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Front-Facing Twin-Spindle Lathe

# **CSII SERIES**

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**CSD 300II**

**CSD 300IIR**

**CSD 300IIDG**

## **Product Manual**

CSIIseries-CSD\_P\_E\_02.00

Original Instructions

**FUJI CORPORATION**

## About This CSII Series (Two-System Machine) Product Manual

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This manual describes procedures for ensuring safe use of the CSII Series (Two-System Machine).

This manual applies to the CSD300II, CSD300IIR, and CSD300IIDG models.

Read this manual carefully and thoroughly. Make sure you fully understand how to operate the machine before use.

Contact Fuji Corporation before using the machine if you have any questions about this manual.

Operate the machine only as described in this manual.

Keep this manual in a safe location for ready reference at any time.

### ■ CSII Series (Two-System Machine) manual organization

The TNII Series manuals consist of the following four manuals:

Manual title	Details
CSII Series (Two-System Machine) Product Manual	Manual describing specifications, individual unit part names, and installation procedures for the machine and control unit
CSII Series (Two-System Machine) Operating Manual	Manual describing procedures for operating and controlling the machine
CSII Series (Two-System Machine) Maintenance Manual	Manual describing inspections, maintenance, and troubleshooting for the machine and control unit
Teaching Pendant Operating Manual	Manual describing the functions and operating procedures of the teaching pendant

## Introduction

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### ■ Machine modifications and alterations

Contact Fuji Corporation before modifying or altering the machine after it has been delivered.

Fuji Corporation rejects all liability for problems that may arise due to customer modifications or alterations of the machine.

### ■ Machine resale and loan

When reselling or loaning the machine, include this manual and the set of manuals provided with the machine when it was delivered.

### ■ Special training

The term “qualified personnel” used in this manual refers to an individual qualified to operate and maintain the machine and appointed by the customer’s safety supervisor or appointed in accordance with the customer’s in-house rules.

### ■ Changes to specifications

Note that due to improvements, the descriptions and diagrams in this manual may differ slightly from those provided here.

### ■ Details to ensure work safety

Every care has been taken in preparing this manual to ensure safe use of the machine by the customer. Read and make sure you fully understand all aspects of safety described in this manual before using the machine.

### ■ Inspection records

We recommend maintaining records of inspections, including work details and dates and times, to help resolve any problems that may arise and as reminders to perform periodic inspections.

### ■ Miscellaneous

The contents of this manual may not be copied, duplicated, or reproduced without permission.

Contact Fuji Corporation if this manual is lost or defaced.

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## Revision History

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Revision No.	Issue date	Revision type	Revision details
Firs issue	April 1, 2021		
02.00	November 1, 2022	Split	<b>CSII Series manuals split into separate manuals</b> <ul style="list-style-type: none"><li>• Split into separate manuals for single-system and two-system machines.</li></ul>
		Specification change	<b>Specification changes to main operation panel</b> <ul style="list-style-type: none"><li>• Changes to instructions and illustrations following changes to main operation panel specifications.</li></ul>
		Specification change	<b>Specification changes to operation screens</b> <ul style="list-style-type: none"><li>• Changes to display screens and illustrations following changes of operation screens to Feons.</li></ul>

## Safety Indications

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This manual uses pictograms and signal words to indicate handling precautions and potential hazards. DANGER, WARNING, and CAUTION contain information essential to safe and correct handling of the machine. Abide by these precautions at all times.

This manual uses the following categories to indicate the extent of potential hazards or damage in the event of failure to observe the precautions:

Category	Details
 <b>DANGER</b>	Indicates aspects posing extremely high risk of death or serious injury if the precaution is not observed.
 <b>WARNING</b>	Indicates aspects posing potential risk of death or serious injury if the precaution is not observed.
 <b>CAUTION</b>	Indicates aspects posing potential risk of minor or moderate injury if the precaution is not observed. Otherwise indicates aspects posing risk of serious damage to the machine.

## Indications Within Text

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### ■ Pictograms within text

The following pictograms are used to identify and describe essential and useful information:

Category	Details
	Indicates operational precautions and essential information for handling the machine.
	Indicates related information and information useful for operations.

### ■ Key and button annotation

Switches, keys, and buttons are indicated as follows in this manual:

Category	Details
< >	Switches, keys, buttons, and lamps on the main operation panel, and keys on the teaching pendant
[ ]	Screen items and buttons displayed on the LCD screen

The selector indications for selector key switches, selector switches, and rotary switches are indicated in boldface.

### ■ Example screens

Unless otherwise stated, the screens shown in this manual are for the CSD300II.

The LCD on the main operation panel shows the system on the left or right side currently selected. Operating procedures are identical for either system.

Unless otherwise stated, the example screens shown apply to the left-hand system.

### ■ Icons specific to individual models

Unless otherwise stated, the machine exterior and screens shown in this manual are for the CSD300II.

The following icons are shown where there are differences in descriptions of the machine exterior or screens for specific models:

Category	Details
<b>CSD300II</b>	Descriptions specific to the CSD300II
<b>CSD300IIR</b>	Descriptions specific to the CSD300IIR
<b>CSD300IIDG</b>	Descriptions specific to the CSD300IIDG

# Chapter 1

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## Safety Precautions

This chapter describes the precautions to use the machine safely and correctly. It also describes the door interlock function.

Carefully read the precautions described in this chapter and make sure you understand how to operate the machine before use.

