5) Perform compressed air pressure setting (0.5 MPa) using the following procedure;

a) Start the compressed air supply by rotating the cock to a vertical position.

b) Confirm the correct air pressure (0.5 MPa) is supplied by checking the pressure gage visually.

c) If the correct air pressure is not supplied, adjust according to steps ***d)*** - ***f)***.

d) Pull the pressure adjustment knob upward to release lock.

e) Rotate the pressure adjustment knob to set the pressure at 0.5 MPa.

<Increasing Pressure>
Rotate the pressure adjustment knob CW.
<Reducing Pressure>
Rotate the pressure adjustment knob CCW.

NOTE

If the pressure cannot be adjusted, check the plant side air source.

f) Following the setting procedure, push the pressure adjustment knob downward to lock.

15 安装后检查 POST-INSTALLATION CHECKS

15-1 第一次开启电源前的检查 Checks before Turning ON Power for First Time

安装完成后，在第一次开启主电源前，检查下列要点。

- 机床外观 （损坏）
- 外罩、部件 （损坏），喷漆状况
- 连接器、电缆连接点 （不需要检查电气柜）

- 电源输入电压，二次电压
- 200 VAC 接地 / 短路确认
  “ 连接电源 ”（37 页）
- 100 VAC 和 24 VDC 接地确认
  “ 连接电源 ”（37 页）
- 机床规格 （与订购单一致）
- 使用说明书，工具箱，备件
- 固定夹板、吊钩和吊环螺栓的拆除
- 螺栓拧紧
- 气动管道连接的确认
- 主气压为 0.5 MPa
- 液压管道的连接
- 液压装置油位 / 压力
- 检查润滑油油位、冷却油油位和切削油油位
- 辅助装置 （机器人等）配线 / 管路 （专用规格）

- 滑动表面防腐涂层被完全除去
- 加工室内的喷淋切削油喷嘴 （选项）方向

Prior to turning on the main power for the first time after installation, check the following points.

- Machine external appearance (for damage)
- Covers, components (for damage), paint condition
- Connectors, cable connection points (electrical cabinet checks not necessary)
- Power input voltage, secondary voltage
- 200 VAC grounding/shorting confirmation
  “CONNECTING POWER” (page 37)
- 100 VAC and 24 VDC grounding confirmation
  “CONNECTING POWER” (page 37)
- Machine specifications (purchase order conformity)
- Instruction manuals, tool box, spare parts
- Transit clamp, lifting hook and eyebolt removal
- Bolt tightening
- Pneumatic piping connection confirmation
- Main air pressure at 0.5 MPa
- Hydraulic piping connections
- Hydraulic unit oil level/pressure
- Check lubricating oil level, cooling oil level and coolant level
- Auxiliary equipment (robot etc.) wiring/piping (special specifications)
- Sliding surface anti-corrosive coating removal
- Shower coolant nozzle (option) direction in machining chamber

15-2 第一次开启电源后的检查 Checks after Turning ON Power for First Time

如果安装后第一次开启机床电源前的检查没有发生问题，则开启机床电源并执行下列表中的附加检查。

If no problems occur at checks prior to turning ON the machine power for the first time after installation, turn ON the machine power and perform additional checks according to following tables.

检查范围 Check Section	序号 No.	检查项目	Check Items
安装检查 Installation Checks	1	确认环境条件满足要求。	Confirm environment conditions satisfy requirements.
	2	检查所有接头、管路和软管处的油或切削油泄露。	Check for oil or coolant leakage from all joints, pipes and hoses.
	3	确认机床周围的维修区域足够。	Confirm maintenance area around the machine is sufficient.
	4	安全性检查	Safety Checks
	5	确认所有固定夹板都已经拆除。	Confirm all transit clamps have been removed.

检查范围 Check Section	序号 No.	检查项目	Check Items
电源相关 Power-Related	6	开启机床电源后，关闭电源并检查异常情况。	After turning ON machine power, turn the power OFF and check for abnormalities.
	7	开启机床电源后，打开数控电源并检查异常情况。	After machine power turning ON, turn ON the NC power and check for abnormalities.
	8	当按下紧急停止按钮时，确认机床进入紧急停止状态。当运行状况正常时，解除紧急停止。	When the emergency stop button is pressed, confirm the machine enters the emergency stop condition. When operating conditions are normal, release the emergency stop.
联锁操作的确认 Interlock Operation Confirmation	9	检查所有联锁功能。	Check all interlock functions.
	10	操作员门 / 刀库门操作确认	Operator door/magazine door operation confirmation
润滑 Lubrication	11	确保润滑油完全供应给机床的相关零件。	Ensure that lubricant is fully supplied to relevant parts of the machine.
手动操作 Manual Operation	12	手动模式下包括超程功能的轴运动确认	Axis movement confirmation in handle mode including over travel function
	13	快速进给模式下移动所有轴，检查是否有噪音或振动。	Move all axes in rapid traverse mode and check for noise or vibration.
	14	旋转主轴检查是否有异音或振动。	Rotate spindle to check for abnormal noise or vibration.
	15	旋转刀库检查是否有异音或振动	Rotate magazine to check for abnormal noise or vibration
	16	排放切削油并检查是否有噪音或振动。	Discharge coolant and check for noise or vibration.
水平调整 Level Adjustment	17	机床水平检查 / 调整 “ 调整机床水平 ”（19 页）	Machine level checks/adjustment “ADJUSTING MACHINE LEVEL” (page 19)
自动运行 （MDI 模式） Automatic Operation (MDI Mode)	18	所有轴返回参考位置	All axes reference position return
	19	主轴旋转	spindle rotation
	20	发出 T 代码指令以分度刀具，确认旋转状态。	Issue a T code command to index a tool and confirm the status of the rotation.
	21	发出 M06 指令并执行刀具更换操作的确认。	Command M06 and perform tool change operation confirmation.
	22	由 M08、 M09 指令分别激活 / 停止供给	Supply activation/deactivation by M08, M09
	23	辅助装置运行确认	Auxiliary device operation confirmation
自动运行 （存储器模式） Automatic Operation (Memory Mode)	24	确认程序输入和执行。 “ 运行确认的示例程序 ”（43 页）	Confirm program input and execution. “Operation Confirmation Sample Program” (page 43)
	25	激活单个程序块并执行程序。确认程序在各程序块停止。	Activate single block and execute program. Confirm the program stops at each block.
	26	确认进给暂停功能有效。	Confirm the feed hold function is valid.
	27	确认块删除功能有效。	Confirm the block delete function is valid.
主轴预热 Spindle Warm-Up	28	完成所有检查后，执行主轴预热。 单独印制的保养手册中的“主轴预热”	Following completion of all checks, perform spindle warm-up. “Spindle Warm-Up” in the MAINTENANCE MANUAL published separately

15-3 运行确认的示例程序 Operation Confirmation Sample Program

以下是第一次打开主电源时输入并执行的示例程序。

附注

1. 在执行此程序时假设未安装工件或刀具。执行程序前，确认程序内容适合加工环境且程序可以安全执行。
2. 使用最短的刀具以避免干扰。根据刀具长度，修正所有轴的行程距离以便不发生干扰。
3. 此程序基于毫米规格。对于英制规格，需要进行数值的转换。
4. 按下 **[单节执行]** 和 **[可选停止]** 按钮使单个程序块和可选停止功能“有效”，然后逐行确认程序下执行程序。

The following is a sample program to be input and executed the first time the main power is turned ON.

NOTE

1. This program assumes that a workpiece or tools are not mounted during execution. Prior to execution, confirm the program contents are appropriate for the machining environment and the program can be performed safely.
2. Use the shortest tool to avoid interference. Based on the tool-length, modify the travel distance for all axes so that no interference occurs.
3. This program is based on millimeter specifications. For inch specifications, conversion of the values is necessary.
4. Press the **[SINGLE BLOCK] (Single Block)** and **[OSP] (Optional Stop)** buttons to make the single block and optional stop functions “valid”, and execute the program while confirming one line at a time.

```
O0001 (CHECK PROGRAM);

N1 (TOOL CHANGE, TOOL STORAGE);
G00 G91 G28 Z0;
M33;
G04 P2000;
T10;
M06;
G04 P2000;
T1;
M06;
/G04 P2000;
/T17;
/M06;
G04 P2000;
M33;
G04 P2000;
M01;

N2 (SPINDLE ROTATION);
G40 G49 G80;
G00 G91 G28 Z0;
G28 X0 Y0;
T2;
M06;
S200 M03 T8;
G04 X2.0;
S1000;
G04 X5.0;
M06;
S200 M04 T17;
G04 X2.0;
S1000;
G04 X5.0;
M05;
M01;
```

```
N3 (RAPID TRAVERSE);
G91 G28 X0 Y0 Z0;
G00 X−1000.0 Y−500.0 Z−200.0;
X1000.0 Y500.0 Z200.0;
G00 X−1000.0 Y−500.0 Z−200.0;
X1000.0 Y500.0 Z200.0;
G00 X−1000.0 Y−500.0 Z−200.0;
X1000.0 Y500.0 Z200.0;
M01;

N4 (CUTTING FEED);
G00 G91 G28 Z0;
G28 X0 Y0;
T2;
M06;
G91 G28 Z0;
G91 Z−50.0 S500 M03 T3;
G01 X−50.0 Y−150.0 F1000;
Z−50.0;
X−50.0 F800;
Y−50.0;
Z−50.0;
X−50.0 F400;
Y−50.0;
Z−50.0;
G00 G28 X0 Y0 Z0 M19;
M01;

N5 (PLANE DESIGNATION, CIRCULAR INTERPOLATION);
G91 G28 G00;
M06;
G28 X0 Y0;
G91 G00 X−75.0 Y−175.0 Z−100.0 S1000 M03 T4;
G17 G03 X−50.0 Y50.0 I−25.0 F900;
G02 X50.0 Y−50.0 R25.0;
G18 G03 X−50.0 Z50.0 K25.0;
G02 X50.0 Z−50.0 R−25.0;
G02 X50.0 Z−50.0 R−25.0;
G19 G03 Y−50.0 Z50.0 J−25.0;
G00 G28 X0 Y0 Z0 S200;
M05;
M01;

N6 (HIGH SPEED DEEP DRILLING CYCLE);
G91 G28 G00 Z0;
M06;
G28 X0 Y0;
G91 G00 X−50.0 Y−150.0 Z−50.0 S1500 M03 T5;
G99 G73 Z−50.0 Q20.0 R−30.0 F300;
X−50.0 Y−50.0;
X−50.0;
G98 Y−50.0;
G00 G80 X100.0 Y100.0;
G91 G28 X0 Y0 Z0 S200;
M19;

M30;
```

2 章
规格
CHAPTER 2
SPECIFICATIONS

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MACHINE SPECIFICATIONS

2 **数控装置规格** 54
NUMERICAL CONTROL UNIT SPECIFICATIONS

3 **功率容量表** 65
POWER CAPACITY TABLE

1 机床规格 MACHINE SPECIFICATIONS

1-1 NVX5060/40 NVX5060/40

项目 Item			NVX5060/40
行程 Travel	X 轴行程 （工作台的纵向运动） X-Axis Travel (Longitudinal Movement of Table)	mm (in.)	600 (23.62)
	Y 轴行程 （鞍座的横向运动） Y-Axis Travel (Cross Movement of Saddle)	mm (in.)	530 (20.87)
	Z 轴行程 （主轴头的垂直运动） Z-Axis Travel (Vertical Movement of Spindle Head)	mm (in.)	510 (20.08)
	工作台表面到主轴基准面的距离 Distance from Table Surface to Spindle Gage Plane	mm (in.)	150 - 660 (5.91 - 25.98)
工作台 Table	工作台加工面 Table Working Surface	mm (in.)	1100 × 600 (43.31 × 23.62)
	工作台最大装载重量 Table Loading Capacity	kg (lb.)	800 (1760)
	工作台面形状 Table Surface Configuration		18 mmT 型槽 6 个 18 mm T-slot 6 pieces
主轴 Spindle	主轴最大转速 *1 Max. Spindle Speed*1	min^{-1}	12000
	主轴转速范围级数 Number of Spindle Speed Ranges	级 Step	1
	主轴锥形孔的类型 Type of Spindle Taper Hole	NT No.	No. 40
	主轴轴承内径 Spindle Bearing Inner Diameter	mm (in.)	80 (3.14)
进给速度 Feedrate	快速进给速度 Rapid Traverse Rate	mm/min (in.)	X, Y, Z:30000 (1181.1)
	进给速度 Feedrate	mm/min (in.)	1-6000 (0.039-236.22)
	微动进给速度 Jog Feedrate	mm/min (in.)	0 - 5000 (0 - 197) <20 级 > 0 - 5000 (0 - 197) <20 Steps>

项目 Item			NVX5060/40
ATC 装置 ATC Unit	刀柄的类型 Type of Tool Shank		MAS-BT40 [CAT-40 DIN-40 HSK A-63]
	拉钉的类型 Type of Retention Knob		90° 森精机专用 [MAS-I [45°]、MAS-II [60°]、DIN、HSK] 90° For Mori Seiki [MAS-I [45°], MAS-II [60°], DIN, HSK]
	刀具收存数 Tool Storage Capacity	刀具 Tools	30 [60]
	最大刀具直径 < 有相邻刀具 > Maximum Tool Diameter <With Adjacent Tools>	mm (in.)	80 (3.14)
	最大刀具直径 < 无相邻刀具 > Maximum Tool Diameter <Without Adjacent Tools>	mm (in.)	150 (5.9)
	最大刀具长度 Maximum Tool Length	mm (in.)	300 (11.81)
	最大刀具质量 Maximum Tool Mass	kg (lb.)	8 (17.6) [12 (26.4)]
	刀具选择方法 Method of Tool Selection		任选法 Technical Memory Random Method
电机 Motors	主轴驱动电机（10%ED/ 连续） Spindle Drive Motor (10%ED/Cont.)	kW (HP)	15/11 (20.1/14.74)
	进给电机 Feed Motors	kW (HP)	X, Y:3.0 (4.02), Z: 4.5 (6.03)
	润滑油泵电机 Lubricant Pump Motor	kW (HP)	0.017 (0.023) × 2
	切削油泵电机 Coolant Pump Motor	kW (HP)	0.73 (0.98) × 2*2, 1.21 (1.62) × 2*3
	油冷却器泵电机 Oil Cooler Pump Motor	kW (HP)	0.68/ 0.77/ 0.69 (200 V: 50 Hz/ 200 V: 60 Hz/ 220 V: 60 Hz)
所需气源 Required Air Source	压缩空气气源 Compressed Air Supply	MPa (psi) L/min (gpm)	0.5 (71.1), 240 (63.4) <ANR>*4
油箱容量 Tank Capacity	润滑油油箱容量 Lubricant Tank Capacity	L (gal.)	2.0 (0.53) < 主轴 > 2.0 (0.53) <Spindle> 4.2 (1.11)< 导轨和滚珠丝杆 > 4.2 (1.11) <Slideway and Ball Screw>
	切削油箱容量 Coolant Tank Capacity	L (gal.)	302 (79.73)*5 613 (161.83)*6
机床尺寸 Machine Size	机床高度 Machine Height	mm (in.)	2596.5 (102.22)
	占地空间 Floor Space	mm (in.)	2340 × 2958 (92.01 × 116.46)
	机床质量 Mass of Machine	kg (lb.)	6350 (13970)

附注

1. [ ] 中的值用于选项。
2.
   *1 根据工件夹紧装置、夹具和使用刀具的限制，可能不能以最大主轴转速旋转。
   *2 50 Hz 的场合

NOTE

1. Values in [ ] are for options.
2.
   *1 Depending on restrictions imposed by the workpiece clamping device, jig, and tool used, it may not be possible to rotate at the maximum spindle speed.
   *2 At 50 Hz

*3 60 Hz 的场合
*4 不包括刀尖吹风。
ANR 显示标准大气状况 - 温度 20°C 绝对气压为 101.3 kPa（29.92 汞柱），且相对湿度为 65%。
*5 切屑车规格
*6 排屑器规格

*3 At 60 Hz
*4 Tool tip air-blow is not included.
ANR indicates the standard air state - temperature of 20°C absolute pressure of 101.3 kPa (29.92 inHg), and relative humidity of 65%.
*5 Chip Bucket Specification
*6 Chip Conveyor Specification

1-2 NVX5080/40
NVX5080/40

项目 Item			NVX5080/40
行程 Travel	X 轴行程 （工作台的纵向运动） X-Axis Travel (Longitudinal Movement of Table)	mm (in.)	800 (31.5)
	Y 轴行程 （鞍座的横向运动） Y-Axis Travel (Cross Movement of Saddle)	mm (in.)	530 (20.87)
	Z 轴行程 （主轴头的垂直运动） Z-Axis Travel (Vertical Movement of Spindle Head)	mm (in.)	510 (20.08)
	工作台表面到主轴基准面的距离 Distance from Table Surface to Spindle Gage Plane	mm (in.)	150 - 660 (5.91 - 25.98)
工作台 Table	工作台加工面 Table Working Surface	mm (in.)	1100 × 600 (43.31 × 23.62)
	工作台最大装载重量 Table Loading Capacity	kg (lb.)	1000 (2200)
	工作台面形状 Table Surface Configuration		18 mmT 型槽 6 个 18 mm T-slot 6 pieces
主轴 Spindle	主轴最大转速 *1 Max. Spindle Speed*1	min^{-1}	12000
	主轴转速范围级数 Number of Spindle Speed Ranges	级 Step	1
	主轴锥形孔的类型 Type of Spindle Taper Hole	NT No.	No. 40
	主轴轴承内径 Spindle Bearing Inner Diameter	mm (in.)	80 (3.14)
进给速度 Feedrate	快速进给速度 Rapid Traverse Rate	mm/min (in.)	X, Y, Z:30000 (1181.1)
	进给速度 Feedrate	mm/min (in.)	1-6000 (0.039-236.22)
	微动进给速度 Jog Feedrate	mm/min (in.)	0 - 5000 (0 - 197) <20 级 > 0 - 5000 (0 - 197) <20 Steps>

项目 Item			NVX5080/40
ATC 装置 ATC Unit	刀柄的类型 Type of Tool Shank		MAS-BT40 [CAT-40 DIN-40 HSK A-63]
	拉钉的类型 Type of Retention Knob		90° 森精机专用 [MAS-I<45°>、 MAS-II <60°>、 DIN、HSK] 90° For Mori Seiki [MAS-I <45°>, MAS-II <60°>, DIN, HSK]
	刀具收存数 Tool Storage Capacity	刀具 Tools	30 [60]
	最大刀具直径 < 有相邻刀具 > Maximum Tool Diameter <With Adjacent Tools>	mm (in.)	80 (3.14)
	最大刀具直径 < 无相邻刀具 > Maximum Tool Diameter <Without Adjacent Tools>	mm (in.)	150 (5.9)
	最大刀具长度 Maximum Tool Length	mm (in.)	300 (11.81)
	最大刀具质量 Maximum Tool Mass	kg (lb.)	8 (17.6)
	刀具选择方法 Method of Tool Selection		任选法 Technical Memory Random Method
电机 Motors	主轴驱动电机 （30 分 / 连续） Spindle Drive Motor (30 min./Cont.)	kW (HP)	15/11 (20/15)
	进给电机 Feed Motors	kW (HP)	X, Y: 3.0 (4.02), Z: 4.5 (6.03)
	润滑油泵电机 Lubricant Pump Motor	kW (HP)	0.017 (0.023) × 2
	切削油泵电机 Coolant Pump Motor	kW (HP)	0.73 (0.98) × 2[*2], 1.21 (1.62) × 2[*3]
	油冷却器泵电机 Oil Cooler Pump Motor	kW (HP)	0.68/ 0.77/ 0.69 (200 V: 50 Hz/ 200 V: 60 Hz/ 220 V: 60 Hz)
所需气源 Required Air Source	压缩空气气源 Compressed Air Supply	MPa (psi) L/min (gpm)	0.5 (71.1), 240 (63.4) <ANR>[*4]
油箱容量 Tank Capacity	滑剂油箱容量 Lubricant Tank Capacity	L (gal.)	2.0< 主轴 > 2.0 <Spindle> 4.2< 导轨和滚珠丝杆 > 4.2 <Slideway and Ball Screw>
	切削油箱容量 Coolant Tank Capacity	L (gal.)	302 (79.73)[*5] 613 (161.83)[*6]
机床尺寸 Machine Size	机床高度 Machine Height	mm (in.)	2596.5 (102.22)
	占地空间 Floor Space	mm (in.)	2180 × 3718 (85.83 × 146.38)
	机床质量 Mass of Machine	kg (lb.)	6350 (13970)

附注

1. [ ] 中的值是选项。

NOTE

1. Values in [ ] are for options.

2.

*1 根据工件夹紧装置、夹具和使用刀具的限制，可能不能以最大主轴转速旋转。

*2 50 Hz 的场合

*3 60 Hz 的场合

*4 不包括刀尖吹风。
ANR 显示标准大气状况 - 温度 20°C 绝对气压为 101.3 kPa（29.92 汞柱），且相对湿度为 65%。

*5 切屑车规格

*6 排屑器规格

2.

*1 Depending on restrictions imposed by the workpiece clamping device, jig, and tool used, it may not be possible to rotate at the maximum spindle speed.

*2 At 50 Hz

*3 At 60 Hz

*4 Tool tip air-blow is not included.
ANR indicates the standard air state - temperature of 20°C absolute pressure of 101.3 kPa (29.92 inHg), and relative humidity of 65%.

*5 Chip Bucket Specification

*6 Chip Conveyor Specification

1-3 NVX5100/40
NVX5100/40

项目 Item			NVX5100/40
行程 Travel	X 轴行程 （工作台的纵向运动） X-Axis Travel (Longitudinal Movement of Table)	mm (in.)	1050 (41.34)
	Y 轴行程 （鞍座的横向运动） Y-Axis Travel (Cross Movement of Saddle)	mm (in.)	530 (20.87)
	Z 轴行程 （主轴头的垂直运动） Z-Axis Travel (Vertical Movement of Spindle Head)	mm (in.)	510 (20.08)
	从工作台面到 主轴基准面的距离 Distance from Table Surface to Spindle Gage Plane	mm (in.)	150 - 660 (5.91 - 25.98)
工作台 Table	工作台加工面 Table Working Surface	mm (in.)	1100 × 600 (43.31 × 23.62)
	工作台最大装载重量 Table Loading Capacity	kg (lb.)	1200 (2640)
	工作台面形状 Table Surface Configuration		18 mmT 型槽 6 个 18 mm T-slot 6 pieces
主轴 Spindle	主轴最大转速 *1 Max. Spindle Speed*1	min^{-1}	12000
	主轴转速范围级数 Number of Spindle Speed Ranges	级 Step	1
	主轴锥形孔的类型 Type of Spindle Taper Hole	NT No.	No. 40
	主轴轴承内径 Spindle Bearing Inner Diameter	mm (in.)	80 (3.14)
进给速度 Feedrate	快速进给速度 Rapid Traverse Rate	mm/min (in.)	X, Y, Z:30000 (1181.1)
	进给速度 Feedrate	mm/min (in.)	1-6000 (0.039-236.22)
	微动进给速度 Jog Feedrate	mm/min (in.)	0 - 5000 (0 - 197) <20 级 > 0 - 5000 (0 - 197) <20 Steps>

项目 Item			NVX5100/40
ATC 装置 ATC Unit	刀柄的类型 Type of Tool Shank		MAS-BT40 [CAT-40 DIN-40 HSK A-63]
	拉钉的类型 Type of Retention Knob		90° 森精机专用 [MAS-I [45°]、 MAS-II [60°]、 DIN、 HSK] 90° For Mori Seiki [MAS-I [45°], MAS-II [60°], DIN, HSK]
	刀具收存数 Tool Storage Capacity	刀具 Tools	30 [60]
	最大刀具直径 < 有相邻刀具 > Maximum Tool Diameter <With Adjacent Tools>	mm (in.)	80 (3.14)
	最大刀具直径 < 无相邻刀具 > Maximum Tool Diameter <Without Adjacent Tools>	mm (in.)	150 (5.9)
	最大刀具长度 Maximum Tool Length	mm (in.)	300 (11.81)
	最大刀具质量 Maximum Tool Mass	kg (lb.)	8 (17.6)
	刀具选择方法 Method of Tool Selection		任选法 Technical Memory Random Method
电机 Motors	主轴驱动电机 (30 min/ 连续) Spindle Drive Motor (30 min./Cont.)	kW (HP)	15/11 (20/15)
	进给电机 Feed Motors	kW (HP)	X, Y: 3.0 (4.02), Z: 4.5 (6.03)
	润滑油泵电机 Lubricant Pump Motor	kW (HP)	0.017 (0.023) × 2
	切削油泵电机 Coolant Pump Motor	kW (HP)	0.73 (0.98) × 2*2, 1.21 (1.62) × 2*3
	油冷却器泵电机 Oil Cooler Pump Motor	kW (HP)	0.68/ 0.77/ 0.69 (200 V: 50 Hz/ 200 V: 60 Hz/ 220 V: 60 Hz)
所需气源 Required Air Source	压缩空气气源 Compressed Air Supply	MPa (psi) L/min (gpm)	0.5 (71.1), 240 (63.4) <ANR>*4
油箱容量 Tank Capacity	滑剂油箱容量 Lubricant Tank Capacity	L (gal.)	2.0< 主轴 > 2.0 <Spindle> 4.2< 导轨和滚珠丝杆 > 4.2 <Slideway and Ball Screw>
	切削油箱容量 Coolant Tank Capacity	L (gal.)	700 (184.8)*5
机床尺寸 Machine Size	机床高度 Machine Height	mm (in.)	2596.5 (102.22)
	占地空间 Floor Space	mm (in.)	2788 × 3618.7 (109.76 × 142.47)
	机床质量 Mass of Machine	kg (lb.)	6810 (14982)

附注

1. [ ] 中的值是选项。
2.
   *1 根据工件夹紧装置、夹具和使用刀具的限制，可能不能以最大主轴转速旋转。
   *2 50 Hz 的场合

NOTE

1. Values in [ ] are for options.
2.
   *1 Depending on restrictions imposed by the workpiece clamping device, jig, and tool used, it may not be possible to rotate at the maximum spindle speed.
   *2 At 50 Hz

*3 60 Hz 的场合
*4 不包括刀尖吹风。
ANR 显示标准大气状况 - 温度 20°C 绝对气压为 101.3 kPa（29.92 汞柱），且相对湿度为 65%。
*5 排屑器规格

*3 At 60 Hz
*4 Tool tip air-blow is not included.
ANR indicates the standard air state - temperature of 20°C absolute pressure of 101.3 kPa (29.92 inHg), and relative humidity of 65%.
*5 Chip Conveyor Specification

2 数控装置规格 NUMERICAL CONTROL UNIT SPECIFICATIONS

(I95042)

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
1	控制轴数 CONTROLLED AXES			
1–1	最大可控数控轴 Maximum Controllable NC Axes		8	8
1–2	控制轴数 Controlled Axes	X, Y, Z, MG	○	○
1–3	联动控制轴数 （标准） Number of Simultaneously Controllable Axes (Standard)		4	5
1–4	控制主轴数 Number of Controlled Spindles		1	1
1–5	C 轴轮廓控制 C-Axis Contouring Control		△	△
1–6	扩展轴名称 Expansion Axis Name	最多 2 个字母 Maximum of 2 Letters	○	○
1–7	磁极位置检测 Magnetic Pole Position Detection		○	○
1–8	控制轴的拆卸 Removal of Controlled Axes		○	○
1–9	最小输入单位 Least Input Increment	0.001 mm/0.0001 in./0.001°	○	○
1–10	最小指令增量 Least Command Increment	0.001 mm/0.0001 in./0.001°	○	○
1–11	最大可编程值 Maximum Programmable Value	±99999.999 mm/9999.9999 in.	○	○
1–12	英制 / 米制转换 Inch/Metric Conversion	G20/G21	○	○
1–13	联锁 Interlock	可选外部输入控制轴联锁。 The external-input controlled axis Interlock is optional.	○	○
1–14	机床锁 Machine Lock		○	○
1–15	紧急停止 Emergency Stop		○	○
1–16	超程 Overtravel		○	○
1–17	门联锁 Door Interlock		○	○
1–18	存储行程限制检查 1/2 Stored Stroke Limit Check 1/2		○	○
1–19	存储行程限制检查 IB Stored Stroke Limit Check IB		△	△
1-20	存储行程限制检查 2B Stored Stroke Limit Check 2B		△	△

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
1-21	存储行程限制检查 1C Stored Stroke Limit Check 1C		△	△
1−22	存储行程限制检查 2、 3 Stored Stroke Limit Check 2, 3		△	△
1−23	镜像 Mirror Image		○	○
1−24	跟随 Follow-Up		○	○
1−25	旋转范围干涉检查 Rotation Range Interference Check		△	△
1−26	位置开关 Position Switch		*1	*1
1−27	高速位置开关 High-Speed Position Switch		*1	*1
1−28	负载监视功能 Load Monitoring Function	软键类型 Soft-Key Type	○	○
2	运行操作 OPERATION			
2−1	自动运行 （存储器） Automatic Operation (Memory)		○	○
2−2	MDI 操作 MDI Operation		○	○
2−3	DNC 运行 DNC Operation		○	○
2−4	使用存储卡的 DNC 运行 DNC Operation Using Memory Card		△*2	△*2
2−5	程序编号搜索 Program Number Search		○	○
2−6	序号搜索 Sequence Number Search		○	○
2−7	序号校对和停止 Sequence Number Collation and Stop		△	△
2−8	程序重新启动 Program Restart		△	△
2−9	刚性攻丝返回 Rigid Tapping Return		○	○
2−10	缓冲寄存器 Buffer Register		○	○
2−11	指定进给功能 Dry Run		○	○
2−12	单个程序块 Single Block		○	○
2−13	微动进给 Jog Feed	0 - 5000 mm/min （20 级） 0 - 5000 mm/min (20 Steps)	○	○
2−14	手动归零 Manual Zero Return		○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
2−15	无卡爪的零点设定 Zero Point Setting without Dog		○	○
2−16	零点返回速度设定 Zero Point Return Speed Setting		○	○
2−17	手动脉冲把手进给 Manual Pulse Handle Feed	手动脉冲把手 1 个 ×1、×10、×100 Manual Pulse Handle 1 ×1, ×10, ×100	○	○
2−18	手动脉冲把手控制 （2/3 把手） Manual Pulse Handle Control (2/3 Handles)		☆	☆
2−19	手动脉冲把手进给倍率 Manual Pulse Handle Feed Multiplication	×1, ×10, ×100	○	○
2−20	手动模式下的手动中断 Manual Interruption in Handle Mode		△	△
2−21	缩回 Retrace		☆	☆
2−22	Z 轴指令废除 Z-Axis Command Neglect		○	○
3	插补 INTERPOLATION			
3−1	纳米插补 Nano Interpolation		○	○
3−2	定位 Positioning	G00	○	○
3−3	单向定位 Uni-Directional Positioning		○	○
3−4	精确定位模式 Exact Stop Mode	G61	○	○
3−5	攻丝模式 Tapping Mode	G63	○	○
3−6	车加工模式 Turning Mode	G64	○	○
3−7	精确定位 Exact Stop	G09	○	○
3−8	线性插补 Linear Interpolation	G01	○	○
3−9	圆弧插补 Circular Interpolation	G02/G03：CW/CCW	○	○
3−10	停留时间 Dwell	G04	○	○
3−11	圆柱插补 Cylindrical Interpolation	G7.1	△	△
3−12	螺旋插补 Helical Interpolation	任意两轴和一个附加轴 Any 2 Axes and an Additional 1 Axis	○	○
3−13	螺旋线 / 圆锥插补 Spiral/Conical Interpolation		△	△
3−14	SSS 控制 SSS Control		△	△

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
3–15	螺纹切削 / 同步进给 Thread Cutting/Synchronous Feed		△	△
3–16	跳步功能 Skip Function	G31	○	○
3–17	多步跳过 Multi-Skip		△	△
3–18	高速跳步 High-Speed Skip		○	○
3–19	归零 Zero Point Return	G28	○	○
3–20	归零检查 Zero Return Check	G27	○	○
3–21	从零点返回 Return From Zero Point	G29	○	○
3–22	第 2 零点返回 2nd Zero Point Return	G30	○*3	○*3
3–23	第 3/4 零点返回 3rd/4th Zero Point Return		○	○
3–24	浮动归零 Floating Zero Point Return		○	○
3–25	法线方向控制 Normal Direction Control	G41.1 （左） /G42.1 （右） /G40.1 （取消） G41.1 (Left)/G42.1 (Right)/G40.1 (Cancel)	△	△
4	进给功能 FEED FUNCTIONS			
4–1	快速进给速度 Rapid Traverse Rate	最大 30000 mm/min Maximum of 30000 mm/min	○	○
4–2	切削进给速度 Cutting Feedrate	*4	○	○
4–3	快进倍率 Rapid Traverse Rate Override	F0/1/10/25/100%	○	○
4–4	每分钟进给量 Feed per Minute	G94	○	○
4–5	每转进给量 Feed per Revolution	G95	△*5	△*5
4–6	恒定切向速度控制 Constant Tangential Velocity Control		○	○
4–7	切削进给速度固定 Cutting Feedrate Clamp		○	○
4–8	自动加速 / 减速 Automatic Acceleration/Deceleration	直线型 （快速进给） / 指数函数型 （切削进给） Linear-Type (Rapid Traverse)/Exponential Function-Type (Cutting Feed)	○	○
4–9	快速进给的钟形加速 / 减速 Bell-Shaped Acceleration/ Deceleration for Rapid Traverse		○	○
4–10	最优加速 / 减速定位功能 Positioning by Optimized Acceleration/ Deceleration Function		○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
4−11	切削进给插补后钟形加速 / 减速 Bell-Shaped Acceleration/ Deceleration after Cutting Feed Interpolation		○	○
4−12	进给倍率 Feedrate Override		○	○
4−13	第二进给倍率 Second Feedrate Override	有关详情请咨询 Consultation Required for Details	☆	☆
4−14	F1- 数字进给 F1-Digit Feed	F1 - F9	△	△
4−15	反比时间进给 Inverse Time Feed		△	△
4−16	进给倍率取消 Feedrate Override Cancel	M48， M49	○	○
4−17	外部减速 External Deceleration		○	○
4−18	切削进给插补后的线性加速 / 减速 Linear Acceleration/Deceleration after Cutting Feed Interpolation		○	○
4−19	高速高精度控制 I（人工智能轮廓控制） High-Speed, High-Precision Control I (AI Contour Control)		△	△
4−20	高速高精度控制 II（高精度轮廓控制） High-Speed, High-Precision Control II (High Contour Control)		△	△
4−21	先行插补前钟形加速 / 减速 Bell-Shaped Acceleration/ Deceleration before Look-Ahead Interpolation		△	○
4−22	高精度控制 High Precision Control		○	○
5	程序输入 PROGRAM INPUT			
5−1	带码 Tape Code	EIA/ISO 代码自动识别 EIA/ISO Code Automatic Discrimination	○	○
5−2	标签跳步 Label Skip		○	○
5−3	奇偶校验 Parity Check	奇偶性 H、奇偶性 V Parity H, Parity V	○	○
5−4	控制缩回 / 伸出 Control In/Out		○	○
5−5	可选程序块跳步 Optional Block Skip		○	○
5−6	附加可选程序块跳步 Additional Optional Block Skip	BDT2 - BDT9	△	△
5−7	最大可编程值 Maximum Programmable Value	±8 位 ±8-Digit	○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
5−8	程序号 / 程序名 Program Number/Program Names	程序编号：4 位 *6 Program Number: 4-Digit*6 程序名称：48 个字符 Program Name: 48 Characters	○	○
5−9	绝对 / 增量编程 Absolute/Incremental Programming	G90/G91	○	○
5−10	小数点编程 Decimal Point Programming	可通过参数设定选择电子计算器类型小数点编程。 Electronic calculator type decimal point programming can be selected by parameter setting.	○	○
5−11	直径指定 Diameter Programming		○	○
5−12	半径指定 Radius Programming		○	○
5−13	平面选择 Plane Selection	G17、 G18、 G19	○	○
5−14	旋转轴指定 Rotary Axis Designation		○	○
5−15	旋转轴滚动 Rotary Axis Roll-Over		○	○
5−16	极坐标指令 Polar Coordinate Command		△	△
5−17	坐标系设定 Coordinate System Setting	G92 （加工中心） G92 (Machining Centers)	○	○
5−18	自动坐标系设定 Automatic Coordinate System Setting		○	○
5−19	工件坐标系 Work Coordinate System	G52 - G59	○	○
5−20	工件坐标系预设 Work Coordinate System Preset	G92.1	△	△
5−21	附加工件坐标系组数 Additional Work Coordinate System Sets	共 48 组 Total 48 Sets	△	△
5−22	手动绝对 Manual Absolute	可编程控制器参数 PC Parameter	○	○
5−23	任意角度倒角 / 倒圆角 Arbitrary Angle Chamfering/Corner Rounding		△	△
5−24	可编程数据输入 Programmable Data Input	G10、 G11 （功能取消） G10, G11 (Function Cancel)	○	○
5−25	可编程参数输入 Programmable Parameter Input	由可编程数据输入替代 Substituted by Programmable Data Input	○	○
5−26	子程序调用 Sub-Program Call	最多 8 层嵌套 Up to 8 Levels of Nesting	○	○
5−27	自定义宏程序 Custom Macro		○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
5−28	附加自定义宏程序公共变量 Additional Custom Macro Common Variables	#100 - #199, #500 - #999	△	△
5−29	中断式自定义宏程序 Interruption Type Custom Macro		△	△
5−30	孔加工封闭循环 Hole Machining Canned Cycle	G80 - G89	○	○
5−31	圆弧半径指令 Circular Arc Radius Command		○	○
5−32	自动拐角倍率 Automatic Corner Override		○	○
5−33	缩放 Scaling	G50/G51	△	△
5−34	坐标系旋转 Coordinate System Rotation	G68/G69	△	△
5−35	三维坐标转换 3D Coordinate Conversion		△	△
5−36	斜面加工指令 Inclined Face Machining Command		△	△
5−37	可编程镜像 Programmable Mirror Image		○	○
5−38	小直径深孔钻削循环 Small Diameter Deep Hole Drilling Cycle		△	△
5−39	最小输入单位 C Least Input Increment C	0.0001 mm/0.00001 in./0.0001°	△	△
5-40	序号 Sequence Number	5 位 5-Digit	○	○
6	辅助功能 / 主轴转速功能 MISCELLANEOUS FUNCTION/SPINDLE SPEED FUNCTION			
6−1	辅助功能 （M 功能） Miscellaneous Function (M Function)	4 位数 M 代码 4-Digit M Code	○	○
6−2	第二辅助功能 Secondary Miscellaneous Function		☆	☆
6−3	辅助功能锁 Auxiliary Function Lock		○	○
6−4	高速 M/S/T/B 接口 High-Speed M/S/T/B Interface		○	○
6−5	辅助功能复数指令 Multiple Miscellaneous Function Commands	3 个指令 3 Commands	○	○
6−6	主轴功能 （S 功能） Spindle Function (S Function)	5 位数 S 代码 5-Digit S Code	○	○
6−7	主轴串行输出 Spindle Serial Output		○	○
6−8	恒线速控制 Constant Surface Speed Control	G96/G97 （取消） G96/ G97 (Cancel)	△	△

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
6–9	主轴转速倍率 Spindle Speed Override	50 -150% （10% 增量） 50 - 150% (10% Increments)	○	○
6–10	主轴定位 Spindle Orientation		○	○
6–11	主轴输出切换 Spindle Output Switching		○	○
6–12	刚性攻丝 Rigid Tapping		○	○
7	刀具偏移 TOOL OFFSET			
7–1	刀具功能 （T 功能） Tool Function (T Function)	8 位数 T 代码 8-Digit T Code	○	○
7–2	刀具偏移组数 Number of Tool Offset Groups	半径和长度定义为一组。 A set is defined as a radius and length combination. 如果半径和长度偏移数据分别设置，则值表示数据量。 If radius and length offset data are set individually, the value indicates the amount of data.	200 组 200 Sets	200 组 200 Sets
7–3	刀具偏移数据存储器 C Tool Offset Data Memory C	D/H 代码，几何和磨损偏移数据 D/H Code, Geometry and Wear Offset Data	○	○
7–4	刀具长度偏移 Tool Length Offset	G43， G44， G49	○	○
7–5	刀位偏移 Tool Position Offset	G45 - G48	○	○
7–6	刀具半径偏移 Tool Radius Offset	G40 - G42	○	○
7–7	刀具几何偏移 / 刀具磨损偏移 Tool Geometry Offset/Tool Wear Offset		○	○
7–8	MAPPS 刀具管理 MAPPS Tool Management		○	○
7–9	刀具长度测量 Tool Length Measurement		△	△
7–10	自动刀具偏移 Automatic Tool Offset		△	△
7–11	工件定位误差补偿 Workpiece Positioning Error Compensation		△	△
7–12	刀具寿命管理 Tool Life Management	MAPPS 刀具管理功能 MAPPS Tool Management Function	○	○
7–13	5 轴加工的刀具中心点控制 Tool Center Point Control for 5-Axis Machining		△	△
8	机械精度补偿 MECHANICAL ACCURACY COMPENSATION			
8–1	齿隙补偿 Backlash Compensation	±9999999	○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
8–2	快速进给 / 切削进给的单独间隙补偿 Individual Backlash Compensation for Rapid Traverse/Cutting Feed		○	○
8–3	记忆型螺距误差补偿 Stored Pitch Error Compensation		○	○
8–4	插补型螺距误差补偿 Interpolation Type Pitch Error Compensation		○	○
8–5	直线度补偿 Straightness Compensation	补偿点：128 Compensating Points: 128	△	△
9	编辑 EDITING			
9–1	零件程序存储 Part Program Storage	(kbyte)*7	125	125
9–2	附加零件程序存储 Additional Part Program Storage	选项 合计 (kbyte)*7 Option Total (kbyte)*7	△ 230, 500, 1000, 2000	△ 230, 500, 1000, 2000
9–3	存储的程序数 Number of Stored Programs	（程序） (Programs)	200	200
9–4	存储的程序数，扩展 1 Number of Stored Programs, Expansion 1	选项 总和 （程序） Option Total (Programs)	△*8	△*8
9–5	程序编辑 Program Edit	删除、插入、更改 Deletion, Insertion, Alteration	○	○
9–6	程序保护 Program Protect		○	○
9–7	后台编辑 Background Editing		○	○
10	操作面板 / 显示章节 OPERATION PANEL/DISPLAY SECTION			
10–1	状态显示 Status Display		○	○
10–2	时钟功能 Clock Function		○	○
10–3	实际位置显示 Actual Position Display		○	○
10–4	程序指摘显示 Program Comment Display	程序名称：48 个字符 Program Name: 48 Characters	○	○
10–5	参数设定显示 Parameter Setting Display		○	○
10–6	报警显示 Alarm Display		○	○
10–7	报警记录显示 Alarm History Display		○	○
10–8	操作员信息记录显示 Operator's Message History Display		○	○
10–9	操作记录显示 Operation History Display		○	○

○：标准 △：选项 ☆：需要顺序变更 ×：不可用
○: Standard △: Option ☆: Possible by changing the sequence ×: Not available

数控型号 NC Model			MSX-853IV	MSX-855IV
10−10	运行时间显示 / 部件数显示 Running Time Display/Number of Parts Display		○	○
10−11	实际进给速度显示 Actual Feedrate Display		○	○
10−12	实际主轴转速和 T 代码显示 Actual Spindle Speed and T Code Display		○	○
10−13	操作监视屏幕 Operating Monitor Screen	负载仪显示等 Load Meter Display, etc.	○	○
10−14	语言 （数控） Language (NC)		△*9	△*9
10−15	数据保护键 Data Protection Key		○	○
10−16	帮助功能 Help Function		○	○
10−17	自诊断功能 Self-Diagnosis Function	报警显示、 I/O 信号诊断、梯形图等 Alarm Display, I/O Signal Diagnosis, Ladder Diagrams, etc.	○	○
10−18	图形显示 Graphic Display	MAPPS IV 会话编程功能标准三维图形显示、图形检查 MAPPS IV Conversational Programming Function Standard 3D Graphics Display, Graphic Check	△	△
10−19	MDI 功能 MDI Function		○	○
10−20	10.4" 彩色 LCD 10.4" Color LCD		○	○
10−21	由组分类的目录显示 Directory Display Classified by Groups		○	○
11	I/O 功能和装置 I/O FUNCTIONS AND UNITS			
11−1	读入机 / 穿孔机接口 Reader/Puncher Interface	1ch (RS232C)	△	△
11−2	快速数据服务器 Fast Data Server	100BASE-TX	△	△
11−3	外部数据输入 External Data Input	外部程序编号搜索、外部刀具偏移和外部工件坐标系平移 External Program Number Search, External Tool Offset, and External Work Coordinate System Shift	○*10	○*10
11−4	外部工件编号搜索 External Work Number Search	工件编号：9999 Work Number: 9999	☆*10	☆*10
11−5	存储卡输入 / 输出 Memory Card Input/Output		○	○
12	箱体和安装 ENCLOSURE AND INSTALLATION			
12−1	箱体构造 Enclosure Construction	封闭防尘式 (IP54) Enclosed Dust-Proof Type (IP54)	○	○

附注

*1 标准规格为 24 个，选项为 48 个。
*2 MAPPS 内部存储器 （6 GB）为标准规格，（20 GB）为可选。前卡槽为可选。
*3 用于 ATC 和 APC 操作。
*4 进给速度：1 mm/min-6000 mm/min
*5 “3−15” “ 螺纹切削 / 同步进给 ” 为必需。
*6 8 位程序编号规格是可选的。
*7 10 m ≈ 4 kB
*8 下表为扩展个数。

零件程序存储大小 (kb) Part Program Storage Size (kbyte)	程序数量 Number of Programs
125	200
230	400
500	1000
1000	1000
2000	1000

*9 MAPPS 屏幕可使用日语、英语、德语、法语、意大利语、西班牙语、葡萄牙语 （巴西语）、瑞典语、荷兰语、中文 （繁体）、中文 （简体）、韩语、土耳其语、丹麦语、挪威语、芬兰语、捷克语、斯洛文尼亚语、匈牙利语、波兰语和俄罗斯语。
数控警报信息屏幕和参数屏幕可使用日语、英语、德语、法语、意大利语、西班牙语、葡萄牙语 （巴西语）、匈牙利语、荷兰语、中文 （繁体）、中文 （简体）、韩语、土耳其语、瑞典语。

*10 有关详情，请咨询。

NOTE

*1 24 for standard specification, 48 for Options.
*2 The MAPPS internal memory (6 GB) is standard, (20 GB) is optional. The front card slot is optional.
*3 Used for ATC and APC operations.
*4 Feedrate: 1 mm/min-6000 mm/min
*5 “3−15” “Thread Cutting/Synchronous Feed” is necessary.
*6 8-digit program number specifications are options.
*7 10 m ≈ 4 kB
*8 Expansion numbers are given in the table below.

*9 MAPPS screens are available in Japanese, English, German, French, Italian, Spanish, Portuguese (Brazil), Swedish, Dutch, Chinese (Traditional), Chinese (Simplified), Korean, Turkish, Danish, Norwegian, Finnish, Czech, Slovene, Hungarian, Polish and Russian.
Japanese, English, German, French, Italian, Spanish, Portuguese (Brazil), Hungarian, Dutch, Chinese (Traditional), Chinese (Simplified), Korean, Turkish, Swedish are available for the NC alarm messages screen and the parameter screen.

*10 For details, consultation is required.

3 功率容量表 POWER CAPACITY TABLE

附注

用以下公式计算得出的电流值来确定断路器和配电容量。

$$\text{输入电流(A)} = \frac{\text{总功率容量(kVA)} \times 1000}{\sqrt{3} \times 200\ (\text{V})} \times 1.25^{*}$$

* 允许选择

NOTE

Breaker and power distribution board capacities are determined using the current calculated by the following formula.

$$\text{Input Current (A)} = \frac{\text{Total Power Capacity (kVA)} \times 1000}{\sqrt{3} \times 200\ (\text{V})} \times 1.25^{*}$$

* Allowance for selection

(I94293 A02)

机床型号 Machine Model				NVX5000
数控				MSX-853IV, MSX-855IV
主轴转速 Spindle Speed				12000 min^{-1}
电源模块 Power Supply Module	制造商 Manufacturer			MITSUBISHI MITSUBISHI
	型号 Model			[MDS-DM-SPV3F200160]
	主轴 Spindle	制造商 Manufacturer		MITSUBISHI MITSUBISHI
		电机型号 Motor Model		[SJ-2B4351TK]
		输出 （25%ED/ 连续） Output (25%ED/ Continuity)	(kW)	15/11
	伺服电机 Servomotor	电机型号 Motor Model		X [HF303-A48] 3
		电机型号 Motor Model		Y [HF303-A48] 3
		电机型号 Motor Model		Z [HF453BS-A48] 4.5
MG		电机型号 Motor Model		MG [HF104BT-A48] 1
1	放大器连续额定容量 Amplifier Continuity Capacity		(kVA)	22.99
2	数控		(kVA)	0
3	电气柜 Electrical Cabinet		(kVA)	1.18
4	辅助装置电机 Auxiliary Unit Motor	切削油泵 Coolant Pump	(kVA)	1.04 (1.3 kVA:1.04/0.8)
		切屑冲洗切削油泵 Chip Flash Coolant Pump	(kVA)	0
		立柱循环切削油泵 Column Circulating Coolant Pump	(kVA)	0
		风扇冷却器 Fan Cooler	(kVA)	0.77

机床型号 **Machine Model**			NVX5000
数控			**MSX-853IV, MSX-855IV**
主轴转速 Spindle Speed			**12000 min^{-1}**
	辅助装置总计 [功率因素 0.8] （标准） Total of Auxiliary Units [Power Factor 0.8] (Standard)	(kVA)	2.07
总容量 （标准） Total Capacity (Standard) 1 + 2 + 3 + 4	连续额定容量 Continuous Rating	(kVA)	26.24
降压变压器 （标准） Step-Down Transformer (Standard)		(kVA)	35
220 V 50 Hz 变压器 220 V 50 Hz Transformer		(kVA)	10

3 章
图纸
CHAPTER 3
DIAGRAMS

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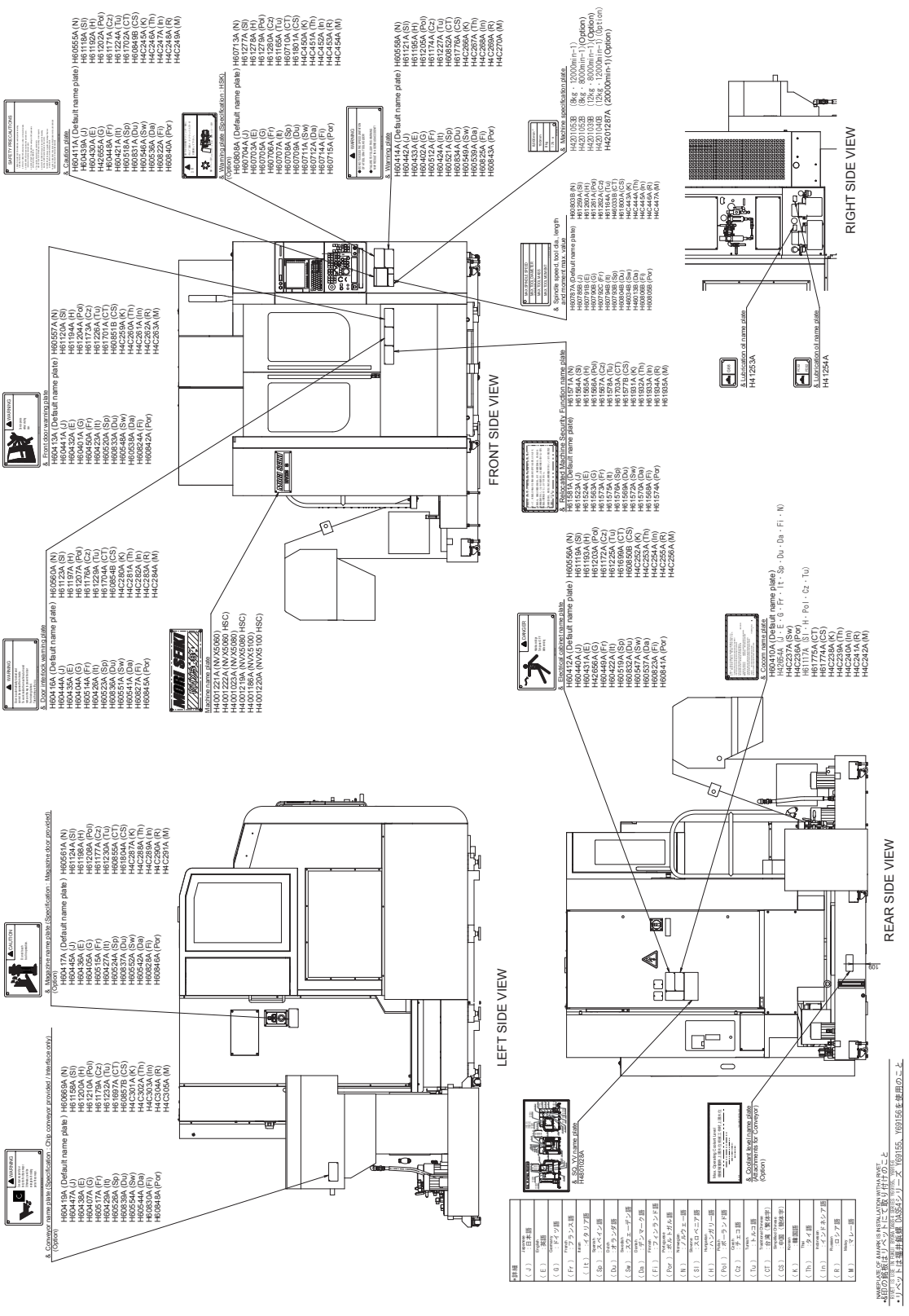
1 警告标签
CAUTION LABELS

(Q55271 A06)



2 总览
GENERAL VIEW

2-1 NVX5060/40
NVX5060/40

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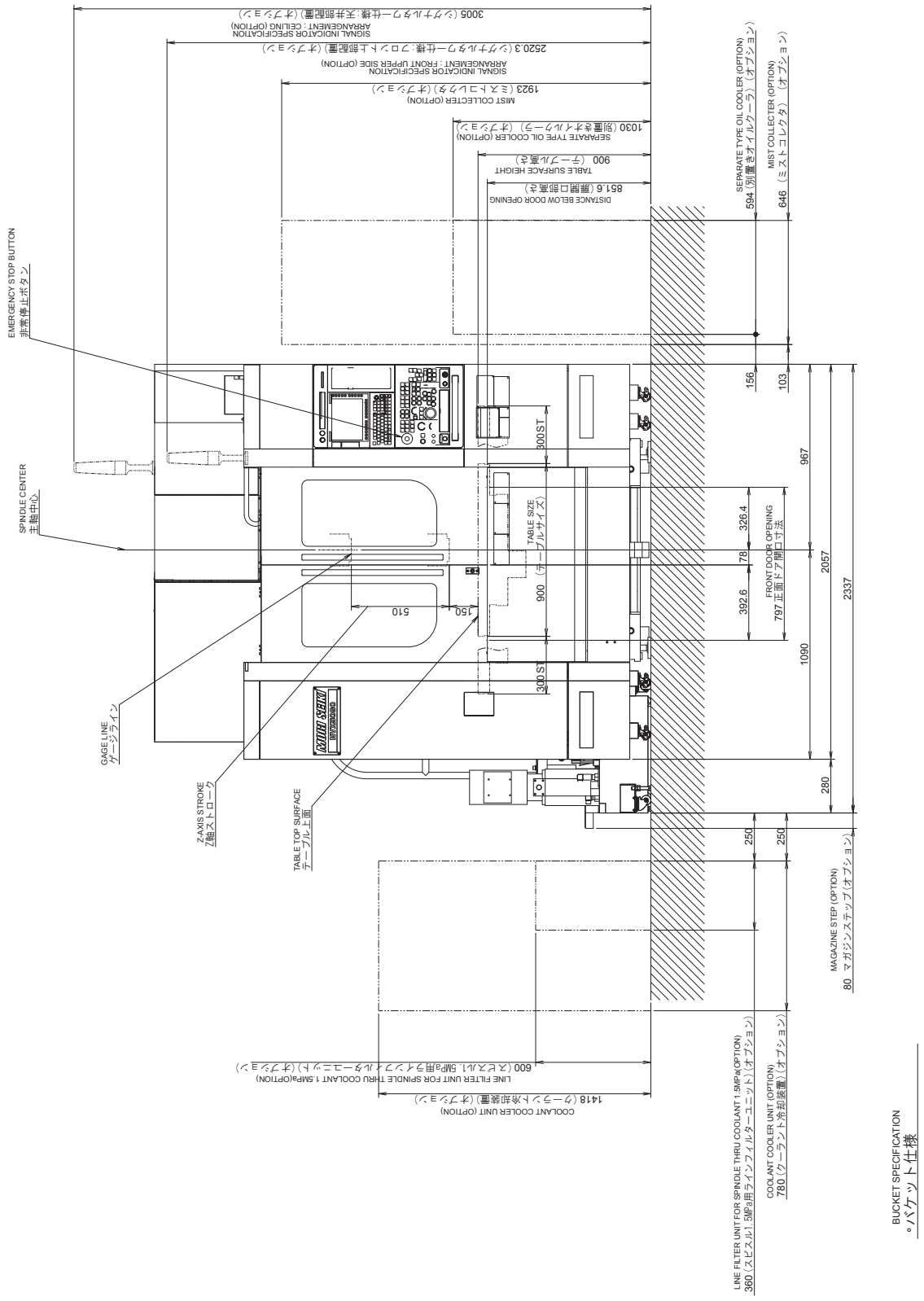
(Q55336 A01 5/6)
Unit: mm



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(Q55336 A01 6/6)
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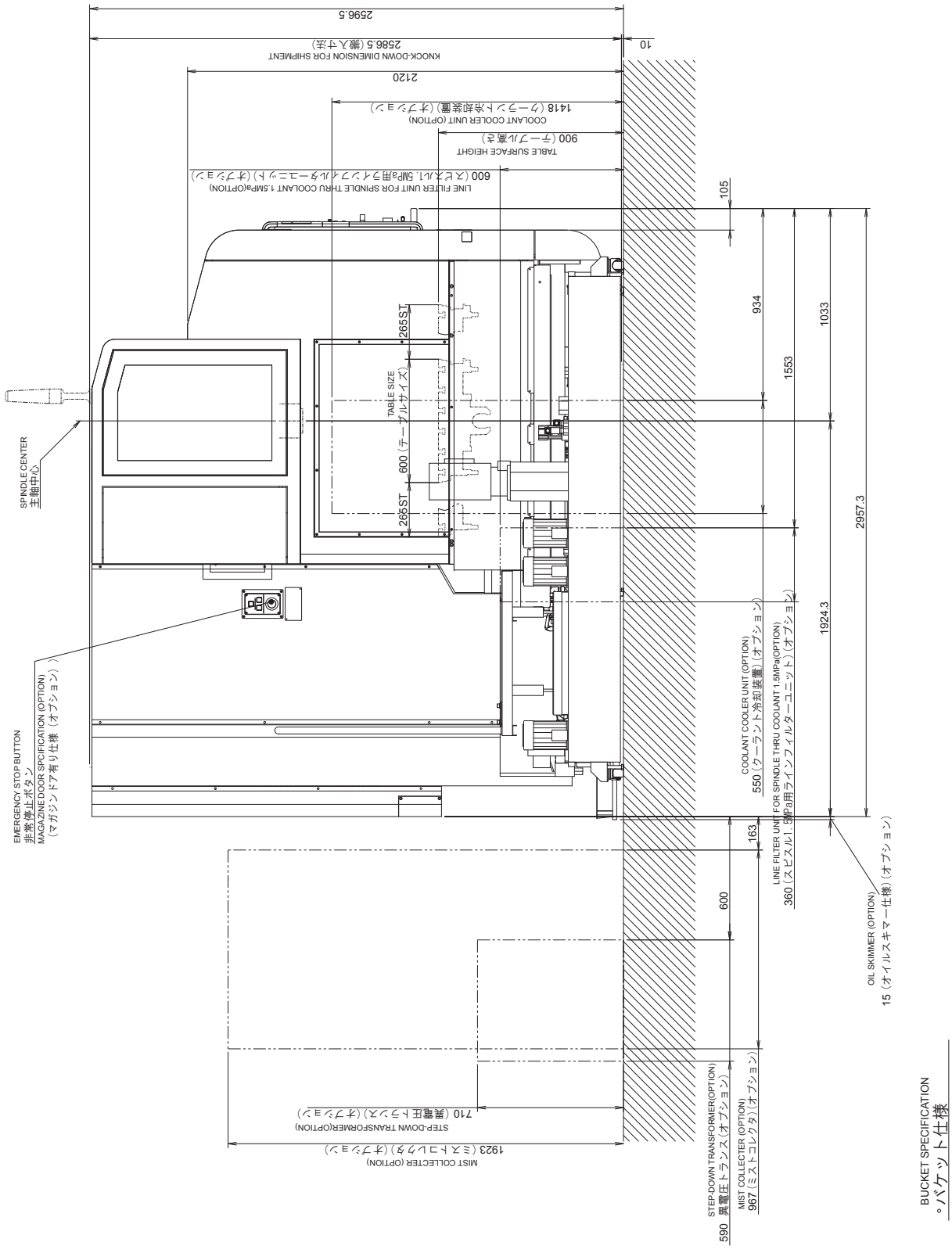

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(Q55336 A01 2/6)

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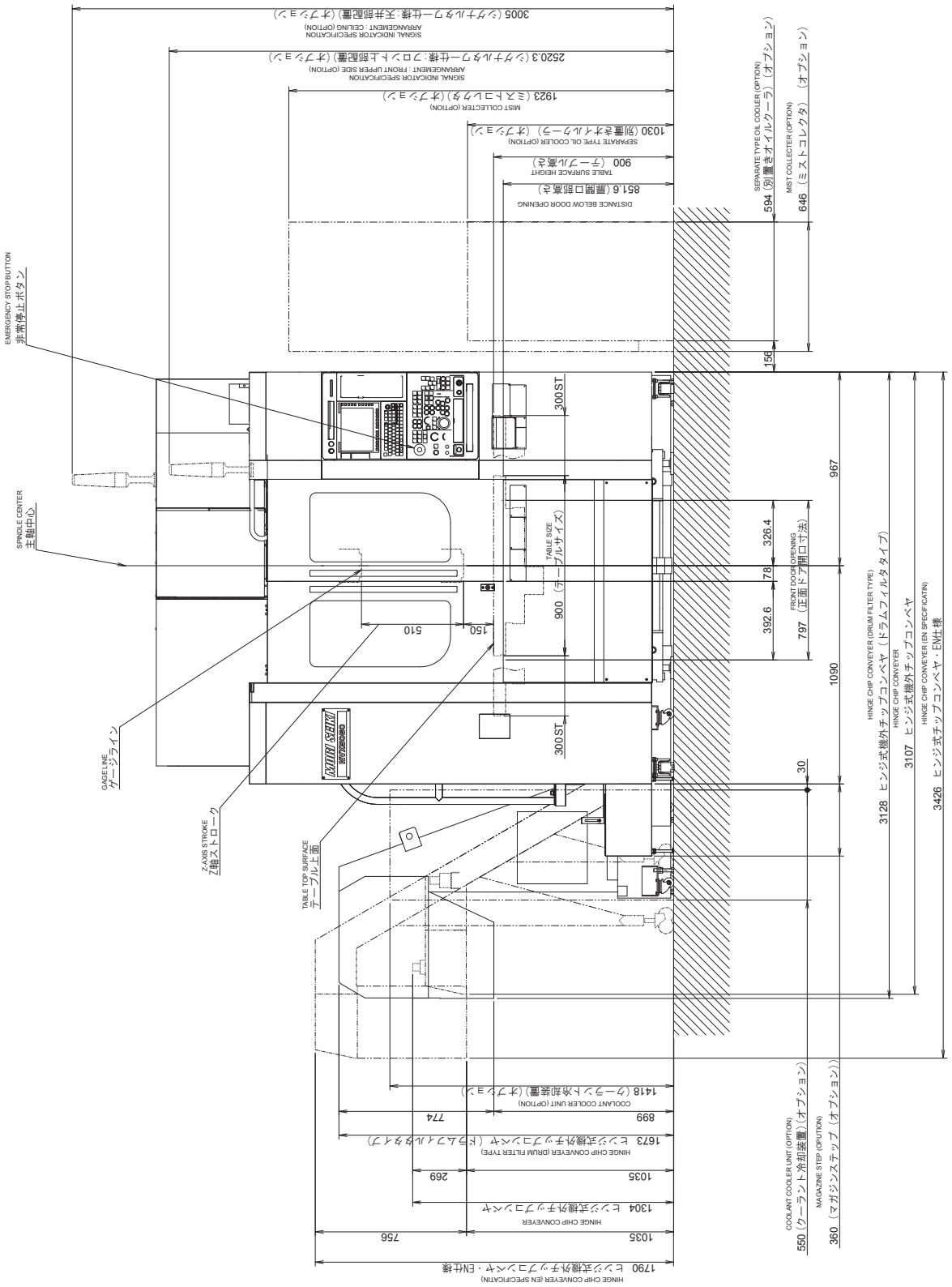

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(Q55336 A01 3/6)

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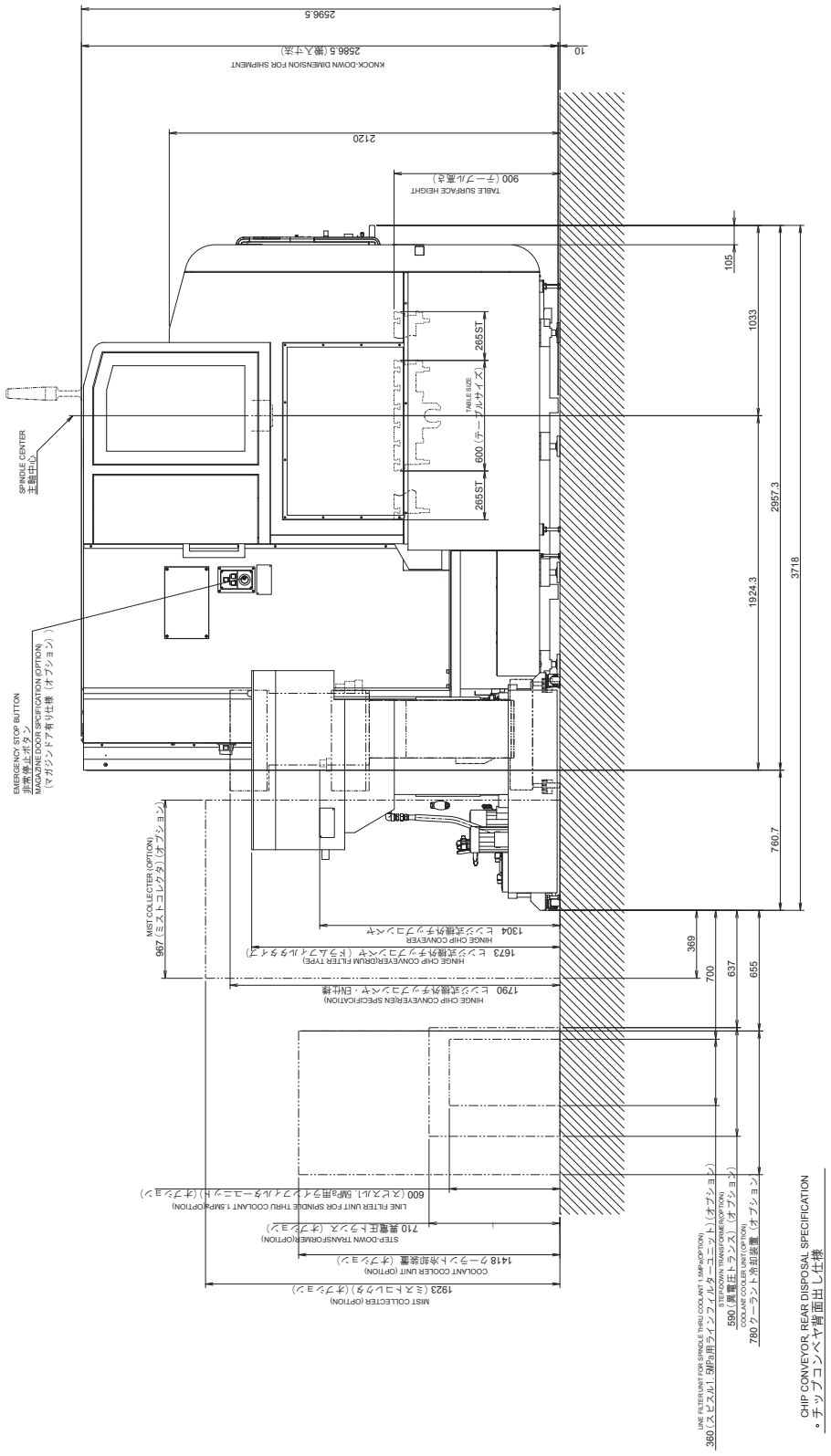

2-2 NVX5080/40
NVX5080/40

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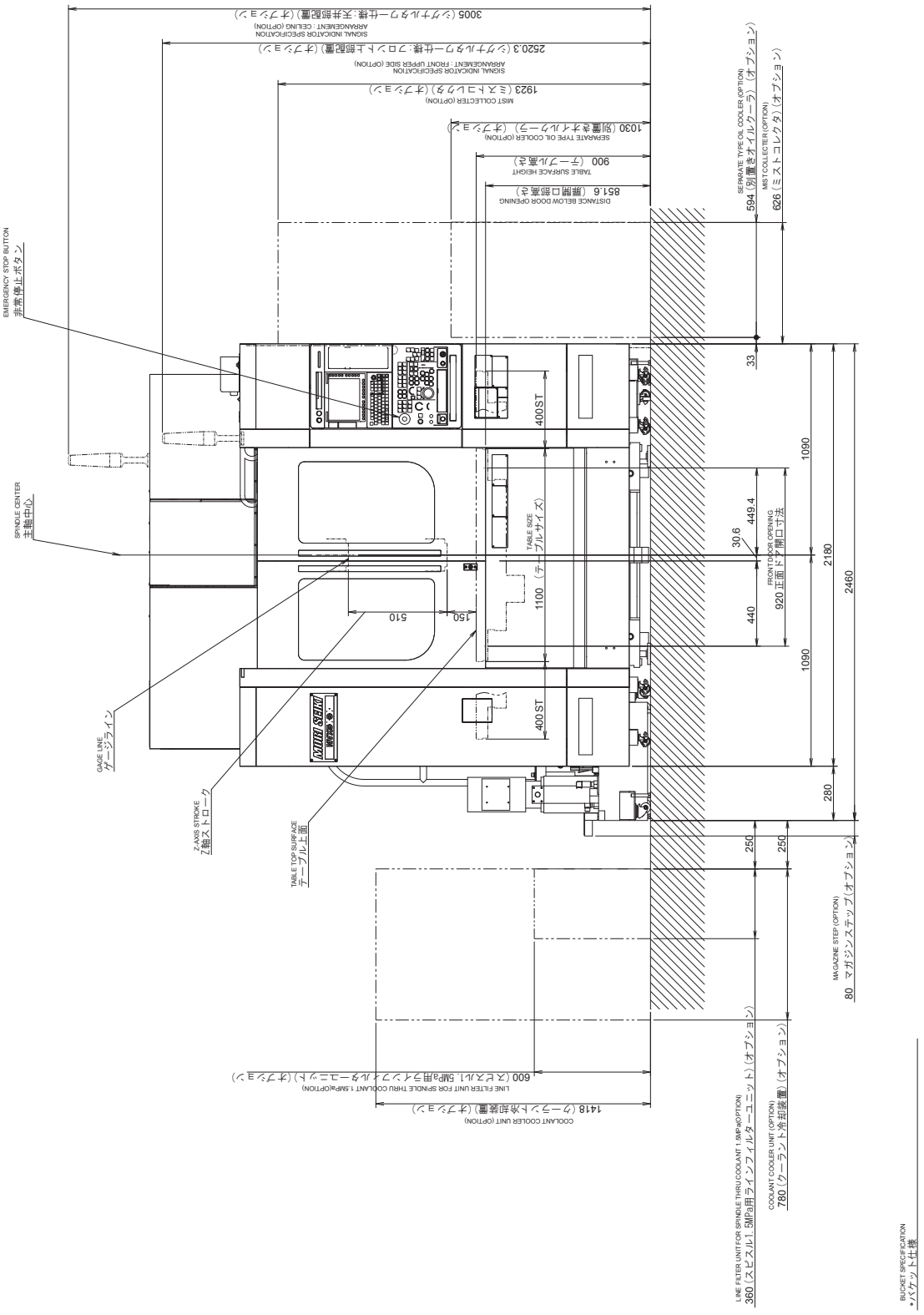
(Q55272 A07 5/6)
Unit: mm



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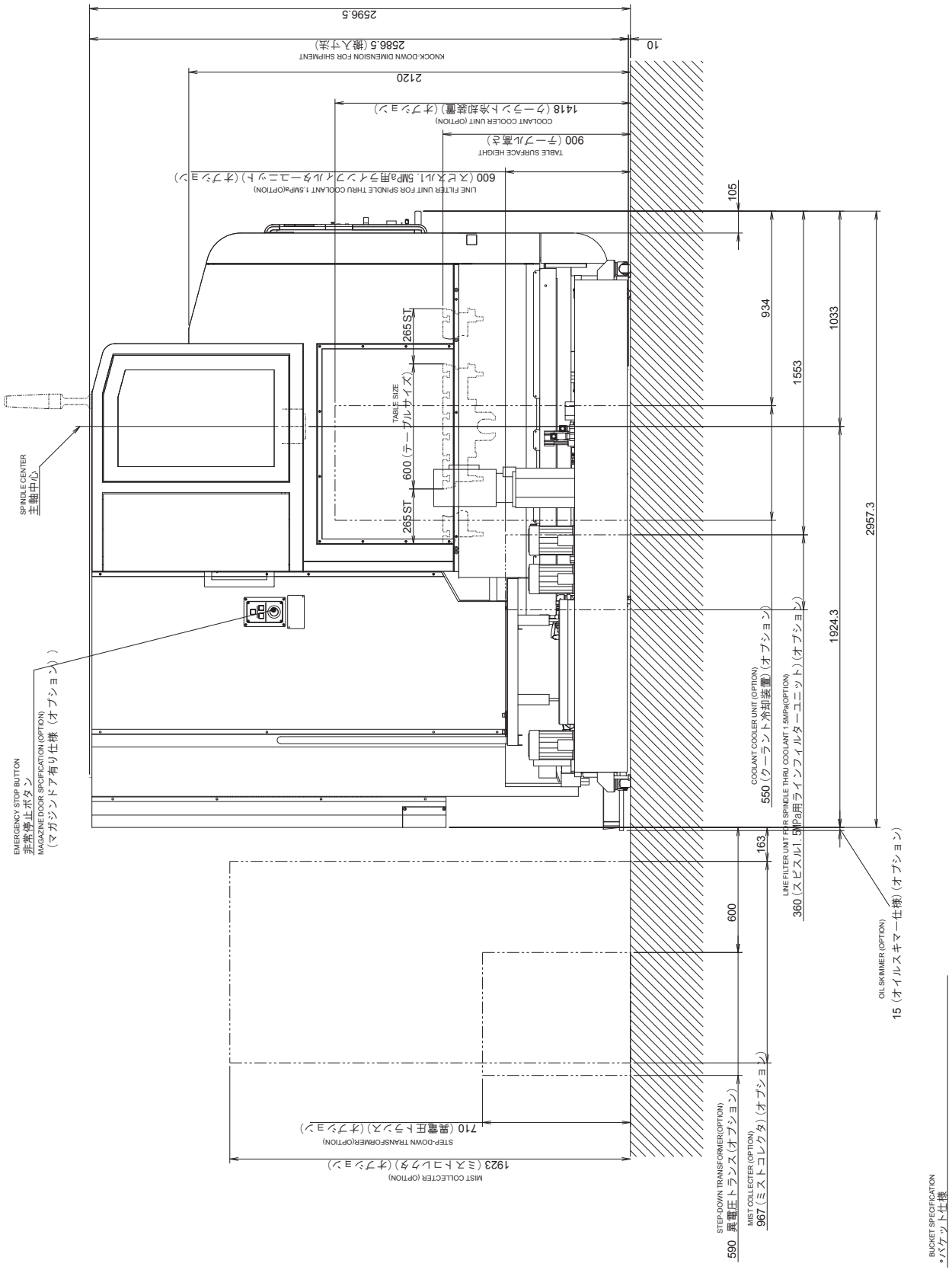

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(Q55272 A07 2/6)

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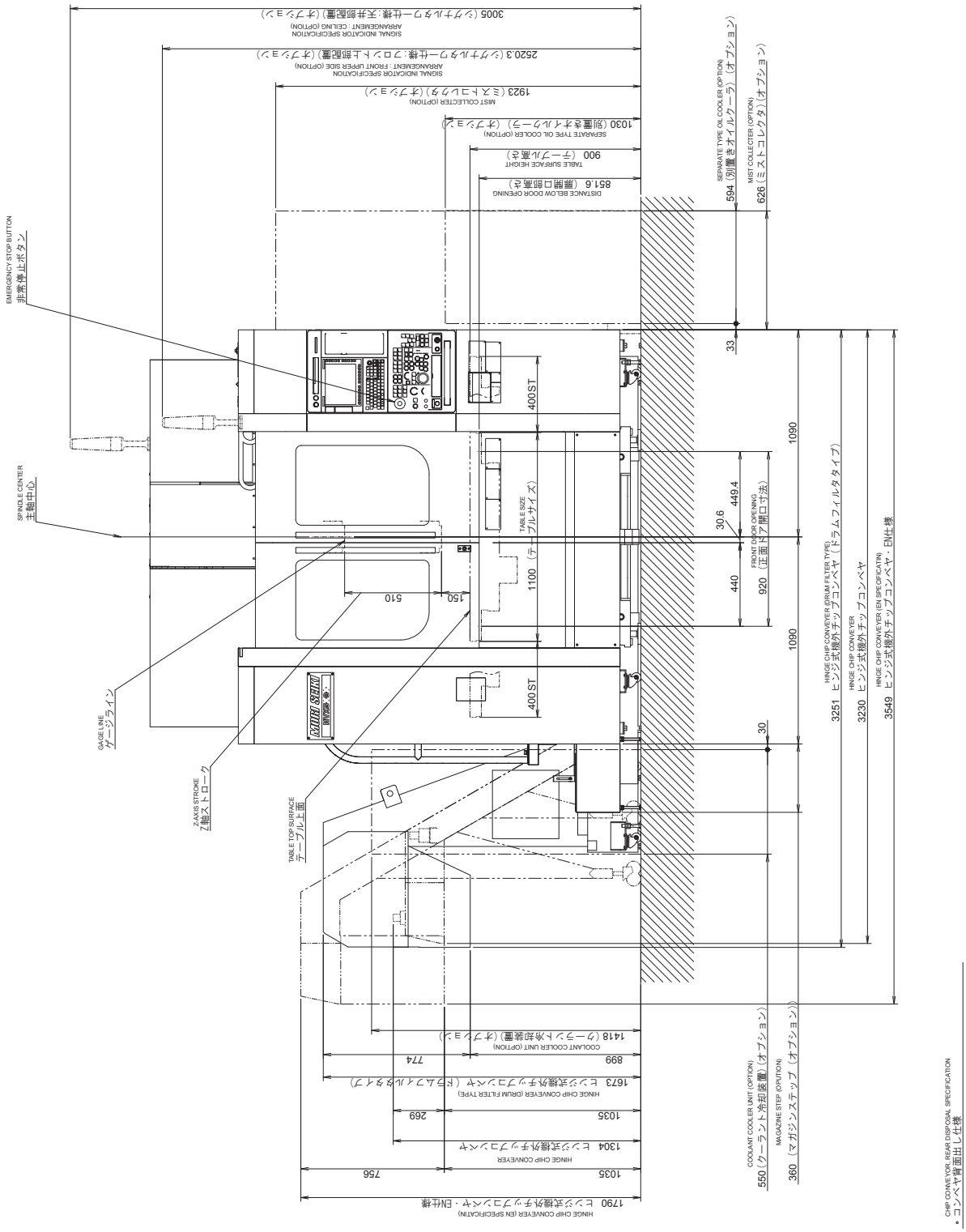

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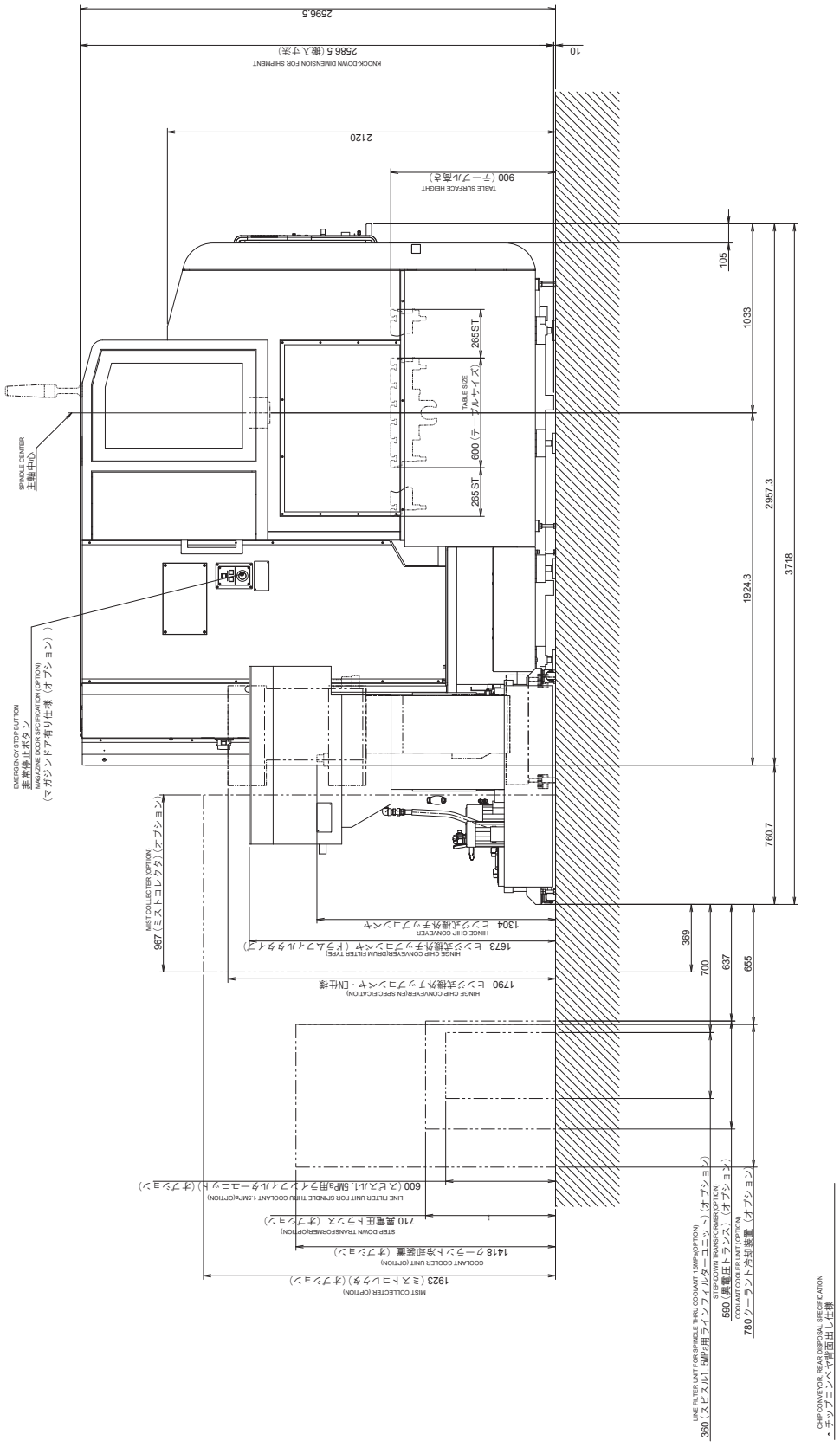
(Q55272 A07 3/6)

Unit: mm



2-3 NVX5100/40
NVX5100/40

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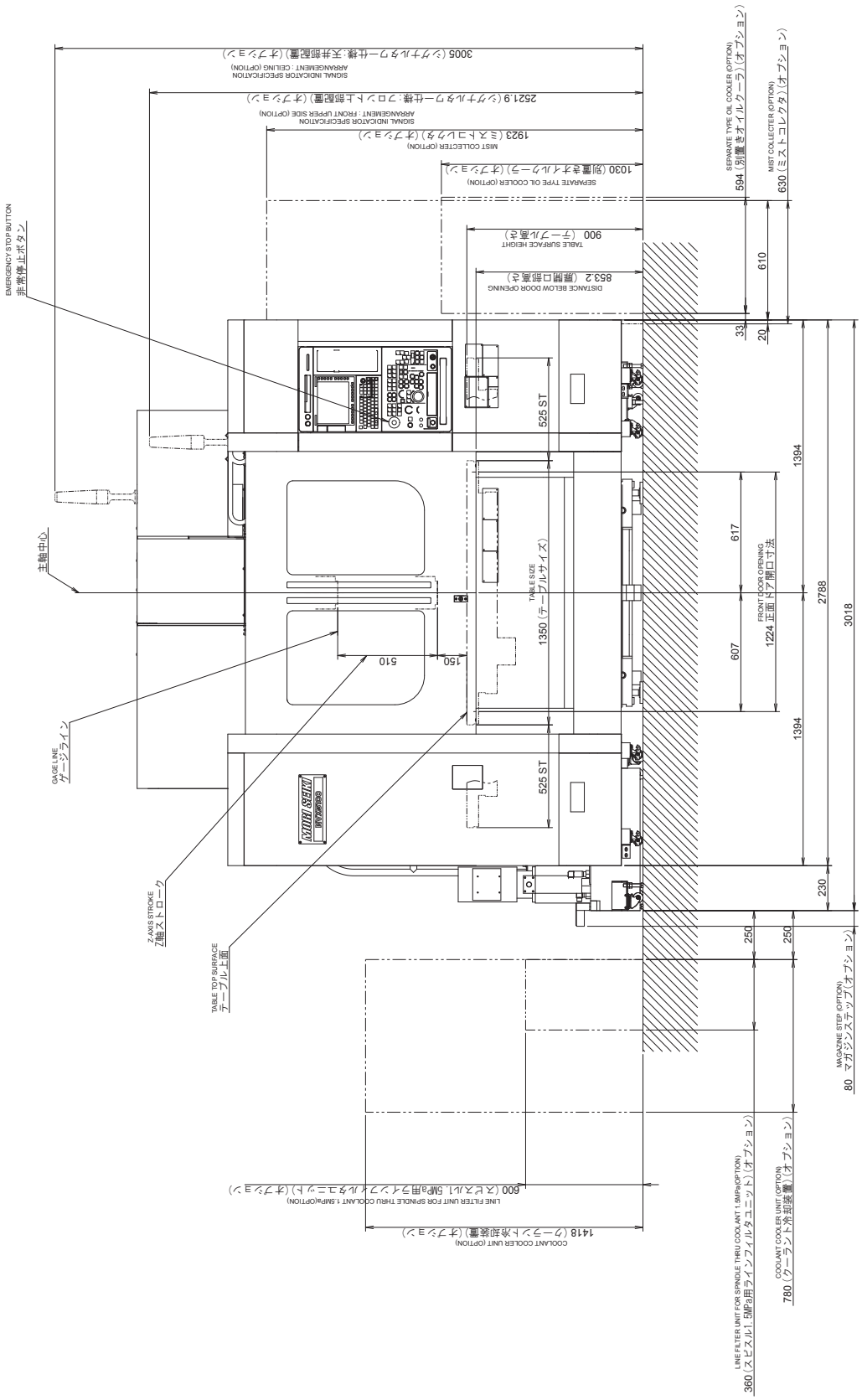
(Q55315 A02 5/6)
Unit: mm

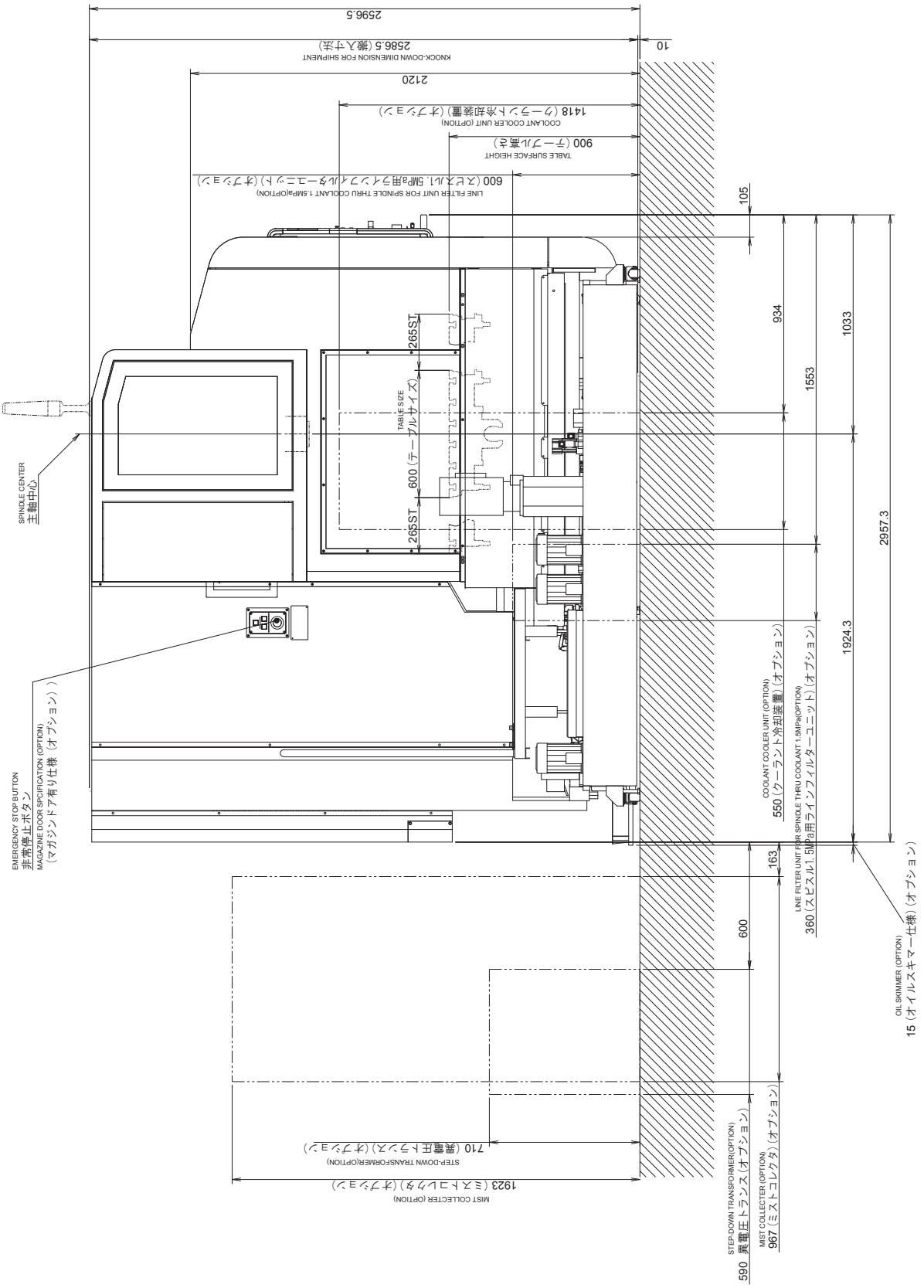


CHIP BUCKET SPECIFICATION
◦チップバケット仕様

< 侧视图 / 切屑车规格 >

<Side View/Chip Bucket Specifications>

(Q55315 A02 6/6)
Unit: mm



CHIP BUCKET SPECIFICATION
。チップバケット仕様

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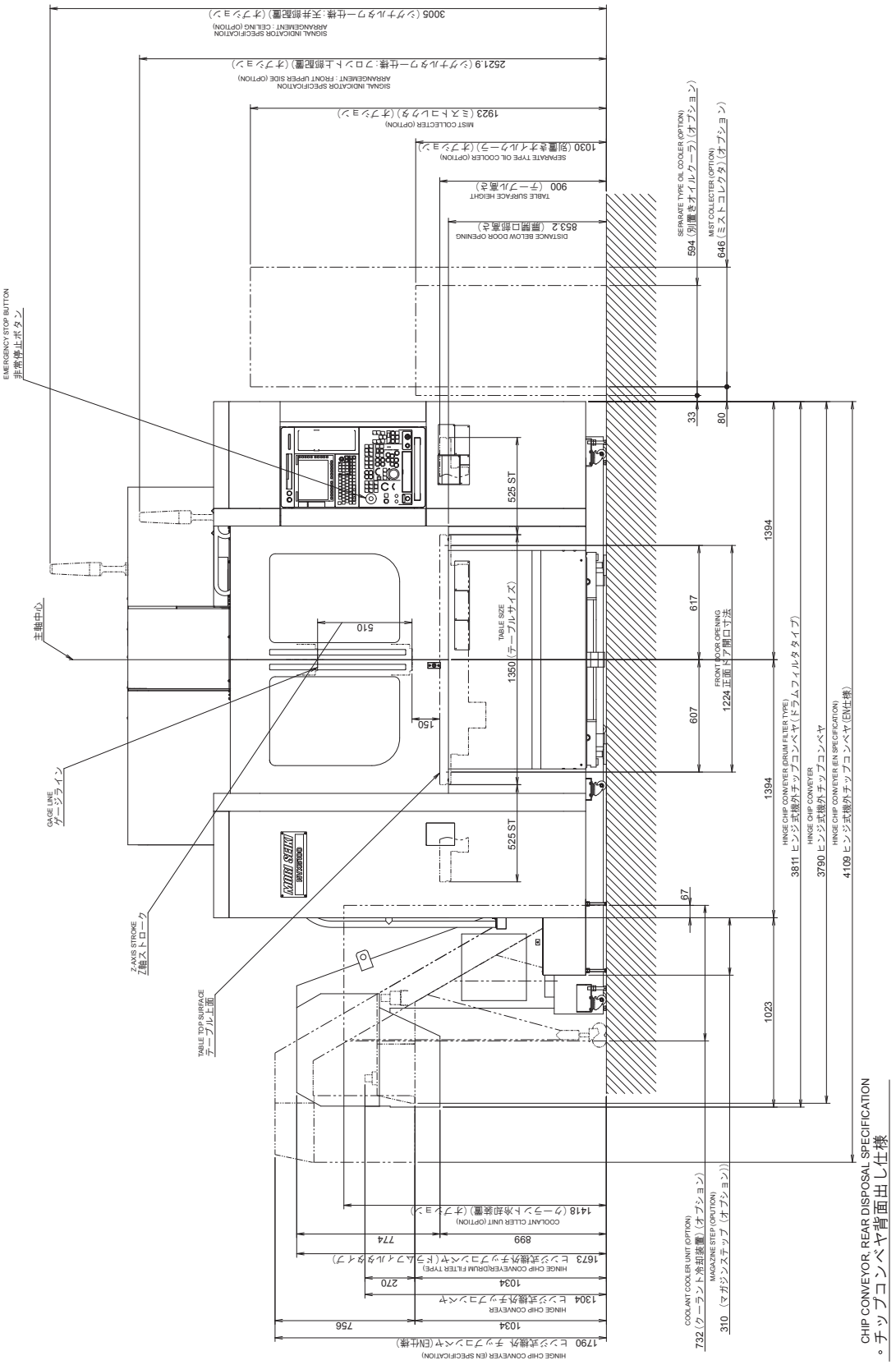
<Front View/Chip Conveyor Specifications>

(Q55315 A02 2/6)

Unit: mm



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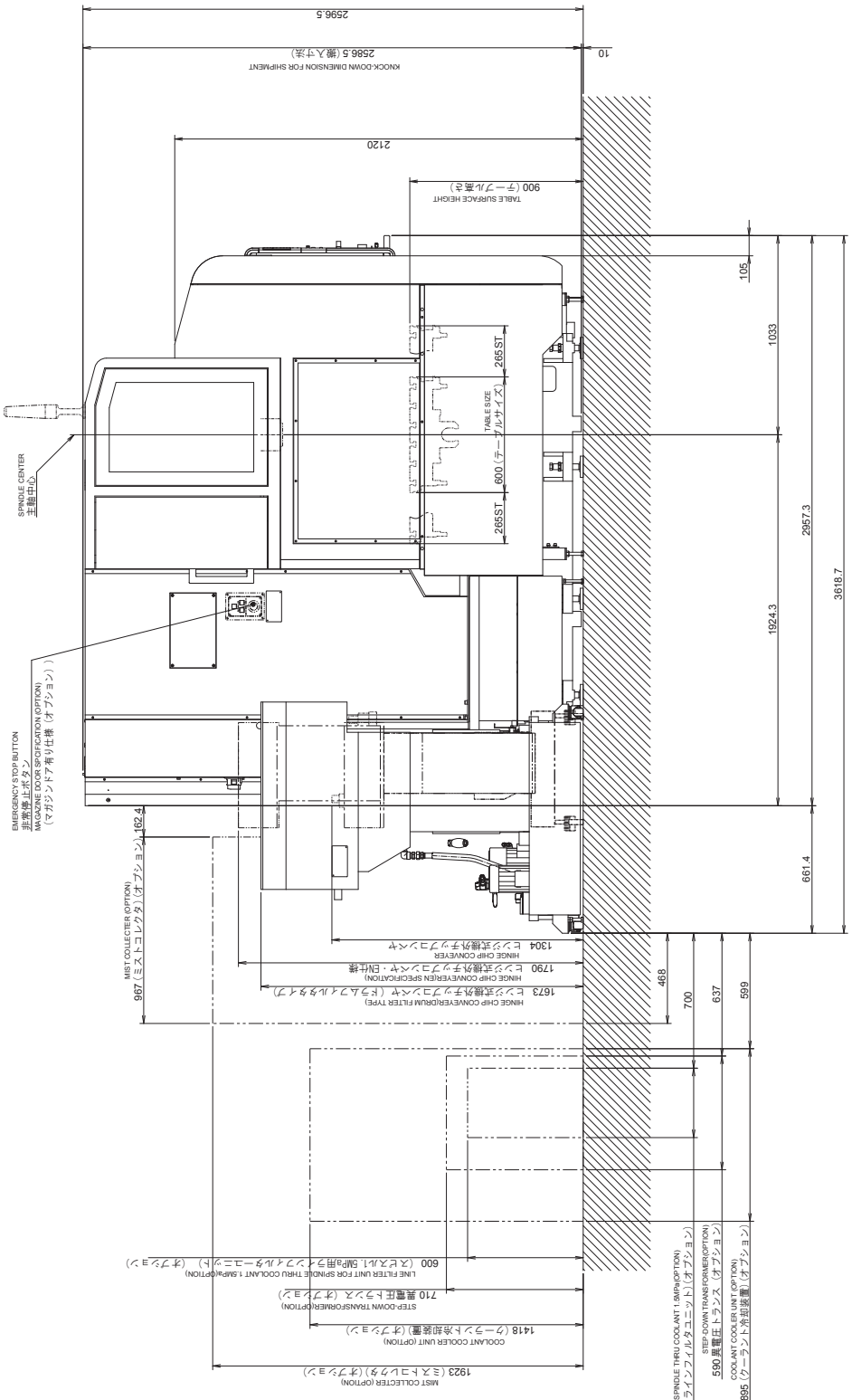
(Q55315 A02 3/6)

Unit: mm



CHIP CONVEYOR, REAR DISPOSAL SPECIFICATION

。チップコンベヤ背面出し仕様

3 安装图 INSTALLATION DIAGRAMS

3-1 NVX5060/40 NVX5060/40

< 切屑车规格 > **<Chip Bucket Specifications>**

(Q55336 A01 4/6)
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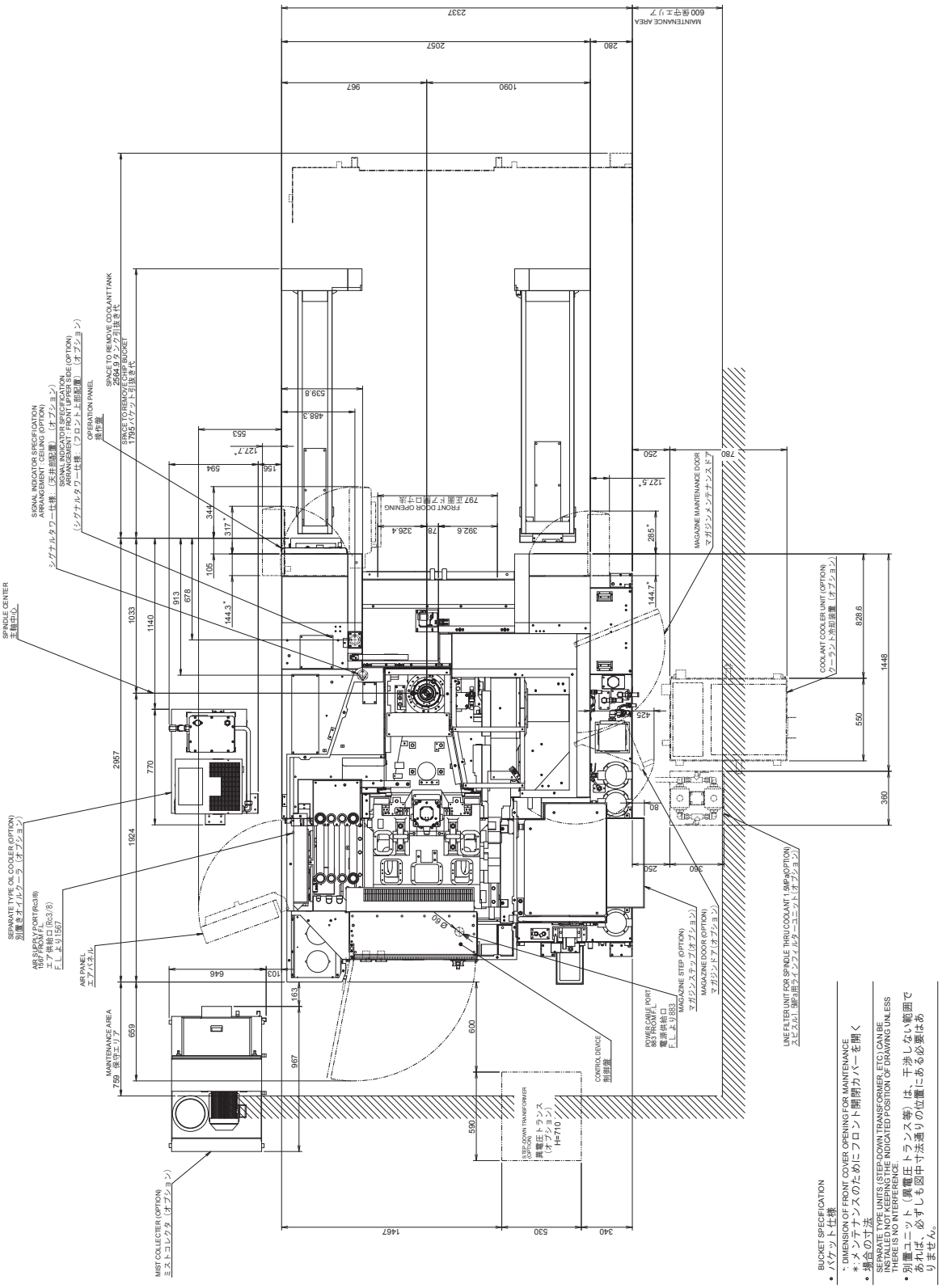

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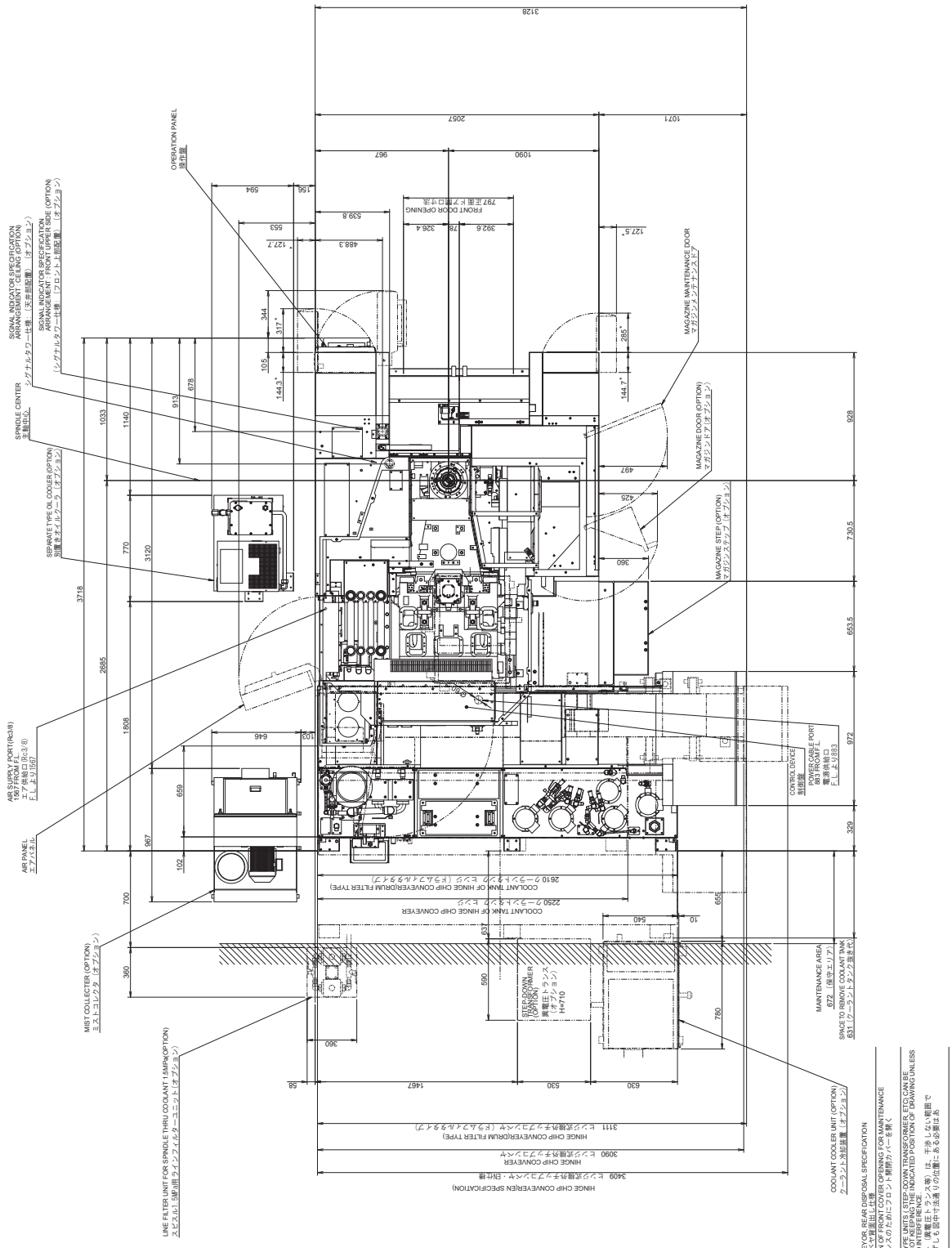
(Q55336 A01 1/6)
Unit: mm



3-2 NVX5080/40
NVX5080/40

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(Q55272 A07 4/6)
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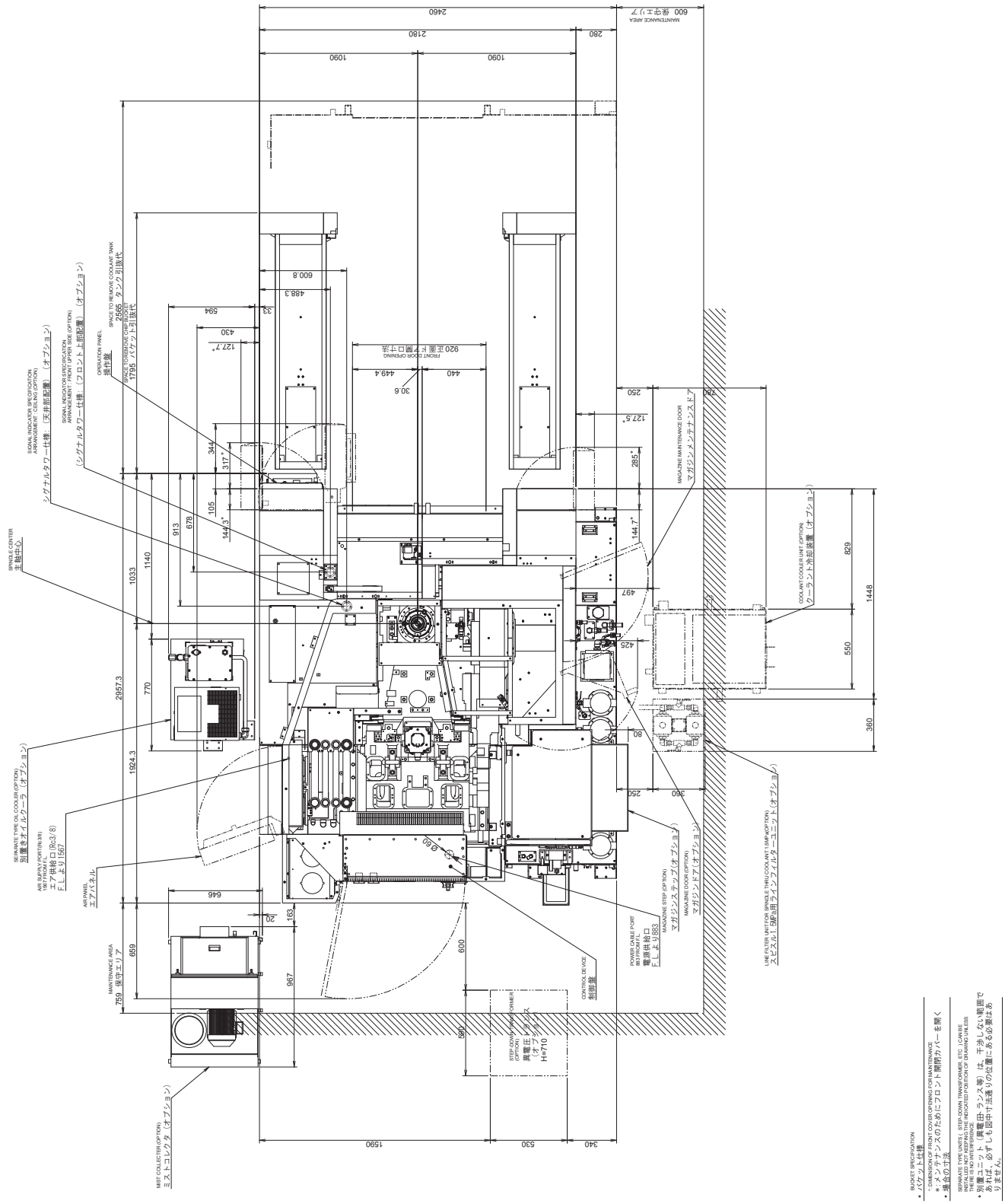
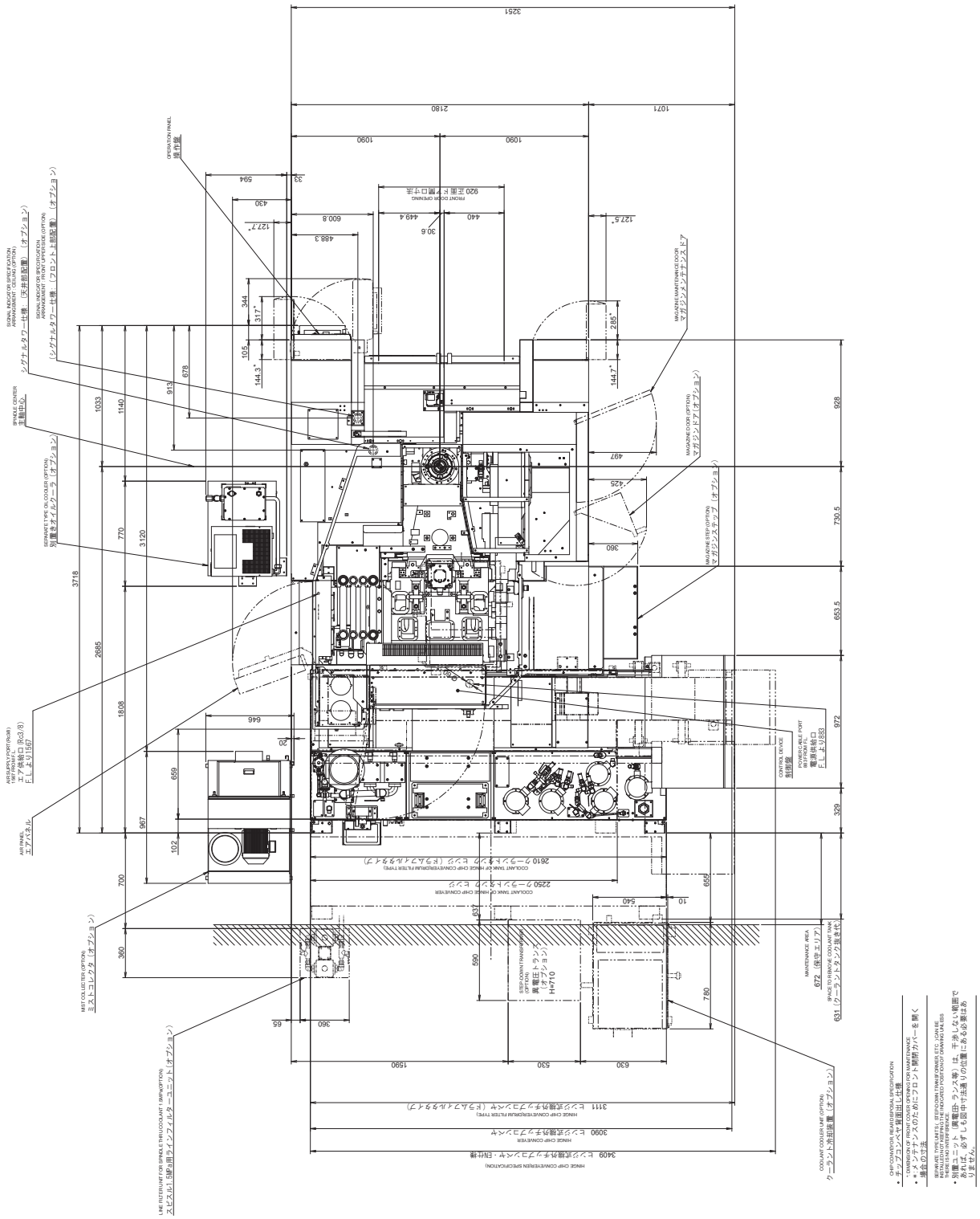


BUCKET SPECIFICATION
• バケット仕様
・DIMENSION OF FRONT COVER OPENING FOR MAINTENANCE
• メンテナンスの為にフロント開閉カバーを開く
• 場合の寸法
SEPARATE TYPE UNITS (STEP-DOWN TRANSFORMER, ETC.) CAN BE INSTALLED IN THE MAINTENANCE AREA WITHOUT INTERFERENCE.
• 別置ユニット（昇圧トランス等）は、干渉しない範囲で
メンテナンスエリアに設置することができます。

< 排屑器规格 >

<Chip Conveyor Specifications>

(Q55272 A07 1/6)
Unit: mm



3-3 NVX5100/40
NVX5100/40

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(Q55315 A02 4/6)
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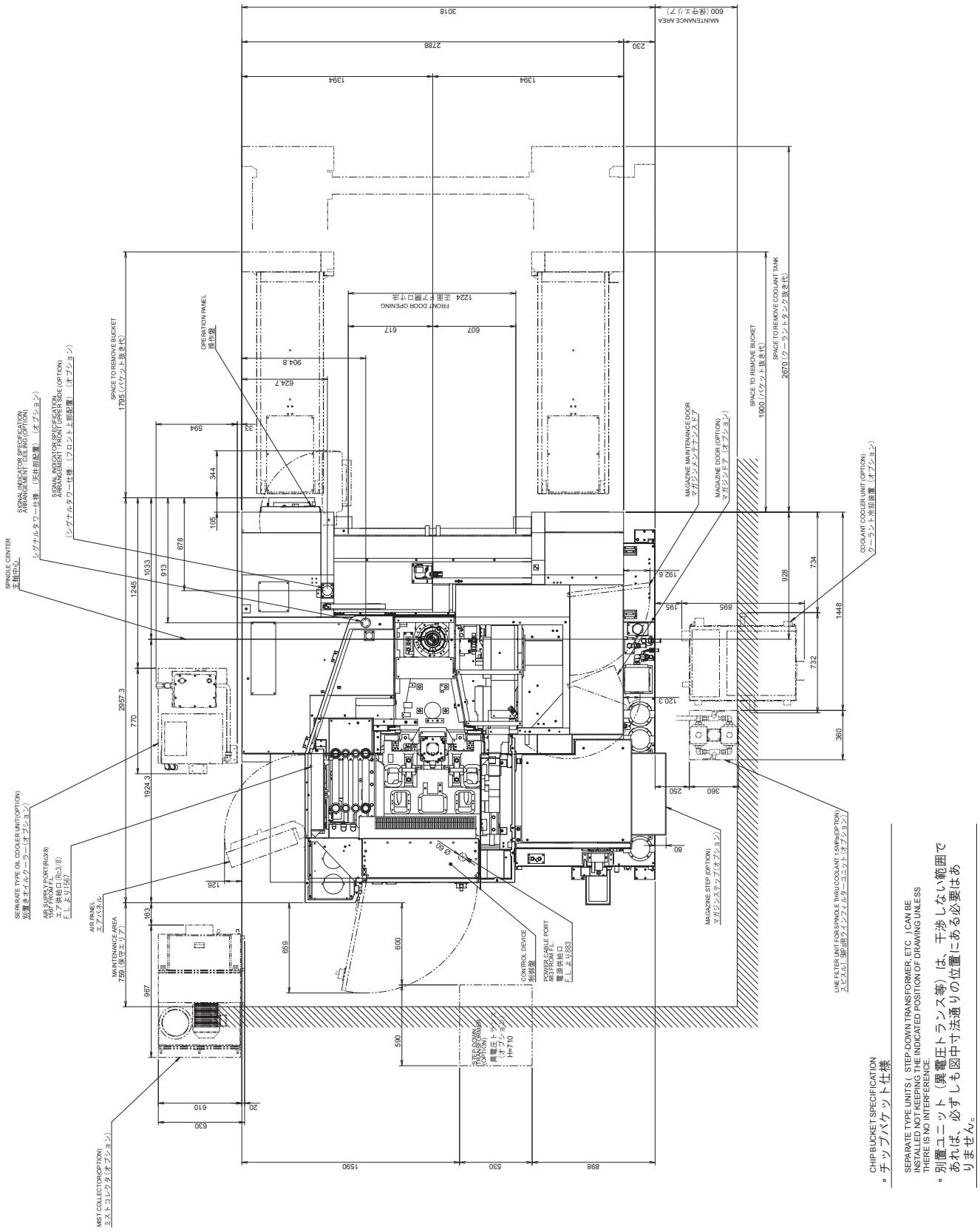

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(Q55315 A02 1/6)
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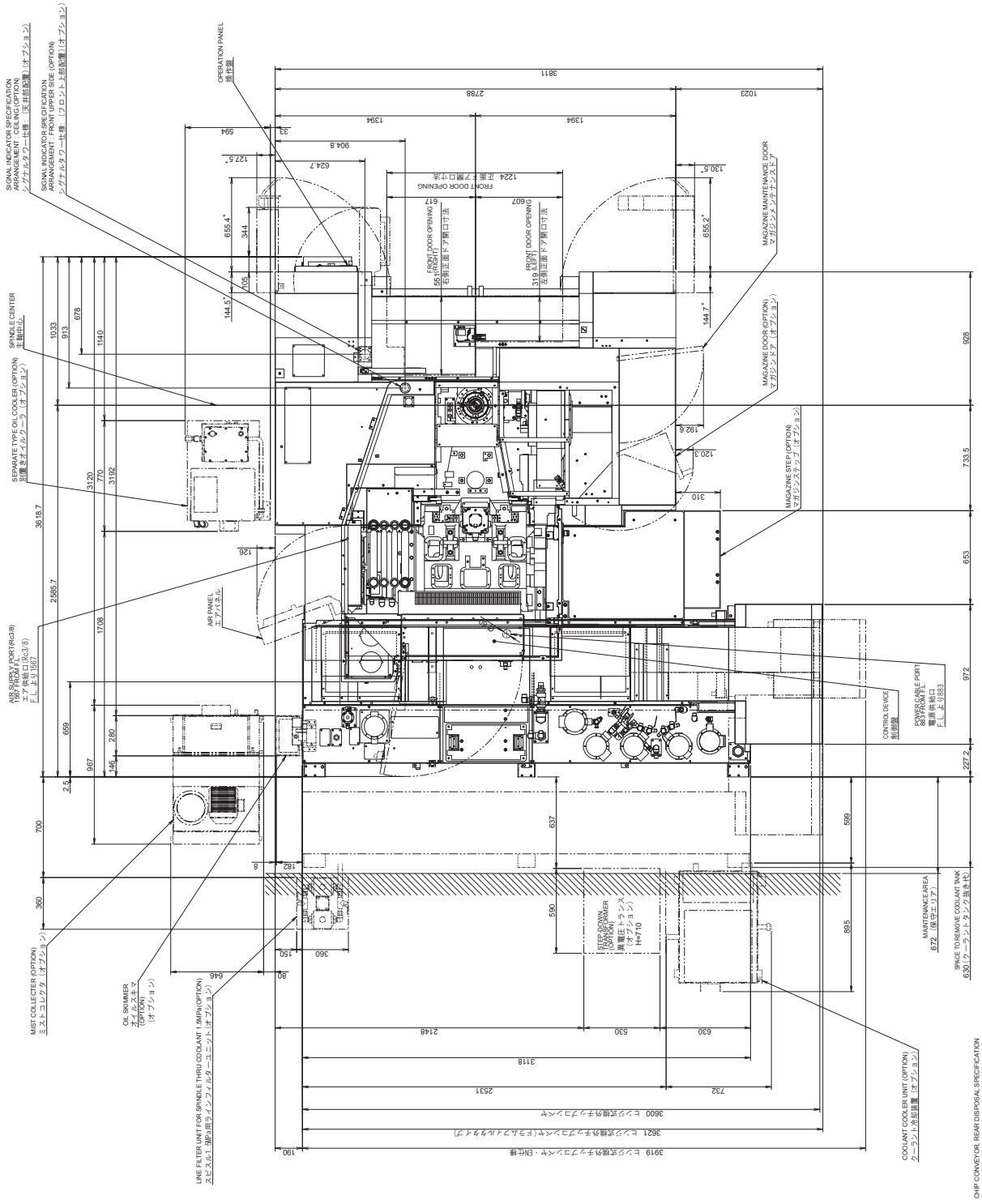
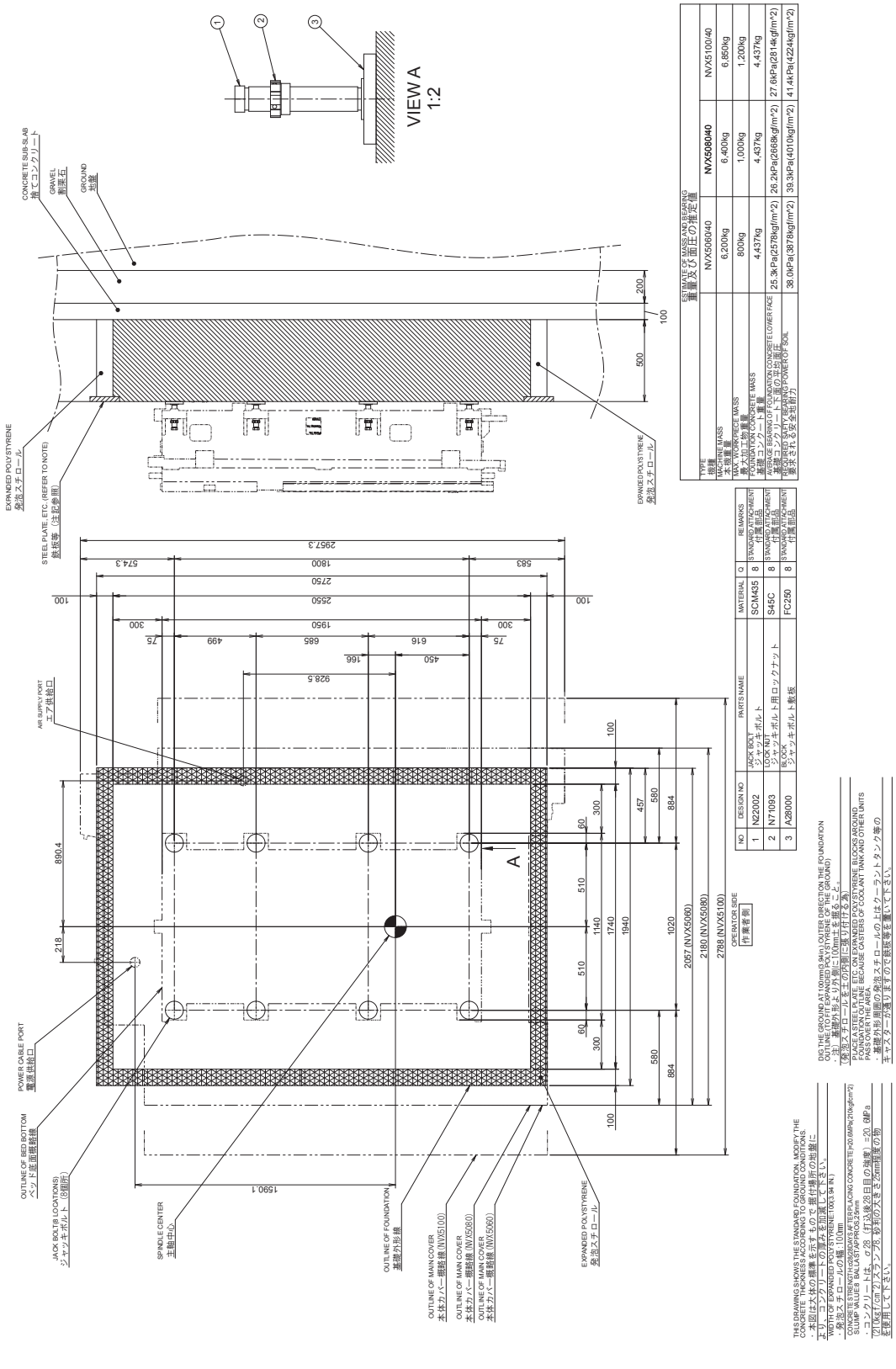


4 地基図 FOUNDATION DIAGRAMS

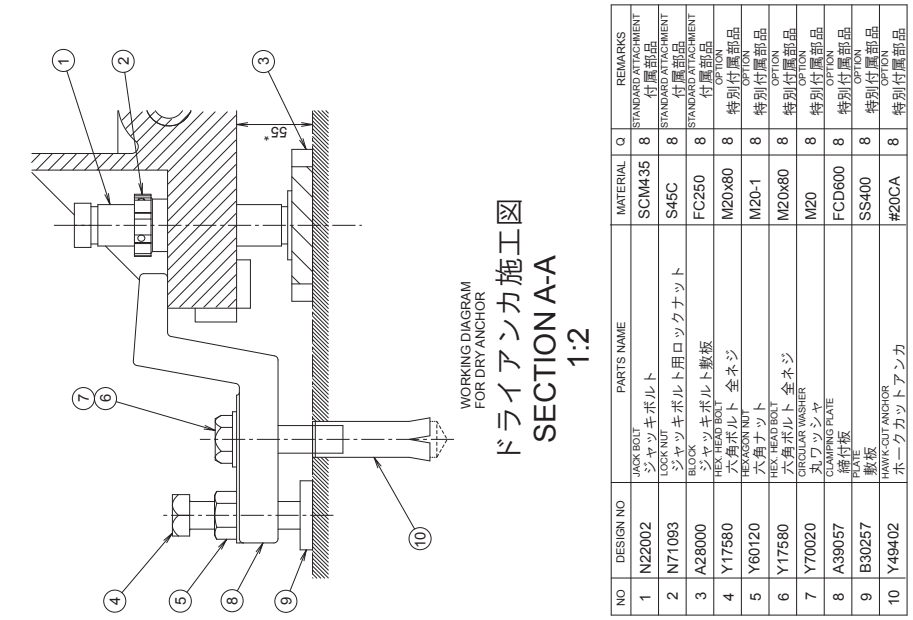
4-1 標準規格 Standard Specifications

(Q55274 A04 1/2)
Unit: mm

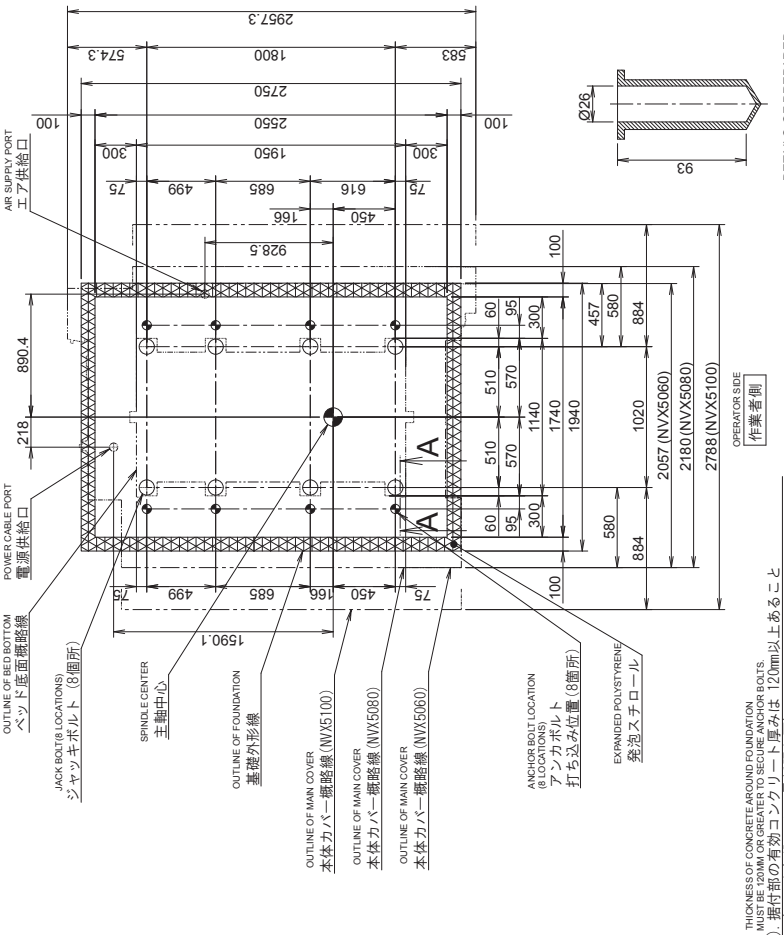


4-2 干錨規格
Dry Anchor Specifications

(Q55274 A04 2/2)
Unit: mm



NO	DESIGN NO	PART'S NAME	MATERIAL	Q	REMARKS
1	N22002	JACK BOLT ジャッキボルト	SCM435	8	STANDARD ATTACHMENT 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 ATTACHMENT 付属部品
3	A28000	BLOCK ジャッキボルト敷板	FC250	8	STANDARD ATTACHMENT 付属部品
4	Y17580	HEX HEAD BOLT 六角ボルト 全ネジ	M20x80	8	OPTION 特別付属部品
5	Y60120	HEXAGON NUT 六角ナット	M20-1	8	OPTION 特別付属部品
6	Y17580	HEX HEAD BOLT 六角ボルト 全ネジ	M20x80	8	OPTION 特別付属部品
7	Y70020	CIRCULAR WASHER 丸ワッシャ	M20	8	OPTION 特別付属部品
8	A39057	CLAMPING PLATE 押付板	FCD600	8	OPTION 特別付属部品
9	B30257	PLATE 敷板	SS400	8	OPTION 特別付属部品
10	Y49402	HAWK-CUT ANCHOR ホークカットアンカ	#20CA	8	OPTION 特別付属部品



1) THICKNESS OF CONCRETE AROUND FOUNDATION MUST BE 120MM OR GREATER TO SECURE ANCHOR BOLTS.
1)．据付部の有効コンクリート厚みは 120mm以上あること（アンカ打込みに最低限必要）

2) TO DECIDE FOUNDATION OUTLINES, REFER TO INSTALLATION DIAGRAM SEPARETELY SUPPLIED.
2)据付位置決定には 別途 据付図を参照の事

3) DRILL PREPARED HOLES AND DRIVE ANCHOR BOLTS BEFORE INSTALLING THE MACHINE BECAUSE DRILLING HOLES AFTER MACHINE INSTALLATION IS IMPOSSIBLE.
3)本機引込み（据付）までに アンカ用の下穴をあけ、及び アンカの打込みを 完了しておくこと。据付後の穴開けは 不可能である為

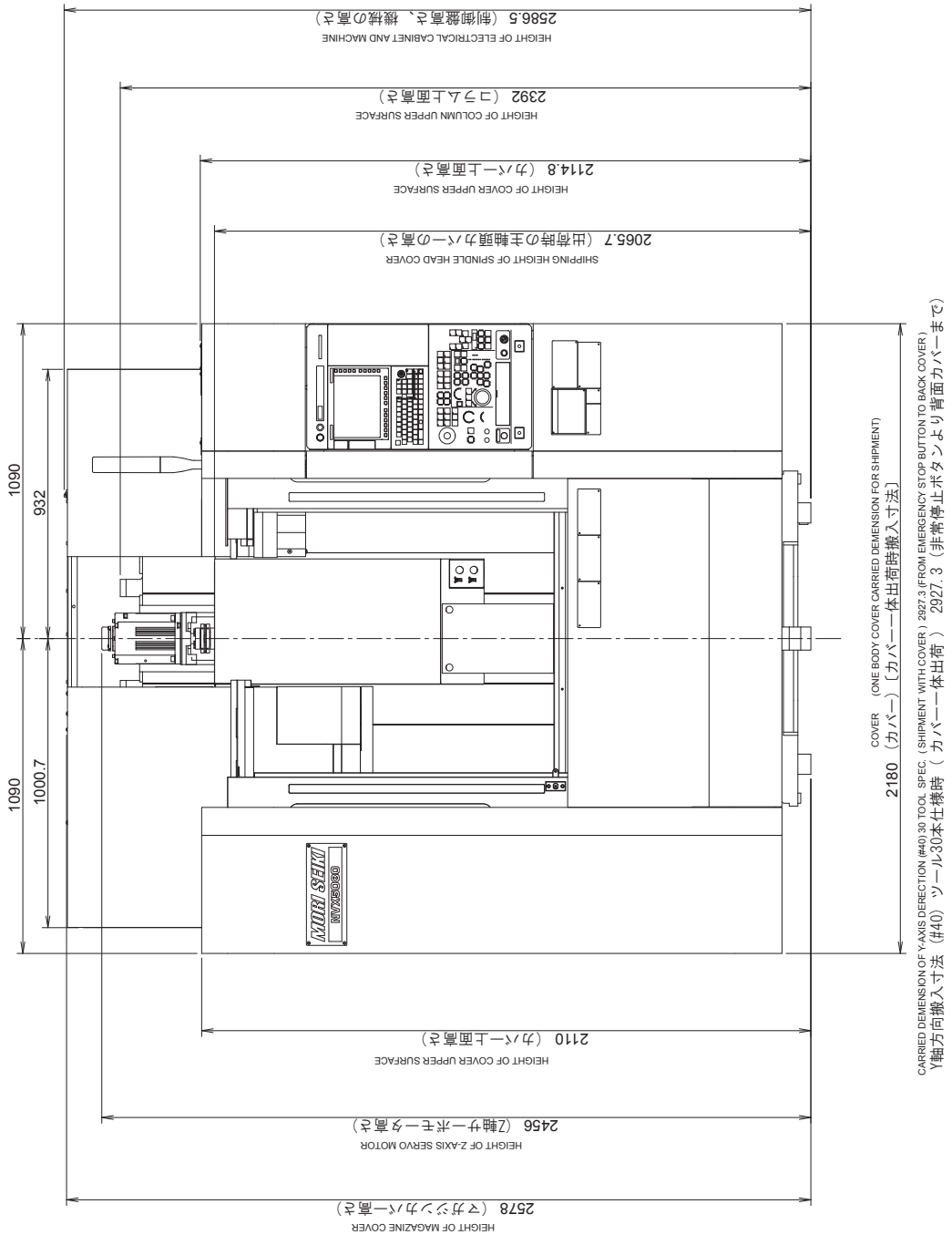
4) DRILL PREPARED HOLES AT EIGHT LOCATIONS MARKED WITH ◔. REFER TO THE DETAILED VIEW AND PAY ATTENTION TO THE DIAMETER AND DEPTH OF THE HOLE. (Ø26X93)
4)穴あけは本図により ◔ の8個所に行う。穴あけには本図の詳細図を参照のうえ、ギリ径 及び下穴深さに注意の事 (Ø26x93)

5) AFTER DRILLING, THE ANCHOR SHOULD BE DRIVEN UP TO THE SAME LEVEL OR SLIGHTLY BELOW THE UPPER SURFACE OF THE CONCRETE.
5)穴あけ後 アンカを コンクリート上面と同一又は上面下まで 打込んでおく事

6) INSTALL MACHINE WITH DIMENSION OF * PART IN THE WORKING DIAGRAM FOR DRY ANCHOR TO SECURE LENGTH OF THREAD ENGAGEMENT.
6)アンカへのボルトのねじ込み長さを確保するため、ドライアンカ施工図の*部寸法で据付を行うこと

5 拆解尺寸图
DISASSEMBLED DIMENSIONS

(Q55281 A01)
Unit: mm



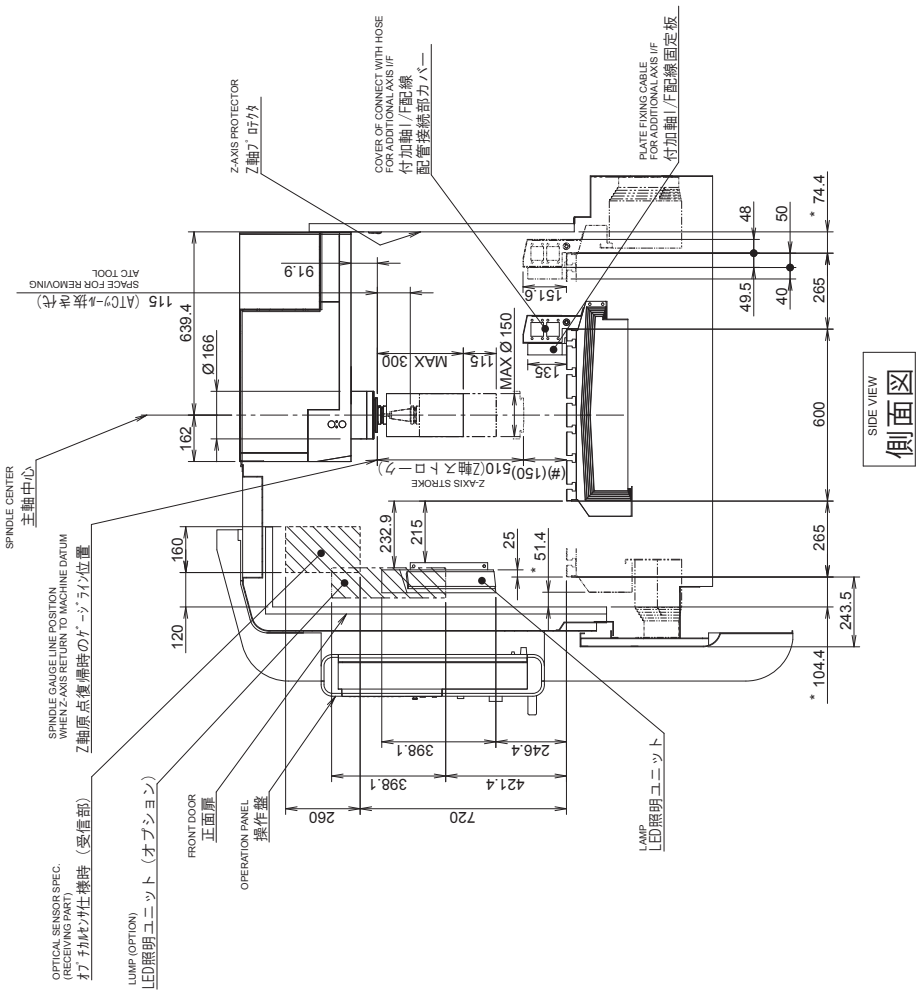
IT IS INDISPENSABLE FOR NVX5080/40.
・本図はNVX5080/40を示す。
HEIGHT IS 200mm UP FOR HIGH COLUMN SPECIFICATION.
・ハイコラム仕様時は、高さ寸法が
・200mm高くなる。

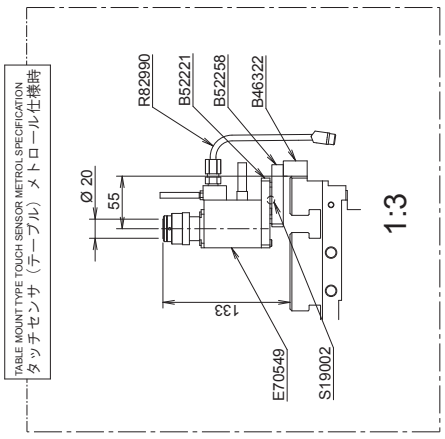
6 軸行程図
AXIS TRAVEL DIAGRAMS

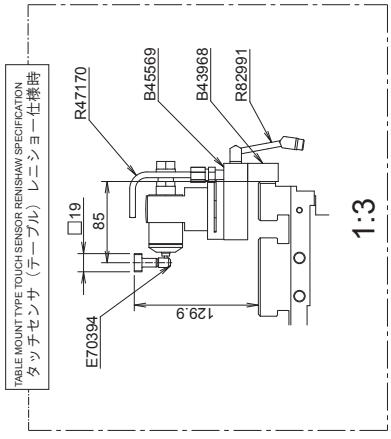
6-1 NVX5060/40
NVX5060/40

< 側視図 > **<Side View>**

(Q53466 A01 1/2)
Unit: mm







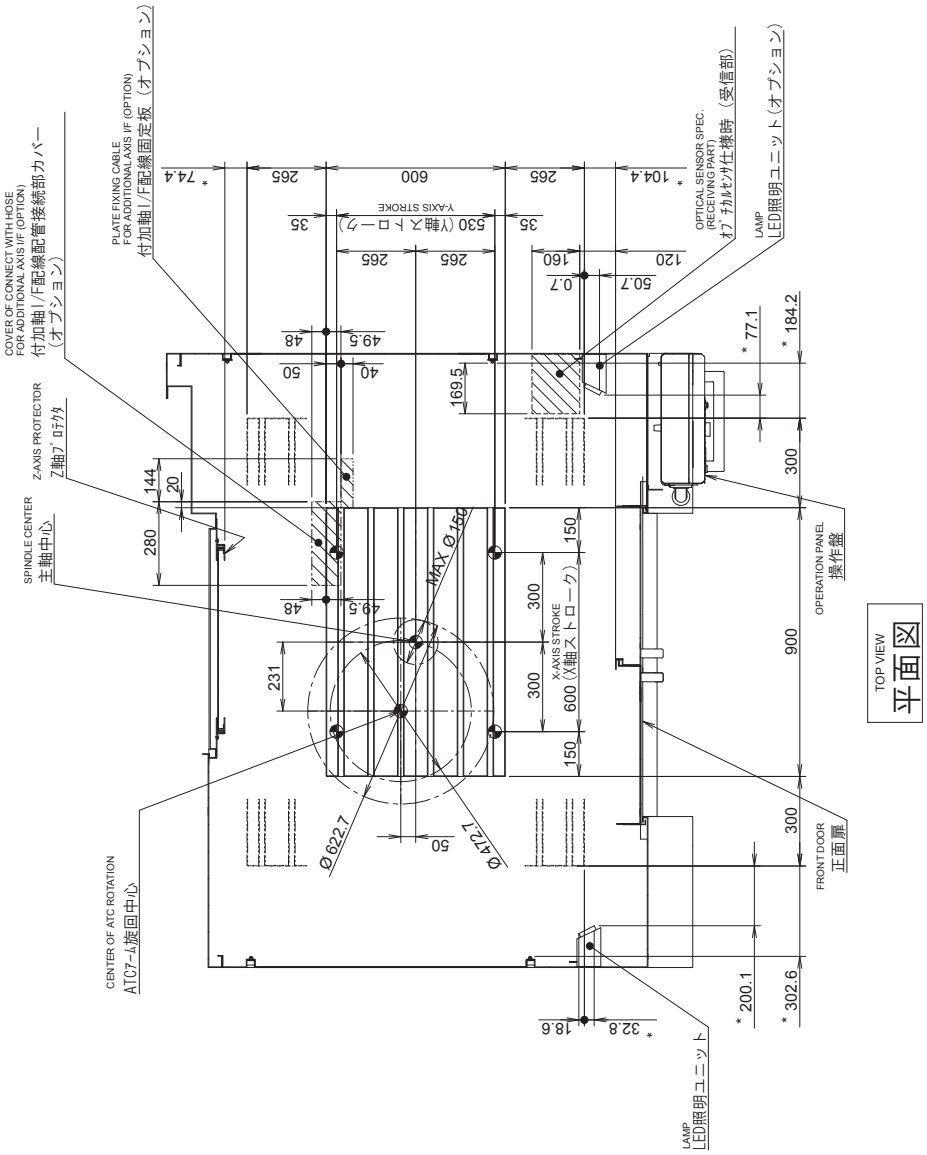
DIMENSIONS MARKED WITH ASTERISK(*) INDICATE THE DISTANCE FROM THE +0TH HARDWARE END POSITION.HOWEVER THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事がありま す。

THE Z-AXIS ZERO POINT IS SET TO THE SAME HEIGHT AS THE TOOL POT OF ATC; THEREFORE,SHRAP(#)INDICATE THE DISTANCE MAY NOT BE ACCURATE.
Z軸原点調整はATCに合わせている為、#印寸法は正確に出ていない可能性があります。

< 顶视图 >

<Top View>

(Q53466 A01 2/2)
Unit: mm

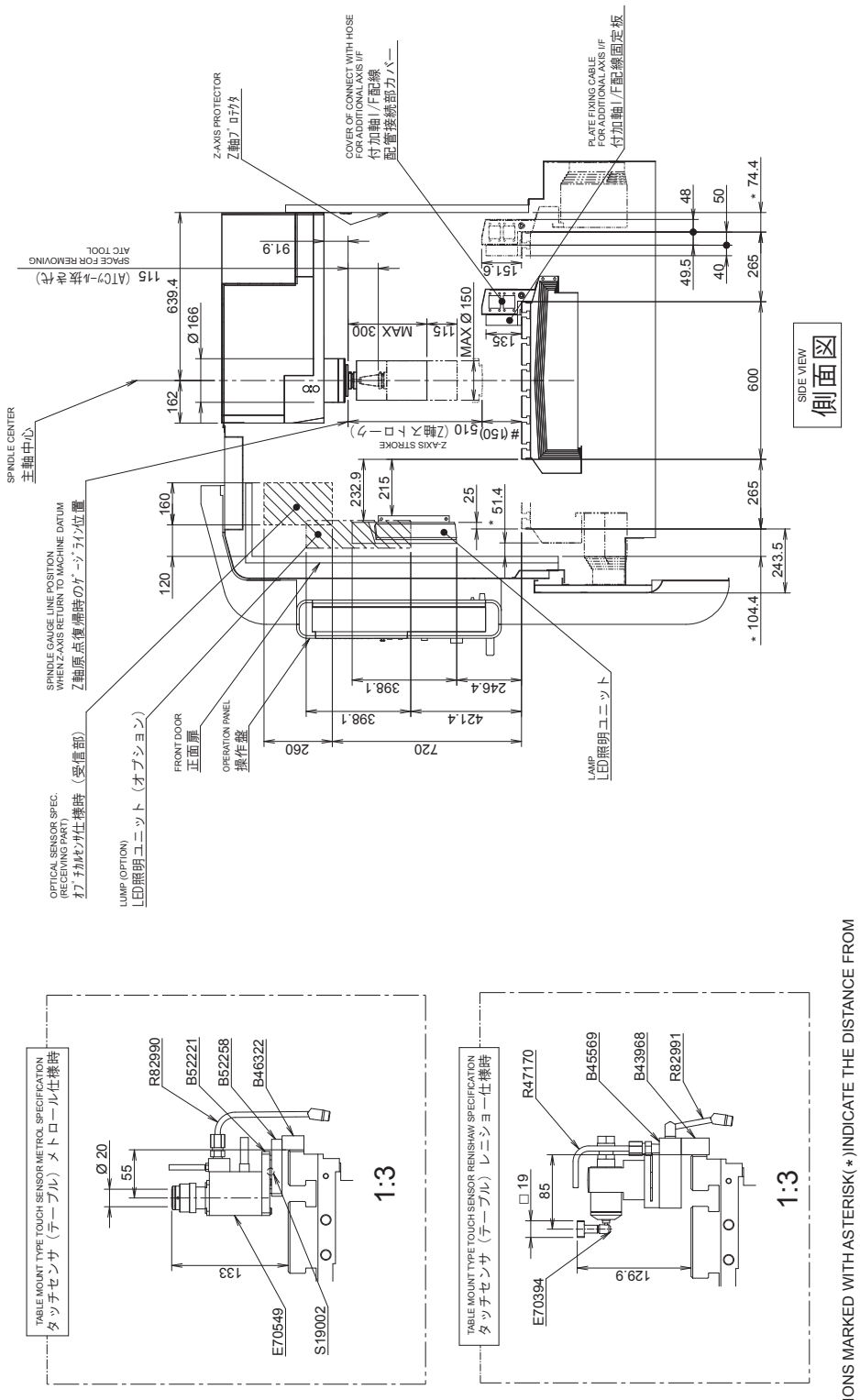


DIMENSIONS MARKED WITH ASTERISK(*) INDICATE THE DISTANCE FROM THE +OTHARDWARE)END POSITION HOWEVER THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

6-2 NVX5080/40
NVX5080/40

< 側視図 > **<Side View>**

(Q53451 A02 1/2)
Unit: mm



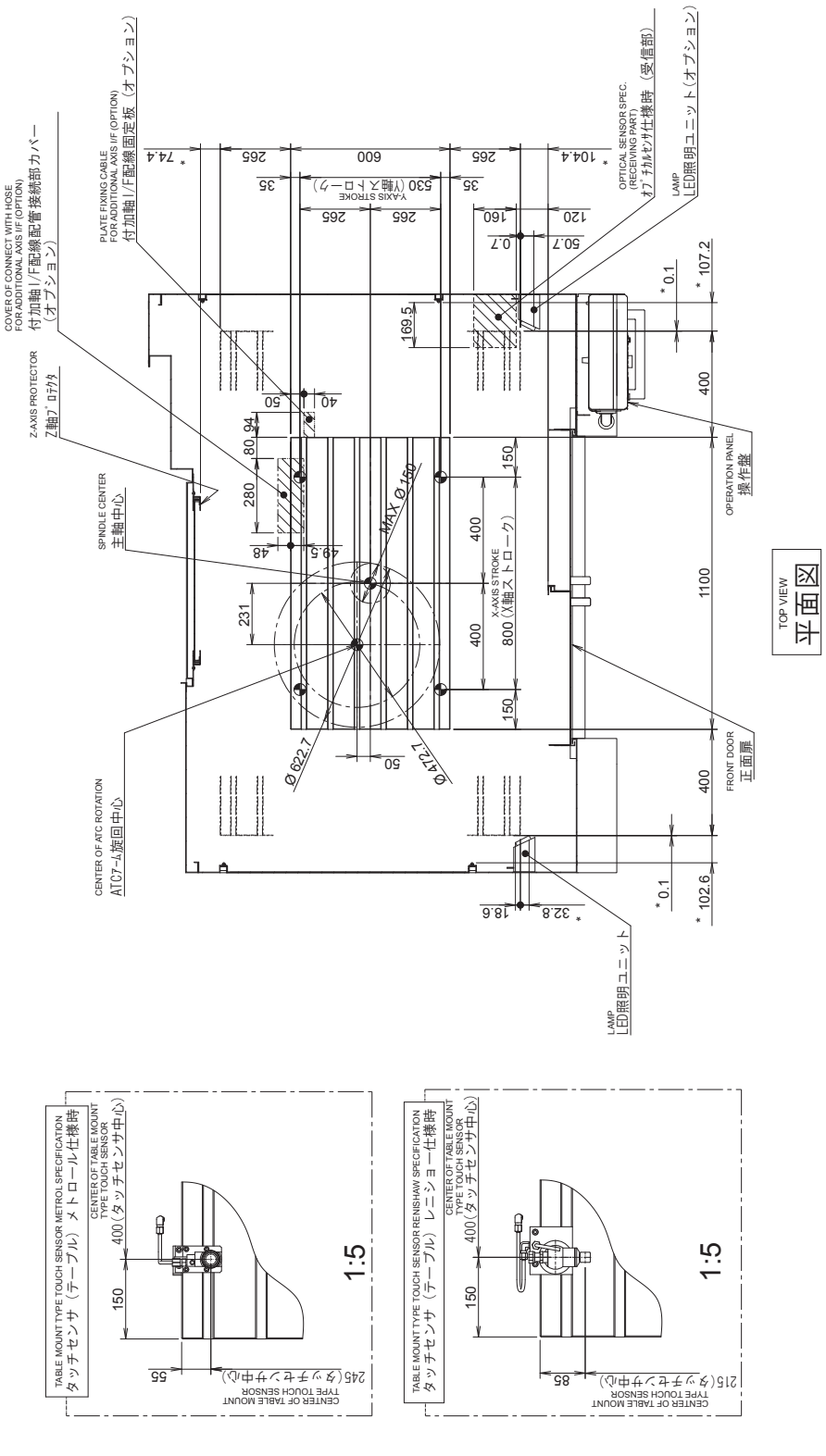
DIMENSIONS MARKED WITH ASTERISK(*)INDICATE THE DISTANCE FROM THE +OT(HARDWARE)END POSITION,HOWEVER,THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

THE Z-AXIS ZERO POINT IS SET TO THE SAME HEIGHT AS THE TOOL POT OF ATC; THEREFORE,SHRAP(#)INDICATE THE DISTANCE MAY NOT BE ACCURATE.
Z軸原点調整はATCに合わせている為、#印寸法は正確に出ていない可能性があります。

< 顶视图 >

<Top View>

(Q53451 A02 2/2)
Unit: mm



DIMENSIONS MARKED WITH ASTERISK(*)INDICATE THE DISTANCE FROM THE +OT(HARDWARE)END POSITION,HOWEVER,THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

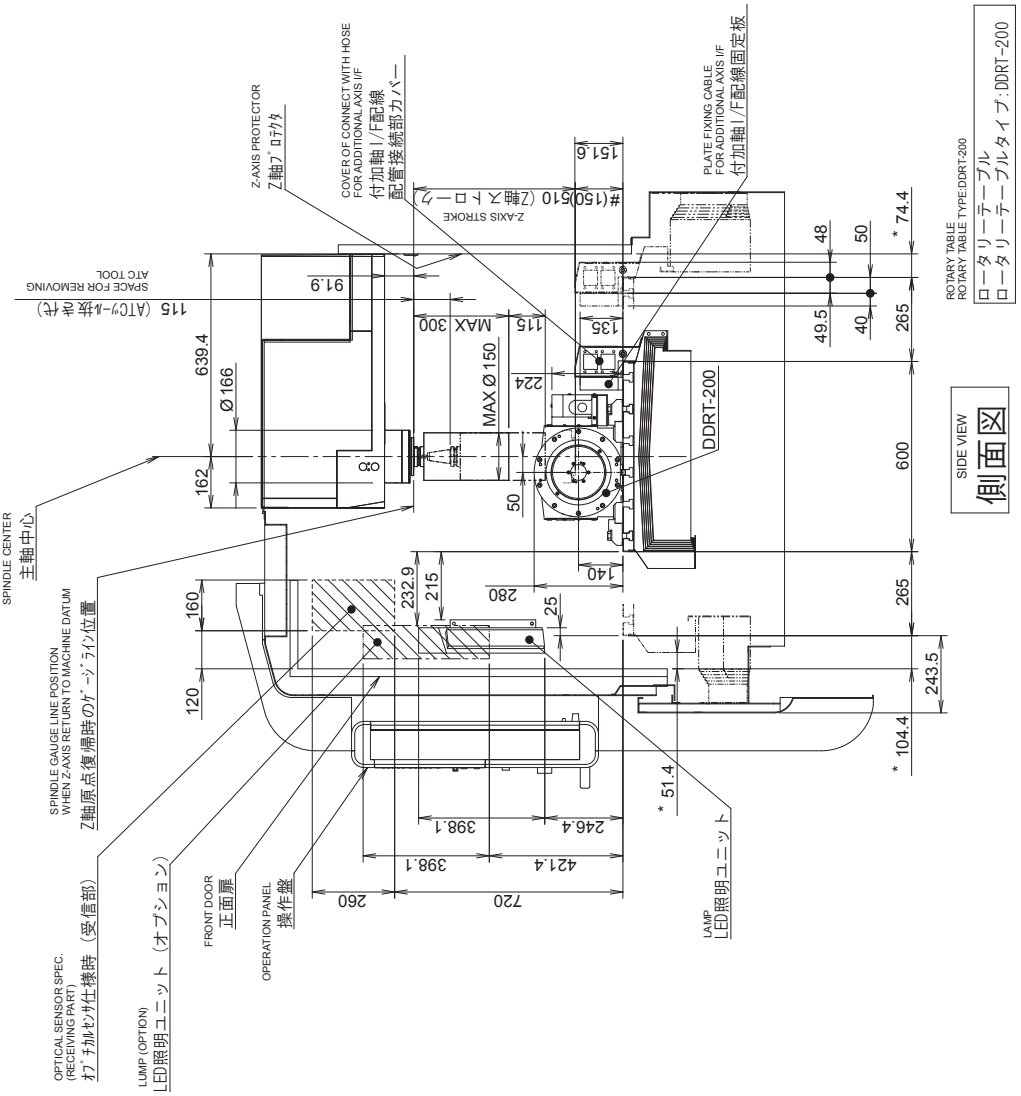
回转工作台 DDRT-200 规格

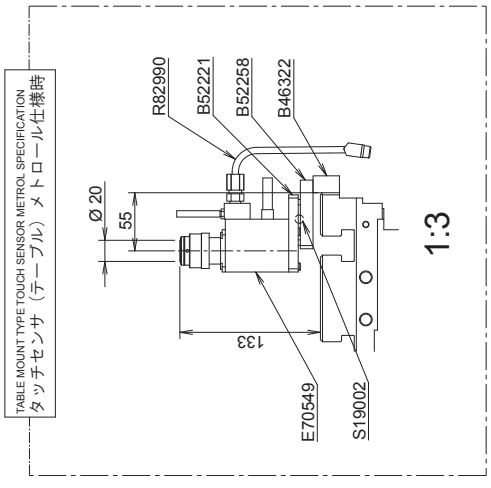
< 侧视图 >

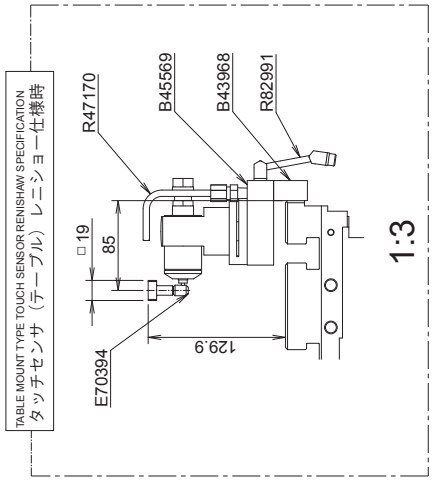
Rotary Table DDRT-200 Specifications

<Side View>

(Q53463 A01 1/2)
Unit: mm





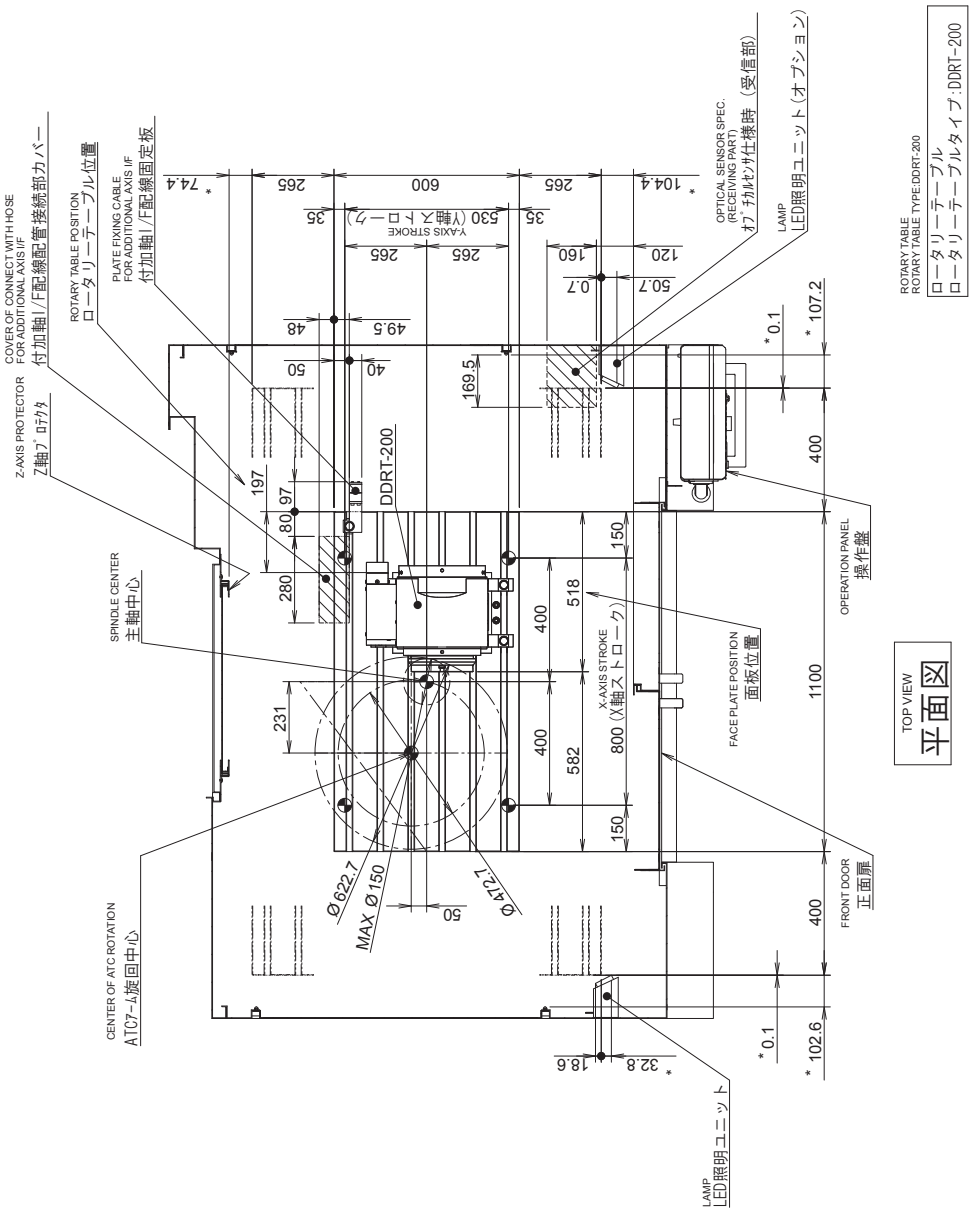


DIMENSIONS MARKED WITH ASTERISK(*) INDICATE THE DISTANCE FROM THE +OT(HARDWARE)END POSITION HOWEVER THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストローク エンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

THE Z-AXIS ZERO POINT IS SET TO THE SAME HEIGHT AS THE TOOL POT OF ATC; THEREFORE,SHRAP(#)INDICATE THE DISTANCE MAY NOT BE ACCURATE.
Z軸原点調整はATCに合わせている為、#印寸法は正確に出ていない可能性があります。

< 顶视图 > **<Top View>**

(Q53463 A01 2/2)
Unit: mm



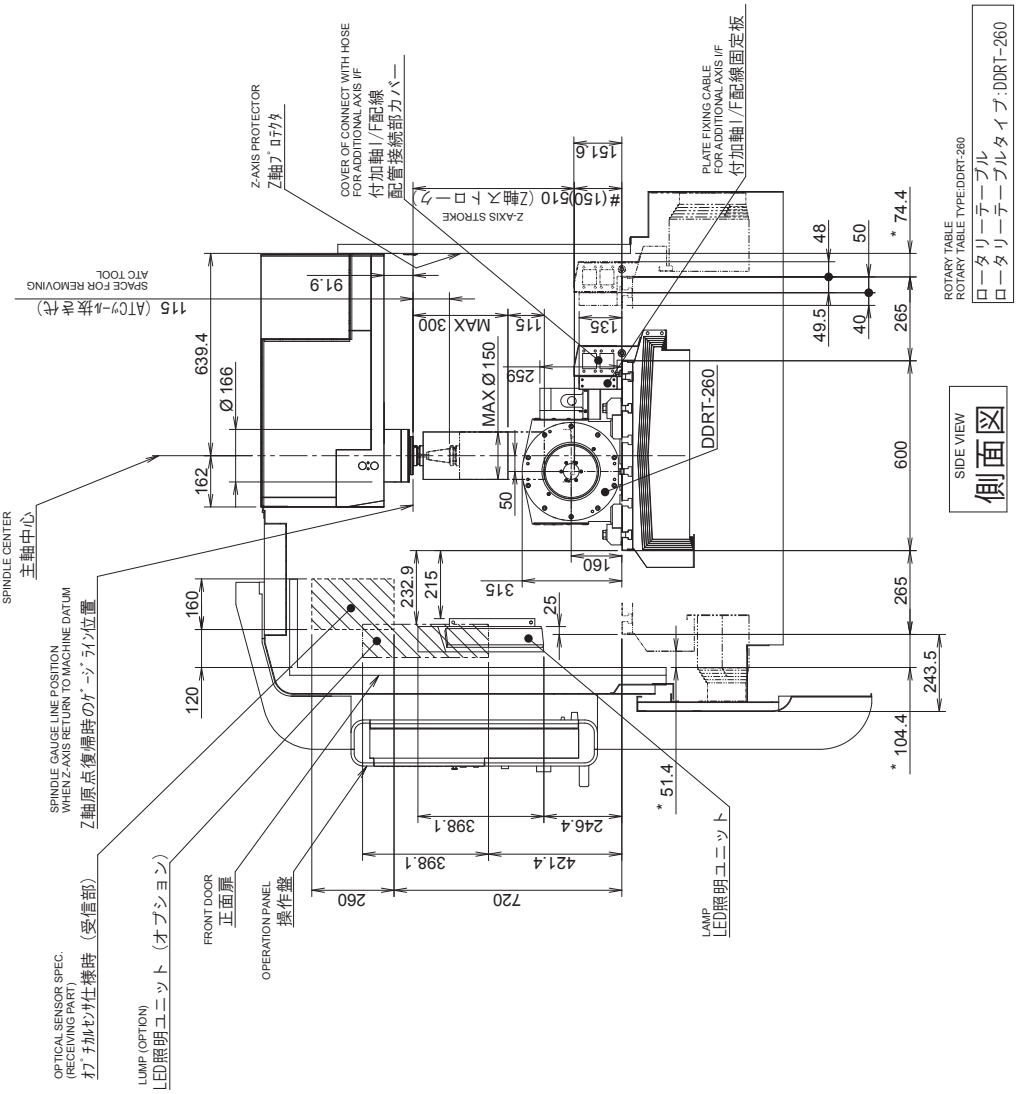
回转工作台 DDRT-260 规格

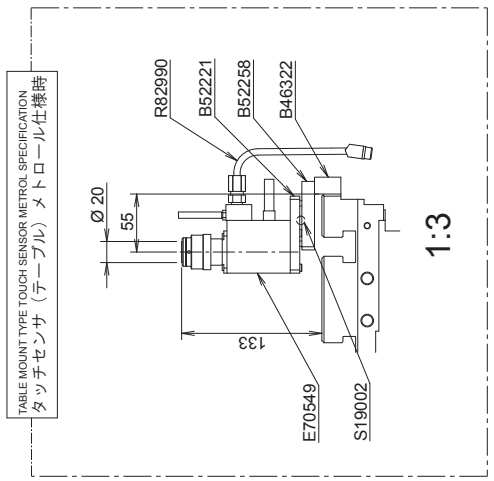
< 侧视图 >

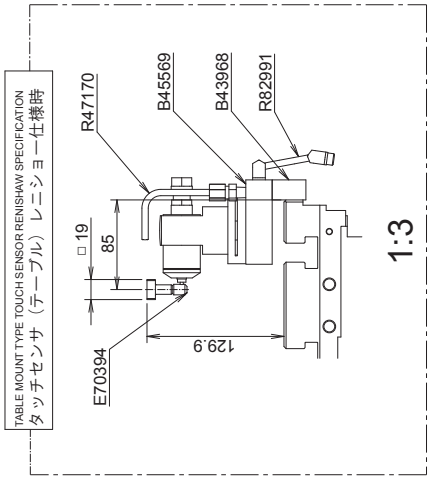
Rotary Table DDRT-260 Specifications

<Side View>

(Q53461 A01 1/2)
Unit: mm







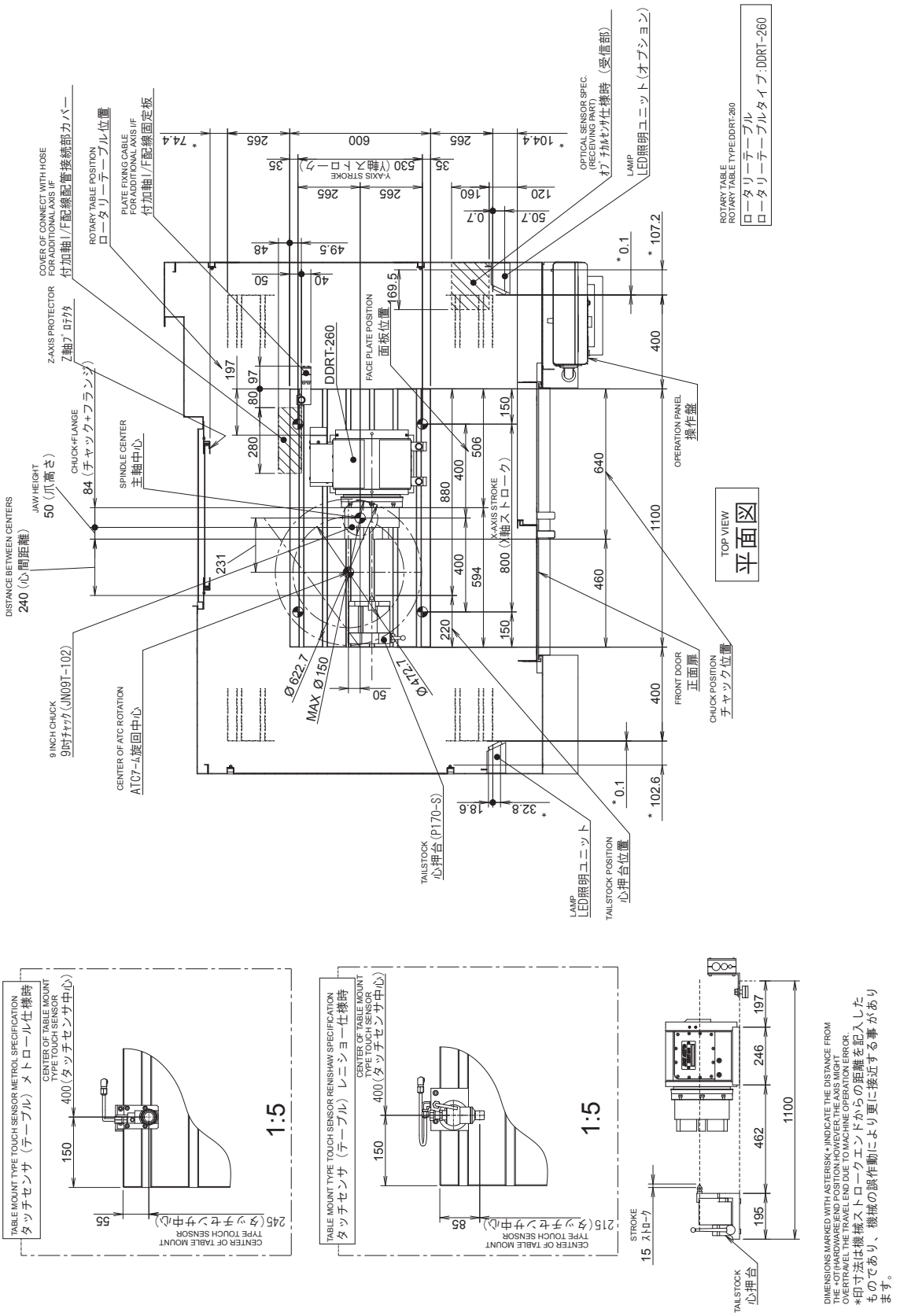
DIMENSIONS MARKED WITH ASTERISK(*) INDICATE THE DISTANCE FROM THE +0T(HARDWARE)END POSITION.HOWEVER,THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

THE Z-AXIS ZERO POINT IS SET TO THE SAME HEIGHT AS THE TOOL POT OF ATC; THEREFORE,SHARP(#)INDICATE THE DISTANCE MAY NOT BE ACCURATE.
Z軸原点調整はATCに合わせている為、#印寸法は正確に出ていない可能性がありません。

< 顶视图 >

<Top View>

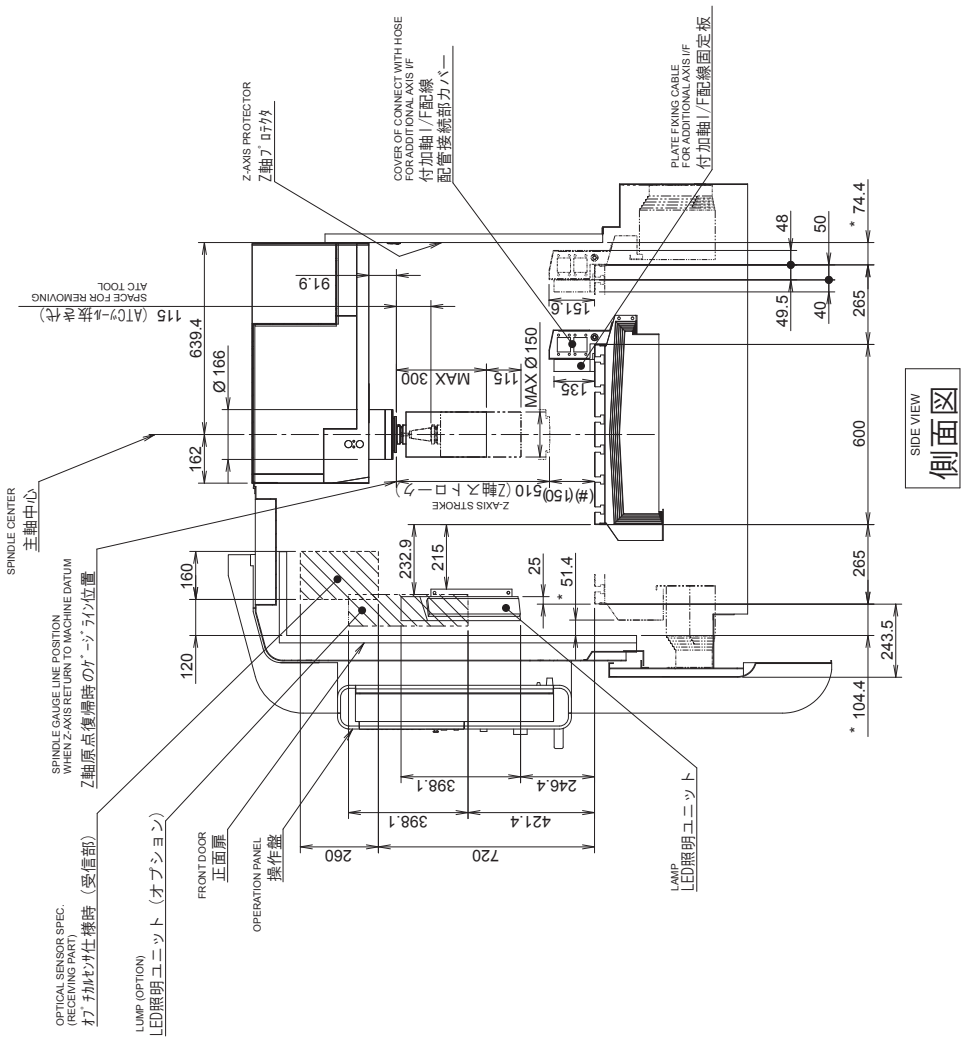
(Q53461 A01 2/2)
Unit: mm

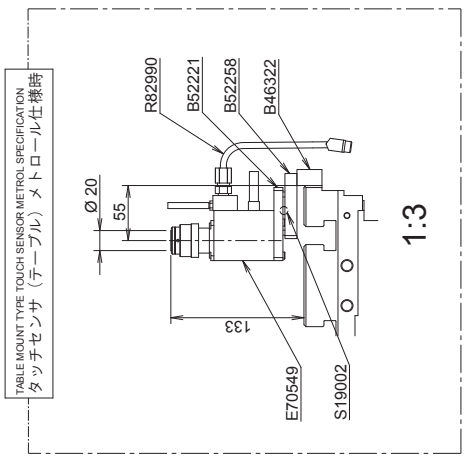


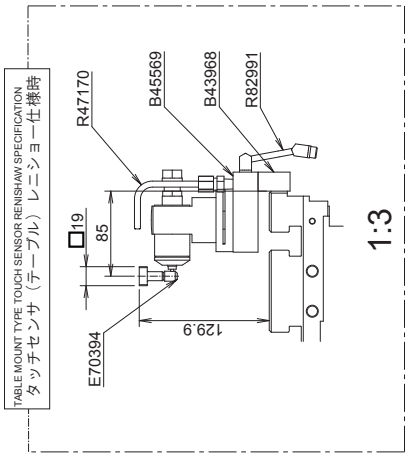
6-3 NVX5100/40
NVX5100/40

< 側視図 > **<Side View>**

(Q53462 A02 1/2)
Unit: mm





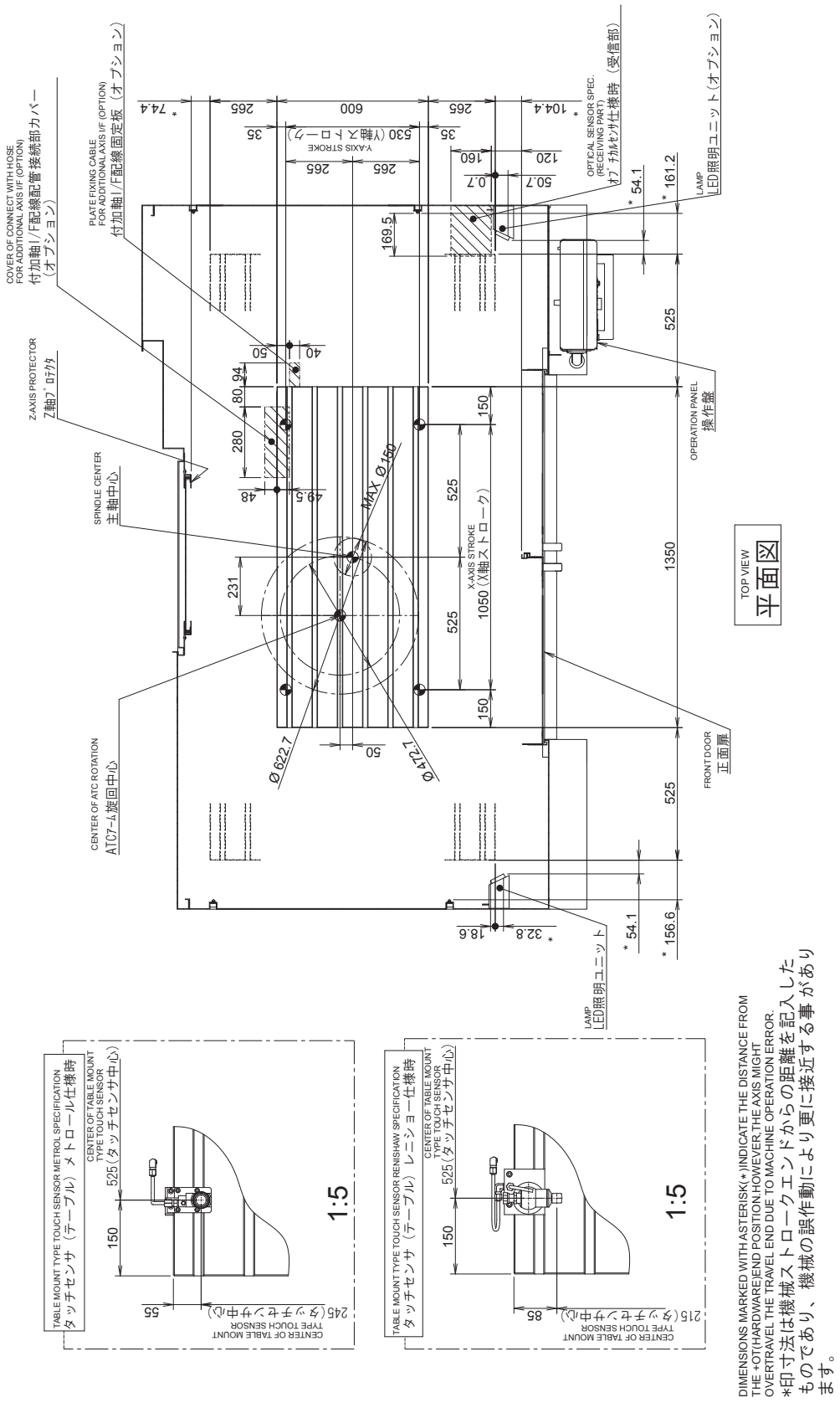


DIMENSIONS MARKED WITH ASTERISK(*)INDICATE THE DISTANCE FROM THE +OT(HARDWARE)END POSITION.HOWEVER,THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
*印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

THE Z-AXIS ZERO POINT IS SET TO THE SAME HEIGHT AS THE TOOL POT OF ATC, THEREFORE, SHRAP(#)INDICATE THE DISTANCE MAY NOT BE ACCURATE.
Z軸原点調整はATCに合わせている為、#印寸法は正確に出ていない可能性があります。

< 顶视图 > **<Top View>**

(Q53462 A02 2/2)
Unit: mm

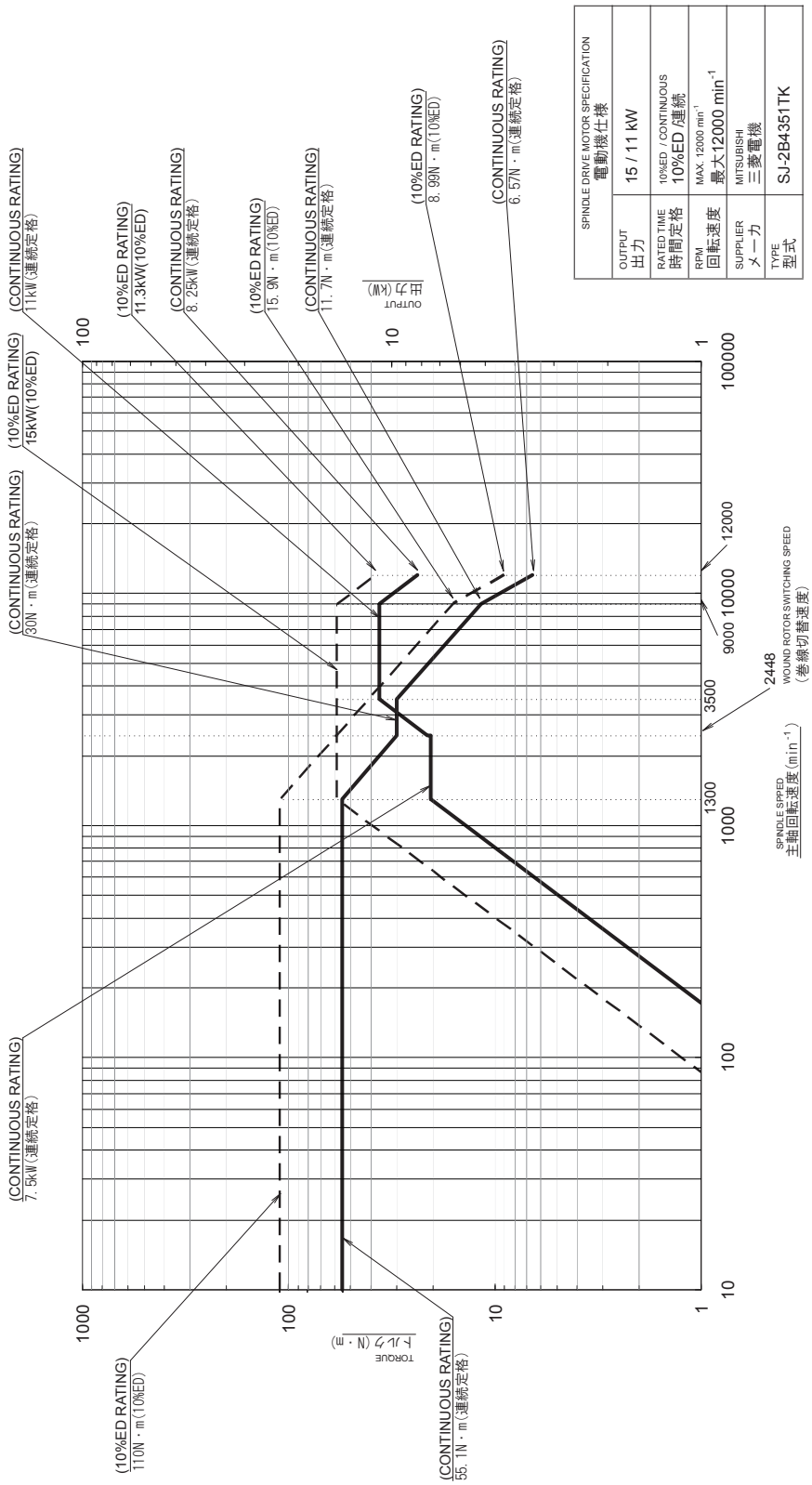


DIMENSIONS MARKED WITH ASTERISK(＊)INDICATE THE DISTANCE FROM THE +OT(HARDWARE)END POSITION.HOWEVER,THE AXIS MIGHT OVERTRAVEL THE TRAVEL END DUE TO MACHINE OPERATION ERROR.
＊印寸法は機械ストロークエンドからの距離を記入したものであり、機械の誤作動により更に接近する事があります。

7 主轴转速输出特性图 SPINDLE SPEED OUTPUT CHARACTERISTICS DIAGRAMS

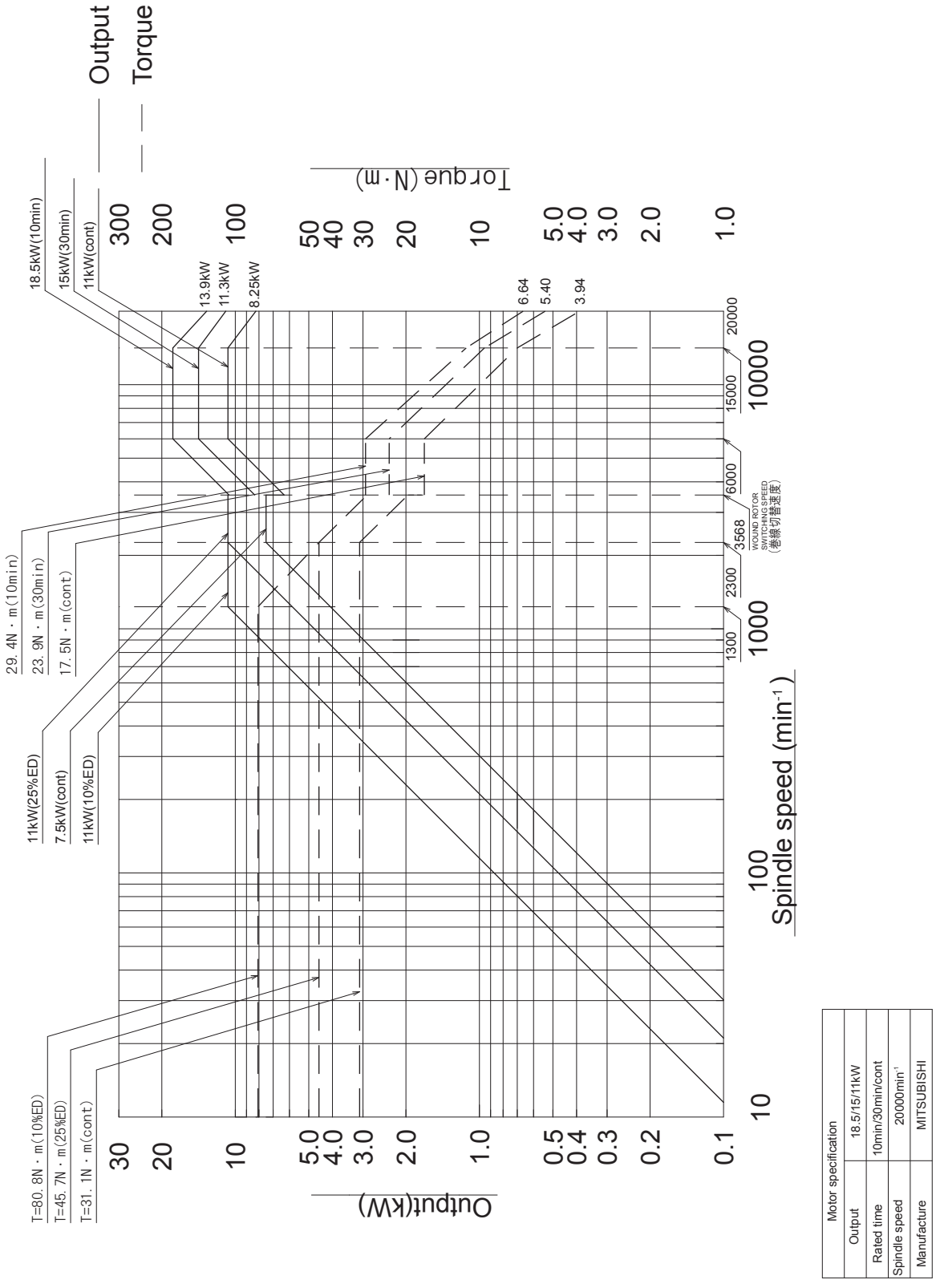
7-1 12000 min^{-1} 12000 min^{-1}

(Q43498 A01)



7-2 20000 min^{-1}
20000 min^{-1}

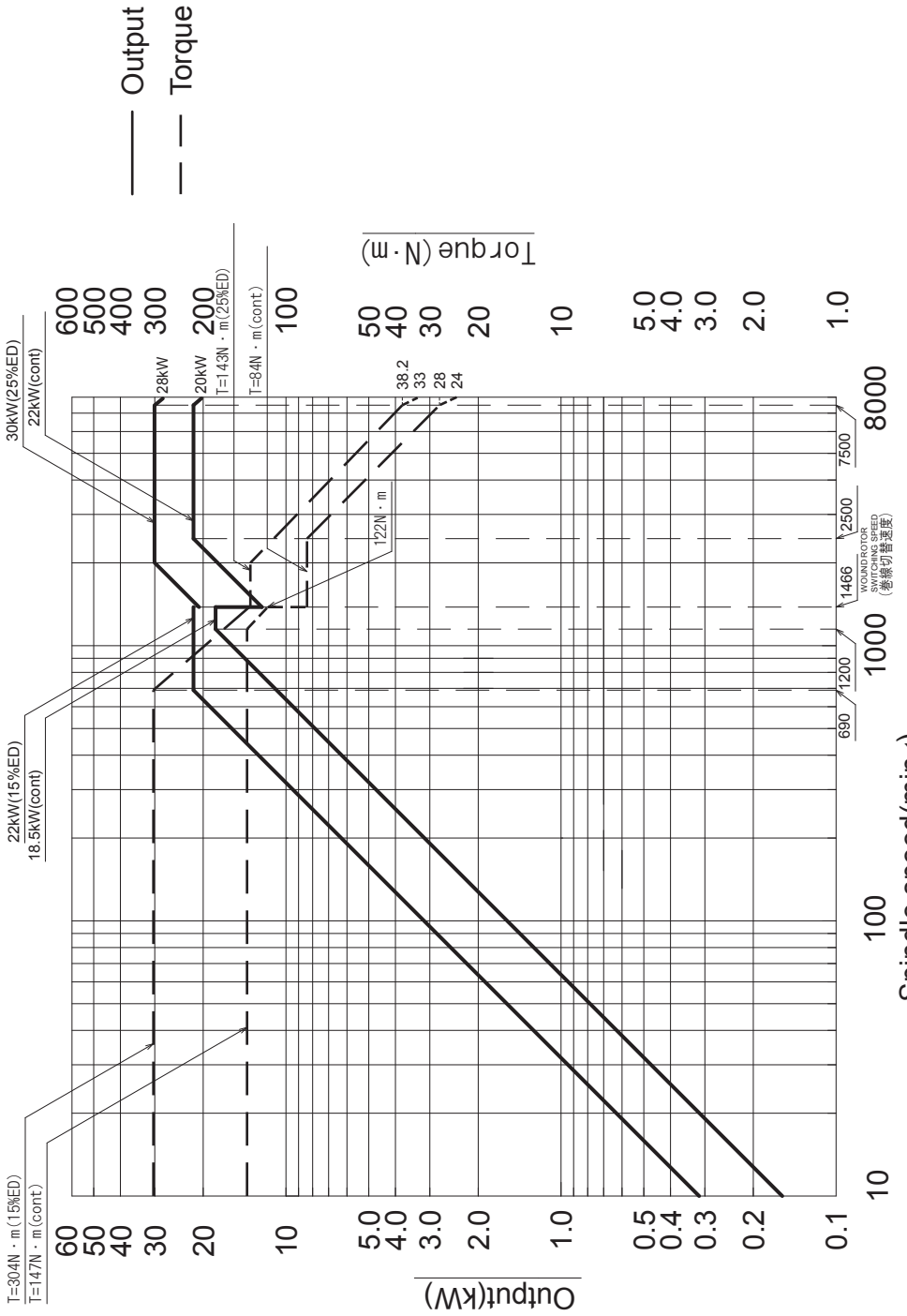
(Q43638 A01)



Motor specification	
Output	18.5/15/11kW
Rated time	10min/30min/cont
Spindle speed	20000min^{-1}
Manufacture	MITSUBISHI

7-3 高转矩规格
High Torque Specifications

(Q43629 A01)

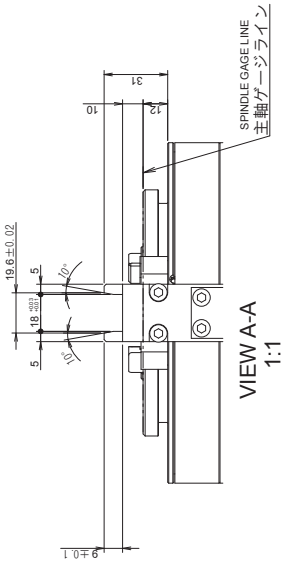


Motor specification	
Output	30/22kW
Rated time	25%ED/cont
Spindle speed	8000min^{-1}
Manufacture	MITSUBISHI

8 主轴头可安装附件 SPINDLE HEAD MOUNTABLE ACCESSORIES

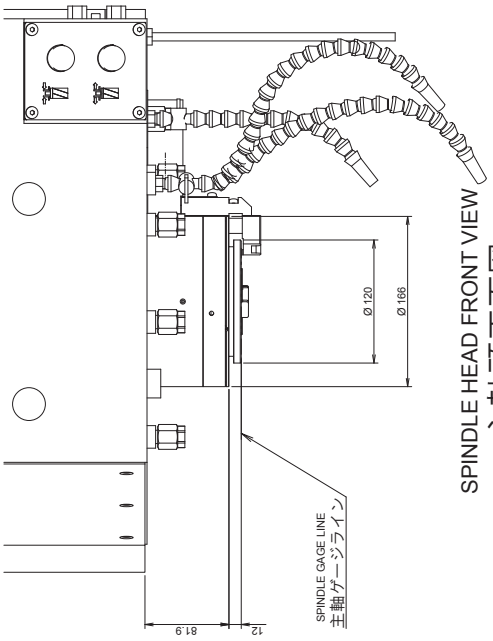
8-1 12000 min^{-1} 12000 min^{-1}

(Q55314 A01)
Unit: mm

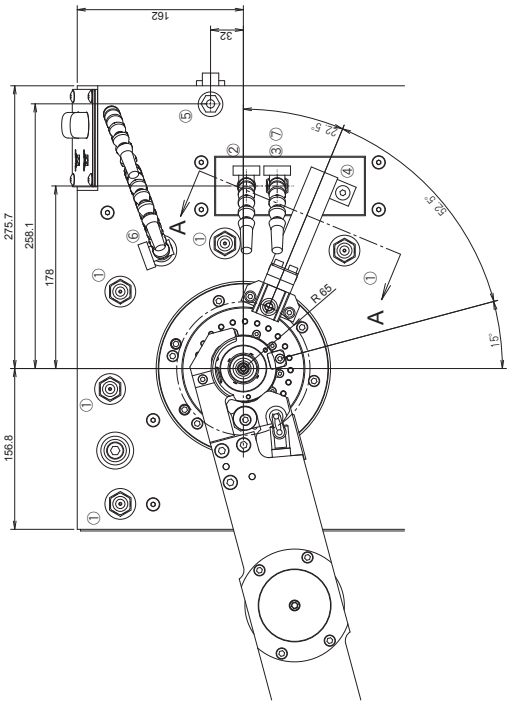


COOLANT NOZZLE (6P) ①クーラントノズル（5箇所）	STANDARD 標準仕様
TOOL TIP AIR BLOW(1P) ②刃先エアブロー（1箇所）	STANDARD 標準仕様
OIL SHOT ③ オイルショット	STANDARD オプション
COOLANT DISCHARGING PORT FOR OIL HOLE ④ オイルホールドリルクーラント	OPTION オプション
OIL MIST ⑤ オイルミスト	OPTION オプション
ADDITIONAL TOOL TIP COOLANT ⑥ 追加刃先クーラント	OPTION オプション
SEMI-DRY ⑦ セミドライ	OPTION オプション

COOLANT DISCHARGING PORT FOR OIL-HOLE(THE PITCH IS R65)
オイルホールドリル用クーラント出口（ピッチ：R65）



SPINDLE HEAD FRONT VIEW
主軸頭正面図



SPINDLE HEAD BOTTOM VIEW
主軸頭底面図

THIS DRAWING SHOWS THE DIMENSIONS WHEN B5901093A INSTALLED.
。本図は、B5901093Aを取付けた図です
1200min^{-1} SPECIFICATION.
。本図は1200min^{-1} 仕様を示す

9 刀柄尺寸 TOOL SHANK DIMENSIONS

⚠ 注意

1. 仅能使用符合指定标准的刀座。
   [机床损坏]
2. 对于配备贯穿主轴切削油系统的机床，请使用与主轴规格对应的刀座。
   [切削油排放故障，机床损坏]
3. 图中所给尺寸仅作参考，刀座不可以仅简单参考显示的尺寸来生产。森精机概不负责以此种方式制造刀座所产生的任何损失和事故。
4. BT 双面约束主轴和 CAT 双面约束主轴适用于 BIG DAISHOWA SEIKI CO., LTD 制造的 BIG-PLUS 规格。
   BIG-PLUS 是 BIG DAISHOWA SEIKI CO., LTD 在日本、美国、欧洲和其他国家的商标或注册商标。
5. 对于贯穿主轴切削油规格，根据所使用的刀座型号，切削油可能会进入主轴部件内。当选择刀座时，仔细考虑好刀座的切削油油路。尤其不能使用下列型号的刀座。
   [机床损坏]

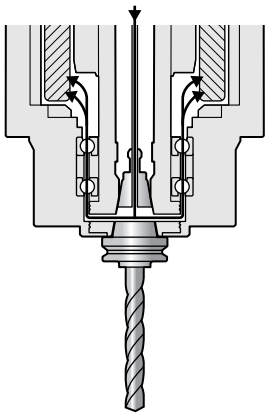
   < 在锥形部分有孔的刀座，例如舌形莫氏锥度刀座 >

   不要使用该型号的刀座。若使用了该刀座，切削油会通过刀座上的孔进入主轴部件内。

⚠ CAUTION

1. Only tool holders conforming to specified standards are to be used.
   [Machine damage]
2. For machines equipped with the through-spindle coolant system, use tool holders corresponding to the spindle specifications.
   [Coolant discharge faulty, machine damage]
3. The dimensions given in the diagrams are only for reference purpose and the tool holders must not be manufactured by simply referring to the indicated dimensions. Mori Seiki is not responsible for any loss and problem arising from the user of tool holders manufactured in such a manner.
4. BT two-face constrained spindles and CAT two-face constrained spindles are made fitting to the specification of BIG-PLUS manufactured by BIG DAISHOWA SEIKI CO., LTD. BIG-PLUS is a trademark or registered trademark of BIG DAISHOWA SEIKI CO., LTD in Japan, the U.S.A., Europe, and other countries.
5. For the through-spindle coolant specifications, coolant may enter the components of the spindle depending on the type of tool holders used. When selecting tool holders, carefully consider the coolant paths of the tool holders. Particularly, the following types of tool holders cannot be used.
   [Machine damage]

   <Holders having holes in their tapered sections such as the tongue type Morse taper holder>
   Do not use tool holders of this type. If you do, coolant enters into the components of the spindle through the holes in the tool holder.



附注

该图适用于中央贯穿切削油规格。

< 锥形部分并不与主轴锥形部分完全接触的特殊刀座 >

不要使用该型号的刀座。若使用了该刀座，切削油会通过锥形部分进入主轴部件内。

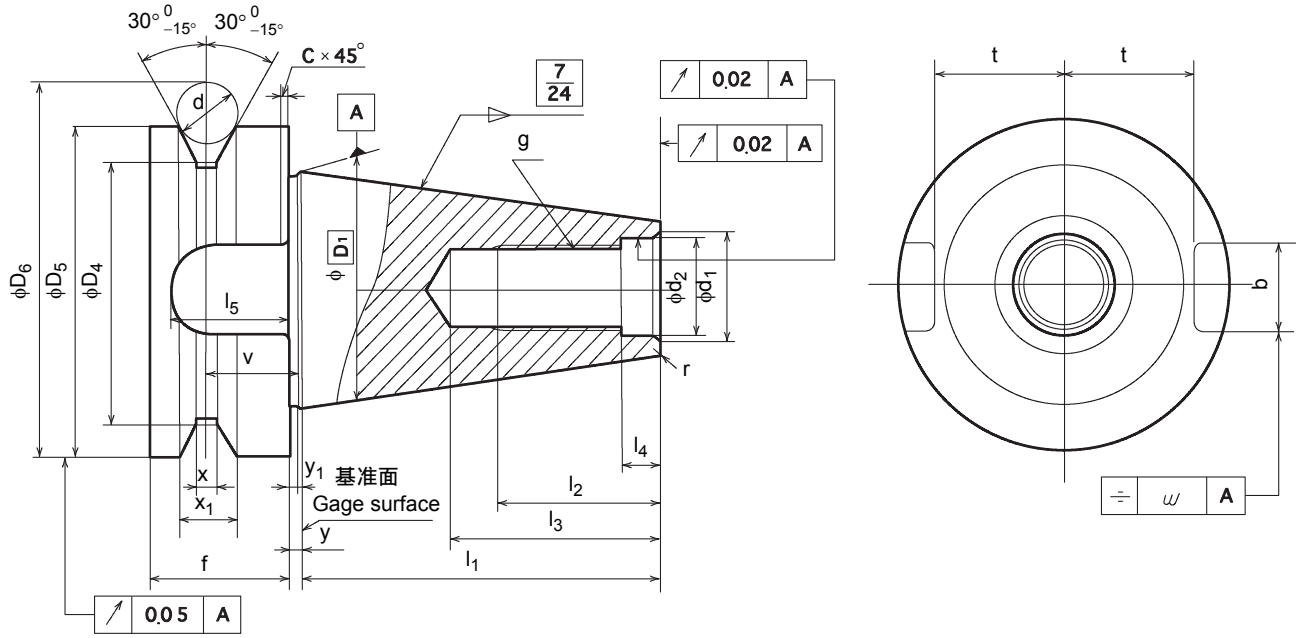
NOTE

The illustration is for the center-through coolant specifications.

<Special holders whose taper section does not come into a full contact with the spindle taper section>
Do not use tool holders of this type. If you do, coolant enters into the components of the spindle through the taper section.

9-1 MAS
MAS

Unit: mm



	刀柄			螺钉					
	D_1	l_1 ±0.15	r （最大）	d_1	d_2 H8	g 6H	l_2 （最小）	l_3 （最小）	l_4 +0.5 0
BT40	44.450	65.4	1	19	17	M16	30	43	9
BT50	69.850	101.8	1	27	25	M24	45	62	13

	Shank			Screw					
	D_1	l_1 ±0.15	r (max.)	d_1	d_2 H8	g 6H	l_2 (min.)	l_3 (min.)	l_4 +0.5 0
BT40	44.450	65.4	1	19	17	M16	30	43	9
BT50	69.850	101.8	1	27	25	M24	45	62	13

	榫头				
	C （最大）	b H12	l_5 （最小）	t 0 −0.2	w
BT40	0.5	16.1	21	22.6	0.12
BT50	1	25.7	31	35.4	0.2

	Tenon				
	C (max.)	b H12	l_5 (min.)	t 0 −0.2	w
BT40	0.5	16.1	21	22.6	0.12
BT50	1	25.7	31	35.4	0.2

	凸缘							
	D_4	D_5 h8	f	v ±0.1	x	x_1 +0.1 0	y ±0.4	y_4 0 −0.4
BT40	53	63	25	16.6	5	10	2	2
BT50	85	100	35	23.2	7	15	3	3

	Flange							
	D_4	D_5 h8	f	v ±0.1	x	x_1 +0.1 0	y ±0.4	y_4 0 −0.4
BT40	53	63	25	16.6	5	10	2	2
BT50	85	100	35	23.2	7	15	3	3

	7/24 锥角公差 * AT_D	参考		
		小端直径	d	D_6
BT40	+0.0041 0	25.375	10	75.679
BT50	+0.0051 0	40.158	15	119.019

	7/24 Taper angle tolerance* AT_D	References		
		Dia. at small end	d	D_6
BT40	+0.0041 0	25.375	10	75.679
BT50	+0.0051 0	40.158	15	119.019

有关详情，参见相关标准。

附注

1. * 7/24 锥角公差为 $^{+AT4}_{0}$（JIS B0614 锥角公差等级 AT4）。
2. 除非特别说明，公差应为 JIS B0405 指定的中级。

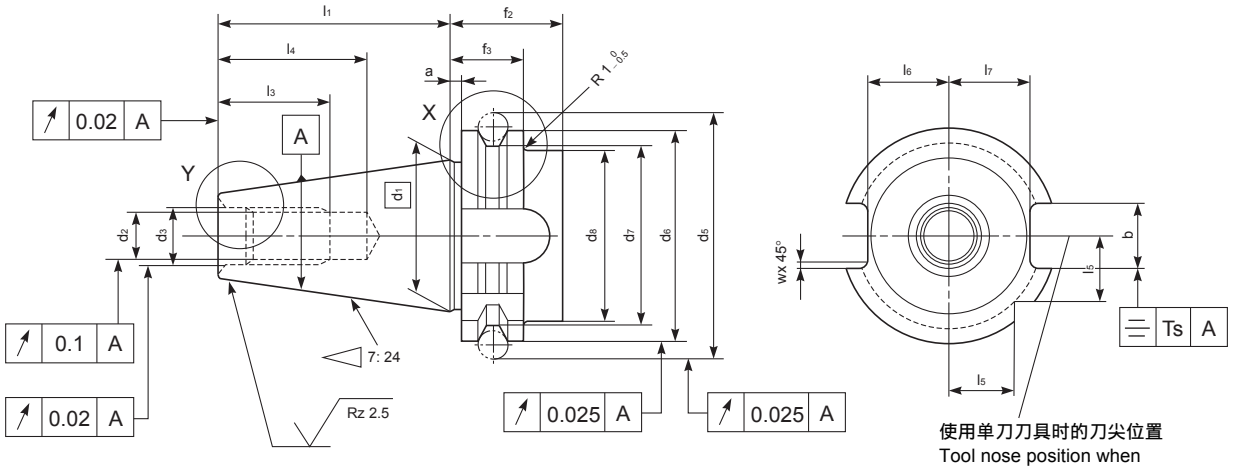
For details refer to the relevant standards.

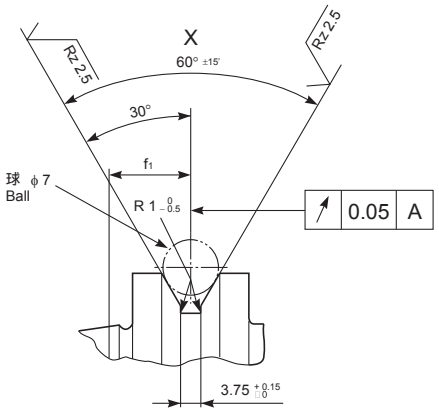
NOTE

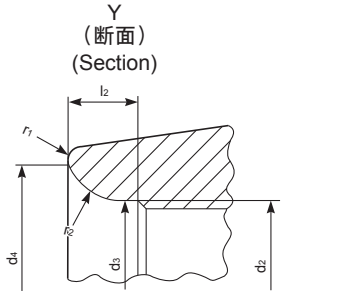
1. * 7/24 Taper angle tolerance is $^{+AT4}_{0}$ (JIS B0614 taper angle tolerance class AT4).
2. Unless otherwise specified, the allowance should be middle class specified by JIS B0405.

9-2 DIN
DIN

Unit: mm







顶尖：60（因制造商不同，可能有锥口孔或倒圆角保护端面。）
Center: 60 (There may be countersinking or corner rounding for protecting the end face depending on the manufacturer.)

7/24 锥度 No.	a ±0.1	b H12	d1	d2	d3 H7	d4 （最大）	d5 ±0.05	d6 0 −0.1
50	3.2	25.7	69.85	M24	25	28	107.25	97.50
40	3.2	16.1	44.45	M16	17	19	72.3	63.55

7/24 taper No.	a ±0.1	b H12	d1	d2	d3 H7	d4 (max.)	d5 ±0.05	d6 0 −0.1
50	3.2	25.7	69.85	M24	25	28	107.25	97.50
40	3.2	16.1	44.45	M16	17	19	72.3	63.55

7/24 锥度 No.	d7 0 −0.5	d8 （最大）	f1 ±0.1	f2 （最小）	f3 0 −0.1	l1 0 −0.3	l2 +0.5 0	l3 （最小）
50	91.25	80	11.1	35	19.1	101.75	11.5	47
40	56.25	50	11.1	35	19.1	68.4	8.2	32

7/24 taper No.	d7 0 −0.5	d8 (max.)	f1 ±0.1	f2 (min.)	f3 0 −0.1	l1 0 −0.3	l2 +0.5 0	l3 (min.)
50	91.25	80	11.1	35	19.1	101.75	11.5	47
40	56.25	50	11.1	35	19.1	68.4	8.2	32

7/24 锥度 No.	l4 (最小)	l5 0 −0.3	l6 0 −0.4	l7 0 −0.4	r1 0 −0.5	r2 0 −0.5	Ts
50	61.5	30	35.5	37.7	2.5	1.5	0.2
40	42.5	18.5	22.8	25	1.2	1	0.12

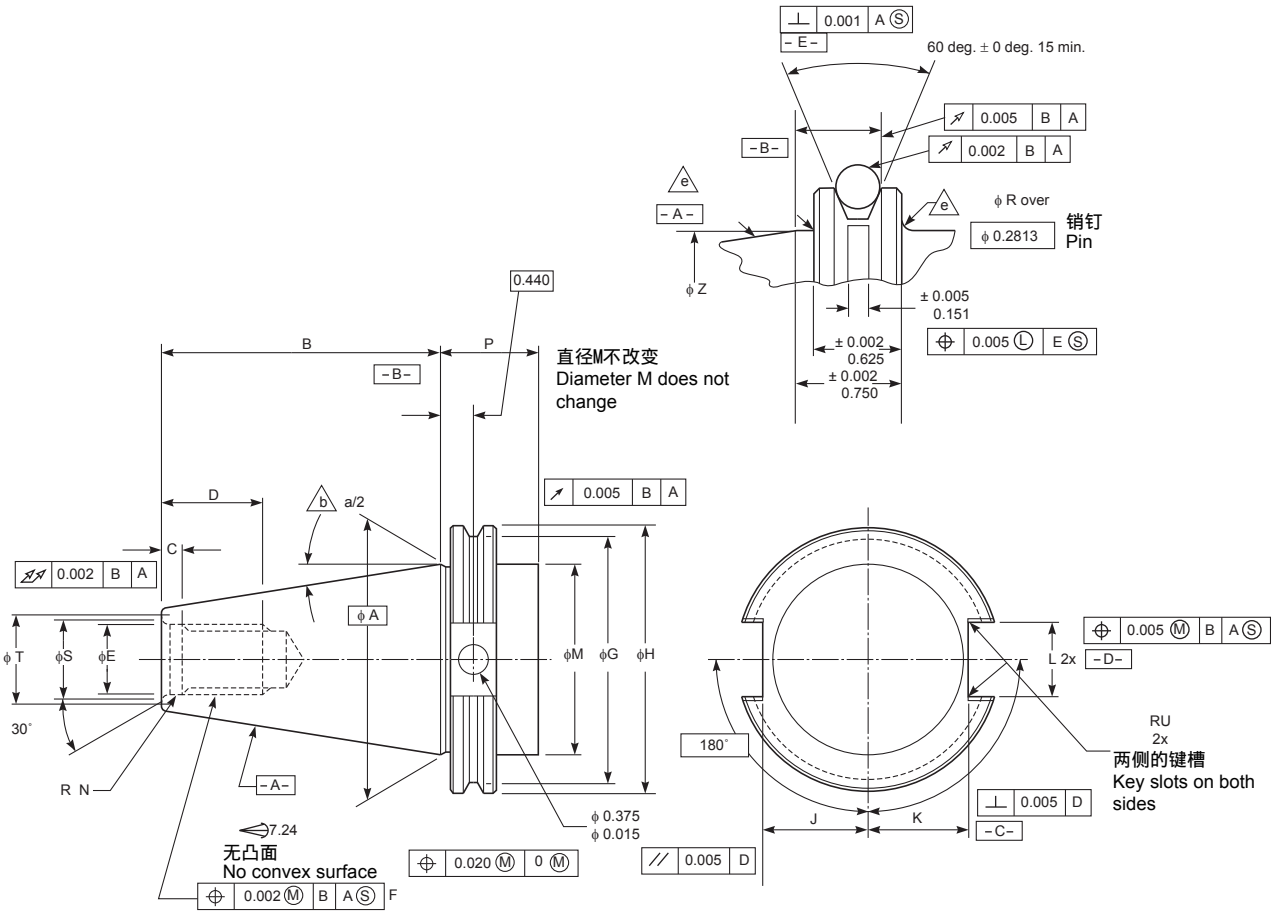
7/24 taper No.	l4 (min.)	l5 0 −0.3	l6 0 −0.4	l7 0 −0.4	r1 0 −0.5	r2 0 −0.5	Ts
50	61.5	30	35.5	37.7	2.5	1.5	0.2
40	42.5	18.5	22.8	25	1.2	1	0.12

有关详情，参见相关标准。

For details refer to the relevant standards.

9-3 CAT
CAT

Unit: inch



尺寸	ϕA 基准直径	B ±0.005	C ±0.010	D (最小)	ϕE +0.015 −0.000	F UNC-28	ϕG ±0.010
50	2.750	4.000	0.250	1.75	1.031	1.000–8	3.594
40	1.750	2.687	0.188	1.12	0.641	0.625 –11	2.219

Size	ϕA Gage diameter	B ±0.005	C ±0.010	D (min.)	ϕE +0.015 −0.000	F UNC-28	ϕG ±0.010
50	2.750	4.000	0.250	1.75	1.031	1.000–8	3.594

Size	ϕA Gage diameter	B ±0.005	C ±0.010	D (min.)	ϕE +0.015 −0.000	F UNC-28	ϕG ±0.010
40	1.750	2.687	0.188	1.12	0.641	0.625 −11	2.219

尺寸	ϕH ±0.002	J +0.000 −0.015	K +0.000 −0.015	L ±0.010	ϕM ±0.005	N	P （最小）
50	3.875	1.485	1.390	1.020	2.750	0.075 0.090	1.38
40	2.500	0.985	0.890	0.645	1.750	0.450 0.060	1.38

Size	ϕH ±0.002	J +0.000 −0.015	K +0.000 −0.015	L ±0.010	ϕM ±0.005	N	P (min.)
50	3.875	1.485	1.390	1.020	2.750	0.075 0.090	1.38
40	2.500	0.985	0.890	0.645	1.750	0.450 0.060	1.38

尺寸	ϕR ±0.002	ϕS ±0.010	ϕT （最小） 平面间	U ±0.010	ϕZ +0.000 −0.005
50	4.238	1.125	1.380	0.030	2.750
40	2.863	0.720	0.860	0.030	1.750

Size	ϕR ±0.002	ϕS ±0.010	ϕT (min.) Between Faces	U ±0.010	ϕZ +0.000 −0.005
50	4.238	1.125	1.380	0.030	2.750
40	2.863	0.720	0.860	0.030	1.750

有关详情，参见相关标准。

For details refer to the relevant standards.

9-4 MAS BT 双面约束 MAS BT Two Face Constrained

BT 双面约束主轴适用于 BIG DAISHOWA SEIKI CO., LTD 制造的 BIG-PLUS 规格。

BT two-face constrained spindles are made fitting to the specification of BIG-PLUS manufactured by BIG DAISHOWA SEIKI CO., LTD.

9-5 CAT 双面约束 CAT Two Face Constrained

CAT 双面约束主轴适用于 BIG DAISHOWA SEIKI CO., LTD 制造的 BIG-PLUS 规格。

CAT two-face constrained spindles are made fitting to the specification of BIG-PLUS manufactured by BIG DAISHOWA SEIKI CO., LTD.

9-6 HSK
HSK

⚠ 注意

使用 HSK 刀座时，假如刀具和刀座有一个通孔，确保刀座上安装有中央贯穿的切削油管或螺塞。否则，切屑会进入刀具夹紧装置的机械部件或主轴锥度部分，损坏主轴和刀座。

⚠ CAUTION

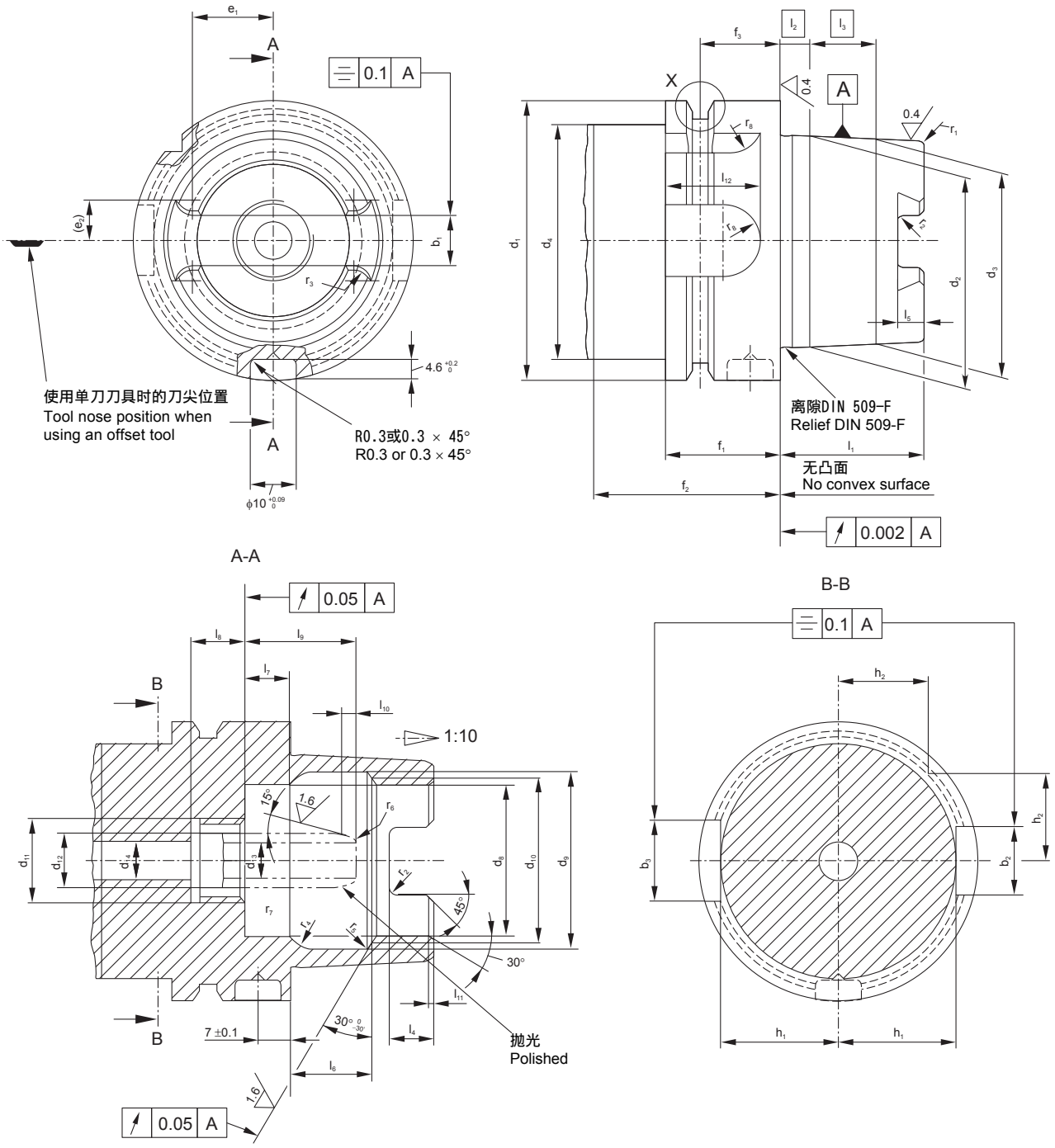
When using the HSK tool holder, if the tool and the holder have a through hole, make sure that the center-through coolant pipe or a plug is installed in the holder. If not, chips could enter the mechanical parts of the tool clamping unit or the spindle taper, damaging the spindle and the holder.

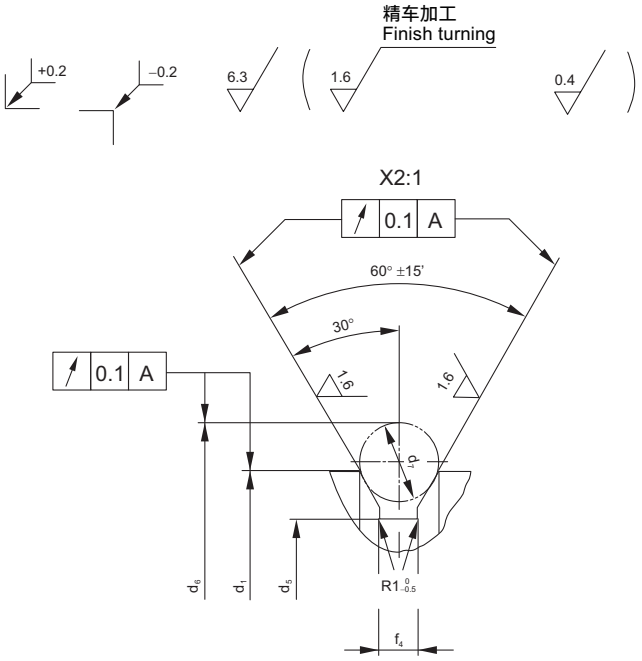
HSK-A63、 HSK-A100

HSK-A63, HSK-A100

Unit: mm

除非特别说明，公差应为ISO 2768指定的等级m。
Unless otherwise specified, the allowance should be class m specified by ISO 2768.





额定值	b1 H10	b2 H10	b3 H10	d1 h10	d2	d2（公差尺寸）	d3	d3（公差尺寸）
63	12.5	16	18	63	48	+0.011 +0.007	46.53	+0.007 +0.003
100	20	20	22	100	75	+0.015 +0.009	72.60	+0.009 +0.003

Rated value	b1 H10	b2 H10	b3 H10	d1 h10	d2	d2 (Toleranced dimensions)	d3	d3 (Toleranced dimensions)
63	12.5	16	18	63	48	+0.011 +0.007	46.53	+0.007 +0.003
100	20	20	22	100	75	+0.015 +0.009	72.60	+0.009 +0.003

额定值	d4（最大）	d5 0 −0.1	d6 0 −0.1	d7	d8 H10	d9 H11	d10	d11
63	53	55	72.3	7	34	40	37	M18 × 1
100	85	92	109.75	7	53	63	58	M24 × 1.5

Rated value	d4 (max.)	d5 0 −0.1	d6 0 −0.1	d7	d8 H10	d9 H11	d10	d11
63	53	55	72.3	7	34	40	37	M18 × 1
100	85	92	109.75	7	53	63	58	M24 × 1.5

额定值	d12 f8	d13	d14（最大）	e1	e2	f1 0 −0.1	f2（最小）	f3 ±0.1
63	12	8	8.4	17.862	9.25	26	42	18
100	16	12	12	27.329	15.00	29	45	20

Rated value	d_{12} f8	d_{13}	d_{14} (max.)	e_1	e_2	f_1 0 −0.1	f_2 (min.)	f_3 ±0.1
63	12	8	8.4	17.862	9.25	26	42	18
100	16	12	12	27.329	15.00	29	45	20

额定值	f_4 +0.15 0	h_1 0 −0.2	h_2 0 −0.3	l_1 0 −0.2	l_2	l_3	l_4 +0.2 0	l_5 +0.2 0
63	3.75	26.5	20	32	6.3	14.7	10	6
100	3.75	44	31.5	50	10	24	15	10

Rated value	f_4 +0.15 0	h_1 0 −0.2	h_2 0 −0.3	l_1 0 −0.2	l_2	l_3	l_4 +0.2 0	l_5 +0.2 0
63	3.75	26.5	20	32	6.3	14.7	10	6
100	3.75	44	31.5	50	10	24	15	10

额定值	l_6 JS10	l_7 0 −0.1	l_8 0 −0.3	l_9	l_{10}	l_{11} +0.3 0	l_{12}	r_1
63	18.13	10	12	24.5	3	1	21	1.2
100	28.56	12.5	16	28	3	1.5	24	2

Rated value	l_6 JS10	l_7 0 −0.1	l_8 0 −0.3	l_9	l_{10}	l_{11} +0.3 0	l_{12}	r_1
63	18.13	10	12	24.5	3	1	21	1.2
100	28.56	12.5	16	28	3	1.5	24	2

额定值	r_2 （最大）	r_3	r_4	r_5	r_6	r_7	r_8	离隙 DIN 509-F
63	1.5	3	8	0.6	1.5	3	8	0.6 × 0.2
100	2	5	12	1	1.5	3	10	1 × 0.2

Rated value	r_2 (max.)	r_3	r_4	r_5	r_6	r_7	r_8	Relief DIN 509-F
63	1.5	3	8	0.6	1.5	3	8	0.6 × 0.2
100	2	5	12	1	1.5	3	10	1 × 0.2

有关详情，参见相关标准。

For details refer to the relevant standards.

10 拉钉
RETENTION KNOB

⚠ 注意

图中所给尺寸仅作参考，拉钉不可以仅简单参考显示尺寸来生产。森精机概不负责以此种方式制造拉钉所发生的任何损失和事故。

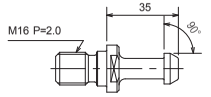
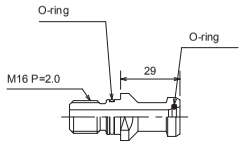
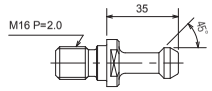
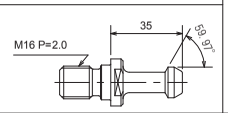
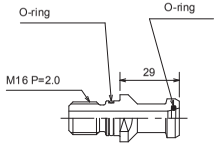
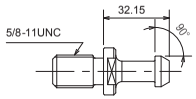
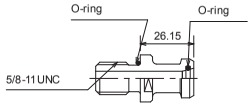
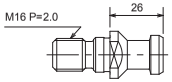
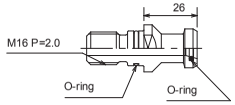
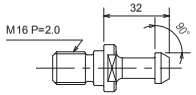
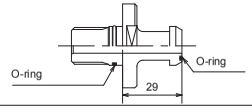
⚠ CAUTION

The dimensions given in the diagrams are only for reference purpose and the retention knobs must not be manufactured by simply referring to the indicated dimensions. Mori Seiki is not responsible for any loss and problem arising from the user of retention knobs manufactured in such a manner.

10-1 拉钉表 Retention Knob Tables

40 号锥度规格 No. 40 Taper Specifications

プルスタッドボルト一覧（BT-40相当シャンク用） No.40Taper Spcification

	規格標準(2面拘束仕様兼用) Standard(Common for two-face constrained specification)	スルースピンドルクーラント仕様 (Through-spindle Coolant Specification) センタースルー(Center Through-spindle)
MAS森90° (MAS Mori 90°)		
MASⅠ		
MASⅡ		
JIS B6339 40P		————
CAT		
DIN		
DIN森90° (DIN Mori 90°)		————
NC5	————	

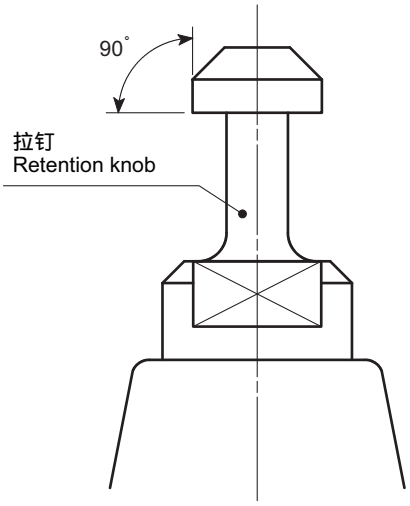
注意）各プルスタ ッドボルトは
ホルダーメーカーへ問合せて頂くことで入手可能です。
本図をもとにプルスタッドボルトを
製作しないで下さい。
本図をもとに製作されて生じる
機械の破損やその他の損害に対して
当社は一切の責任を負いません。

NOTE) It is possible to get
the retention knobs by
contact with tooling maker.
The dimensions given
below are only for reference
purpose and the retention
knobs must not be manufactured
by simply referring to
the indicated dimensions.
Mori seiki is not responsible
for any loss and problem
arising from the user
of retention knobs manufactured
in such a manner.

10-2 使用拉钉时的注意事项
Cautions when Using Retention Knob

⚠ 注意

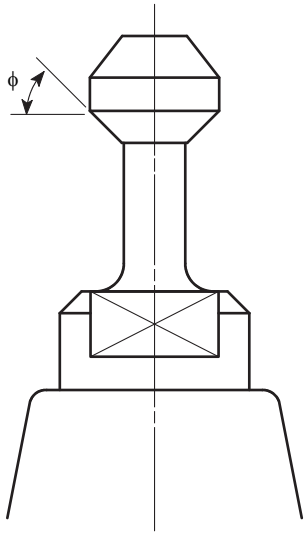
1. 仅使用符合机床规格的拉钉。不同规格的拉钉有不同的夹紧机构，因此不可使用不符合机床规格的拉钉。如果使用这样的拉钉，夹头可能会断裂且会发生意外事故，从而损坏机床。
如下所示的拉钉形状依规格而改变。



2. 若要使用中央贯穿主轴切削油规格的拉钉，务必将密封胶涂至拉钉螺纹上。如果使用中央贯穿主轴切削油规格的拉钉时没涂抹密封胶，或者需要 O 形圈时没有使用 O 形圈，切削油会从拉钉螺纹处泄漏并对机床造成损坏。

⚠ CAUTION

1. **Use only the retention knob that meets the machine specifications. Since retention knobs of different specifications have different clamp mechanism, the one that does not meet the machine specification must not be used. If such retention knob is used, the collet will break and unexpected accidents will occur, causing damage to the machine.**
The shapes of the retention knobs as following illustration vary depending on specifications.



2. **To use a retention knob of center through-spindle coolant specification, be sure to apply sealant to the threads of the retention knob. If the retention knob of center through-spindle coolant specification is used without applying sealant or without an O-ring for the one that requires the use of an O-ring, coolant will leak through the threads of the retention knob and could cause damage to the machine.**

11 刀具限制
TOOL RESTRICTIONS

(Q81114 A01)
Unit: mm

工具制限図
Tool Restrictions

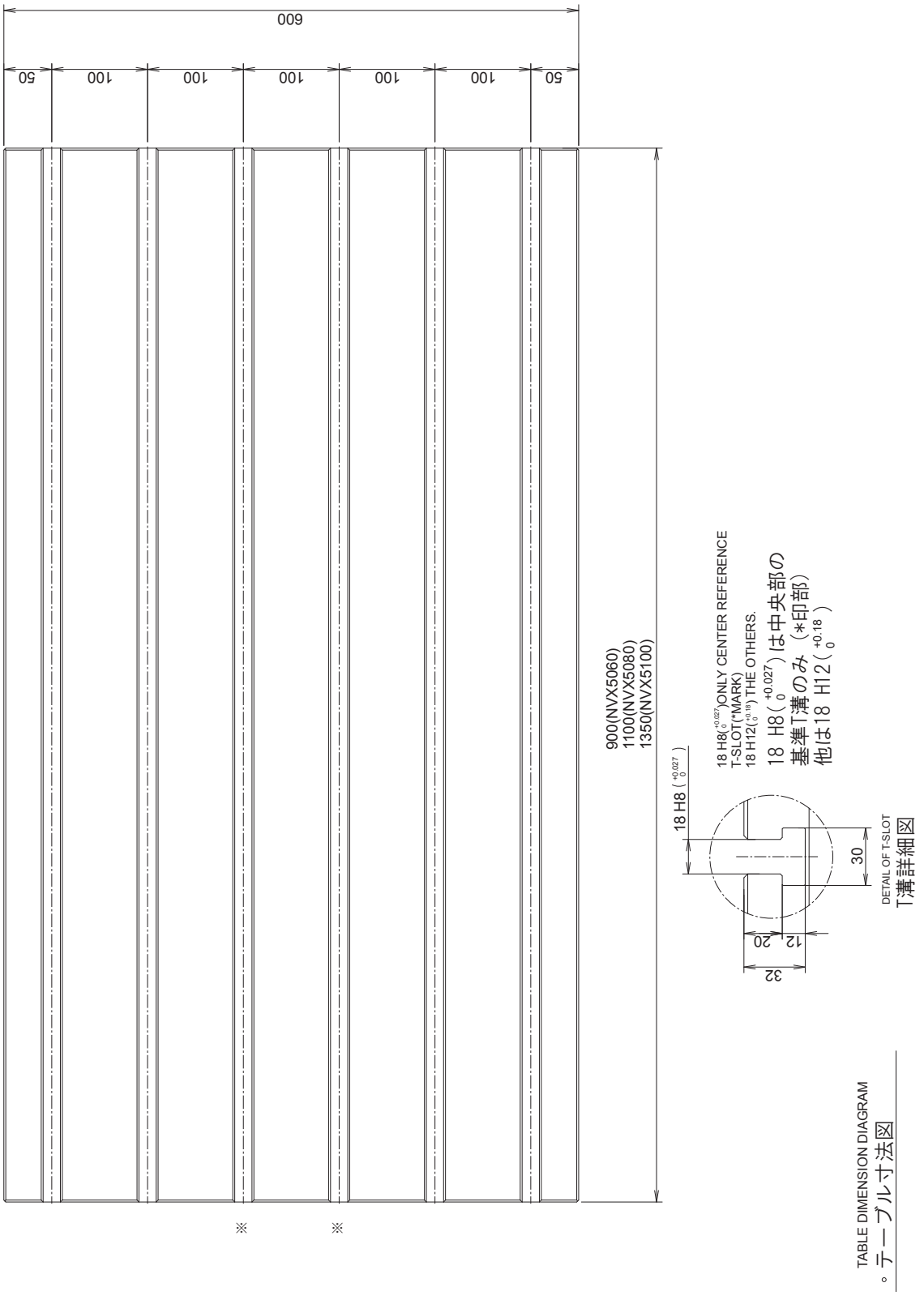
機種 Model		NVX5000		
シャンクサイズ Shank size		No. 40		
規格 Standard		MAS	CAT	DIN
最大工具長さ Max.tool length	A (mm)	300		
最大工具径（隣接工具あり） Max. tool dia (with adjacent tools)	B (mm)	80		
最大工具径（隣接工具なし） Max. tool dia (without adjacent tools)	B (mm)	150*2		
工具制限（最小） Tool limitation (min.)	C (mm)	32	34.925	35
工具制限（最大） Tool limitation (max.)	D (mm)	63	44.45	50
最大工具質量 Max. tool mass	(kg)	8 , 12*1		
最大モーメント（ゲージラインより） Max.tool mass moment (from gage line)	(N-m)	11		

*1 重量工具仕様
*2 20000min-1仕様の場合、最大工具径はΦ125です。

*1 Heavy ATC specification
*2 For 20000min-1 specifications, the maximum tool diameter is Φ125.

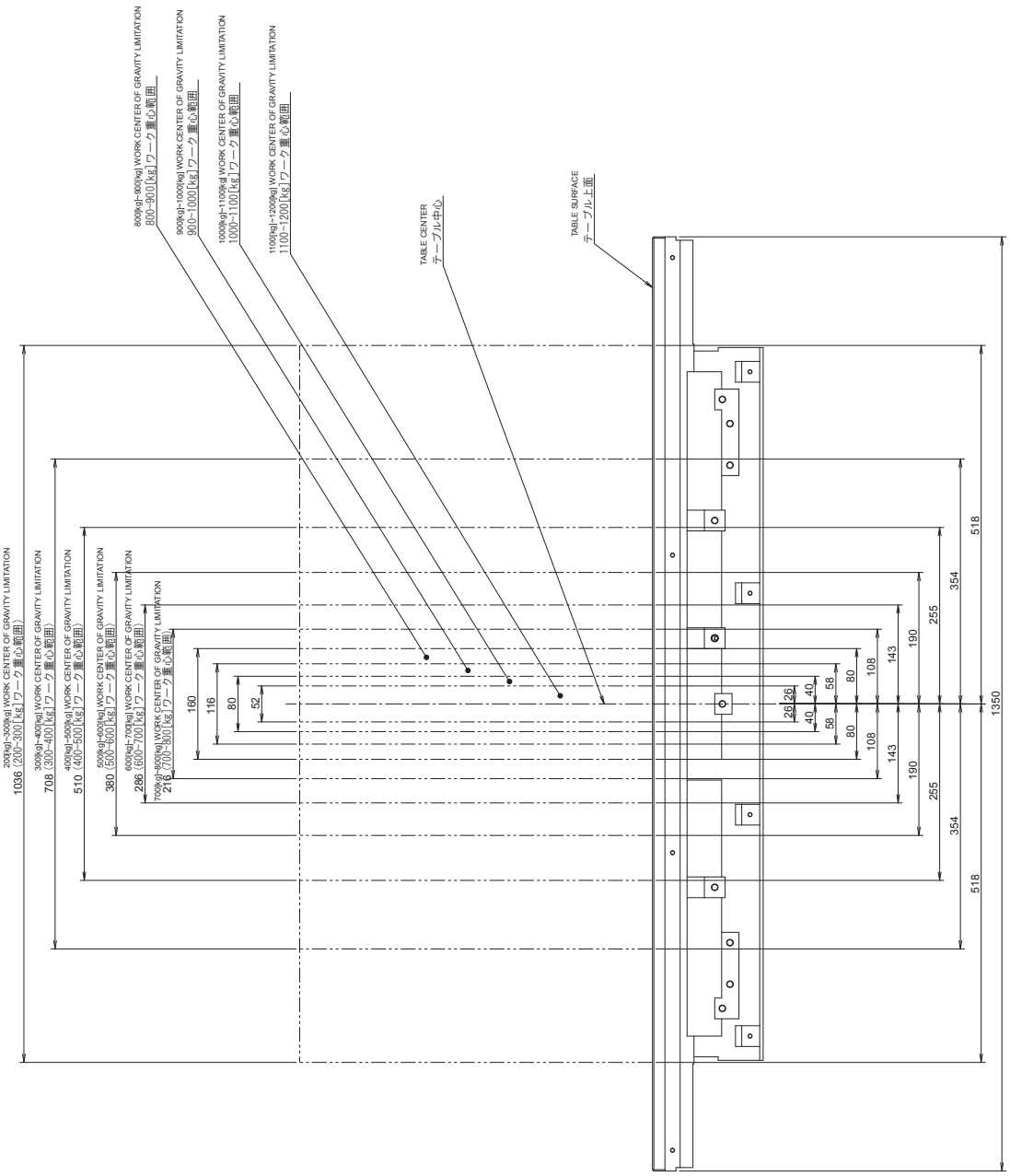
12 工作台尺寸图
TABLE DIMENSIONS

(Q55275 A04)



13 工件重心位置限制
WORKPIECE CENTER OF GRAVITY POSITION RESTRICTIONS

(Q53465 A01)
Unit: mm



SUPECIFICATION
・NVX5100/40、NVX5100/50仕様
・本図は、ワーク重心制限図です。
ワーク重心が図で示した範囲内にない場合、
機械の破損に繋がります。
This is work center of gravity limitation diagram.
Mchine will be damaged, if the center of gravity
is not included this area.

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