## 1-1 Safety Precautions

To ensure safety, observe the following danger, warning, and caution points:

### 1-1-1 General Instructions

#### DANGER

- Avoid contact with switches, buttons, or keys when your hands are wet.  
Touching switches, buttons, or keys when your hands are wet is extremely hazardous, as it may result in electric shock.
- Avoid touching or standing close to rotating or moving parts while the machine is operating.  
Entrapment in rotating or moving parts may cause serious injury.  
When operating the machine, check to make sure no individuals or obstructions are positioned behind the machine, inside the protective cover, or near rotating or moving parts.
- Avoid using the machine with the protective cover, door interlock function, or any other safety devices disengaged.  
Using the machine with the protective cover or safety devices disengaged may result in serious injury if the machine moves in unexpected ways. Contact Fuji Corporation, Fanuc Corporation, or the corresponding auxiliary manufacturer if the protective cover or any safety device is damaged.
- Always turn off the power before carrying out setup, maintenance, or inspection work inside the machine.  
Performing setup, maintenance, or inspection work inside the machine while the power is turned on may result in serious injury due to entrapment in rotating or moving parts, if for some reason the machine operates suddenly.
- Before performing maintenance or inspection work, place a notice on the machine in a prominent location reading "Maintenance underway. Avoid any contact with the machine!"  
Serious injury may result if another individual accidentally turns on the power and moves the machine while maintenance or inspection work is underway.
- Before performing maintenance or inspection work on the control panel, motors, or transformers, be sure to turn off the factory primary power supply.  
In cases in which the power must be turned on for maintenance or inspection work, work must be performed with great care by qualified personnel. Performing maintenance or inspection work with the power turned on may result in electric shock.
- Check to confirm that the sheathing of the power cables is free of damage before using the machine.  
Damage to the power cable sheathing is extremely hazardous, as it may result in electric shock.
- Make sure all electrical current is discharged and the machine has cooled before starting maintenance or inspection work.  
Even after the power has been turned off, internal components may remain electrically charged. Parts like the motor and internal lighting may still be hot. Inadvertent contact with electrically charged or hot parts is extremely hazardous, as it may result in electric shock or burns.



## WARNING

- Keep the area around the machine free of other objects. Do not leave water or oil spills on the floor.  
Items left around the machine or water or oil spills left on the floor may lead to falling and serious injury.
- Before performing work, make sure you are fully aware of the surroundings. Secure suitable working platforms to allow work to be carried out safely.  
Failure to secure safe and stable working platforms may lead to serious injury by losing balance and falling.
- To ensure correct operation, make sure you are completely familiar with the locations and functions of the switches, buttons, and keys.  
Serious accidents or damage to the machine may result if the machine moves in unexpected ways due to incorrect switch or button operation or incorrect choice of functions.
- Make sure all doors are closed when the machine is operating.  
Leaving doors open may result in serious injury involving entrapment in moving parts or ejection of the workpieces or tools.
- Contact Fuji Corporation if you need to modify any parameters.  
The parameters are set at the factory to suit the particular machine specifications.
- Do not attempt to modify the machine.  
Fuji Corporation rejects all liability whatsoever for the machine if it has been altered or modified by the customer.
- To ensure safe and correct use of the product, carefully read the manuals provided by Fuji Corporation, Fanuc Corporation and individual auxiliary manufacturers. Make sure you understand all details before using the machine.  
Using the machine without a proper understanding of the contents of the manuals may result in malfunctions, serious accidents, or damage to the machine.
- Keep the manuals in a safe place to prevent loss.  
If you lose any of the manuals, contact Fuji Corporation, Fanuc Corporation, or the corresponding auxiliary manufacturer.
- Be sure to observe instructions on the warning labels and nameplates affixed to the machine. (Refer to '1-2 Warning Label Locations'.)  
Failure to observe instructions on nameplates or using the machine without a proper understanding of the details indicated may result in malfunctions, serious accidents, or damage to the machine. Contact Fuji Corporation if nameplates are damaged, fall off, or become illegible.
- Avoid using the machine while under the influence of alcohol or drugs.  
Impaired attention or focus may result in malfunctions, serious accidents, or damage to the machine. Serious injury may also result due to falling.
- Operators must wear appropriate safety shoes, protective glasses, and helmets.  
Failure to wear proper protective equipment may lead to serious injury.
- The machine cannot be operated with the front door open if the door interlock function is in normal mode. (Refer to '1-3 Using the Door Interlock Function').
- If the door interlock function is switched to setting mode, the spindle and turret can be rotated with certain restrictions when the front door is opened or already open. Work with great care when operating the machine with the front door open. Keep safety in mind at all times.
- Do not modify the front door by disassembling the <DR ILK> door interlock selector key switch or using a dummy switch.  
Modifying the machine to enable unrestricted operation while the front door is open may also permit automatic operation when the front door is open, resulting in serious accidents or damage to the machine.



## WARNING

- Handle the machine with great care if you must operate the machine with the door interlock function switched to setting mode—for example, when forming soft jaws or measuring tool offset values. Keep the numerous hazards in mind.  
Be sure to return the door interlock function to normal mode after finishing any work with the door interlock function switched to setting mode.
- When operating the machine, be ready to press the <EMERGENCY> emergency stop button at any time. Do not place obstructions in the vicinity of the <EMERGENCY> emergency stop button. (Refer to '5-3 Emergency Stop' in the 'Operating Manual'.) Placing obstructions in front of the <EMERGENCY> emergency stop button may impede access to the button in the event of an emergency, resulting in serious accidents or damage to the machine.
- To ensure safety, the factory supervisor (facility supervisor) must restrict access to the factory and machine installation location to individuals who have received sufficient safety training.  
The presence of individuals who have not received sufficient safety training within the factory and around the machine location may result in serious injury.
- Confirm that all machine operations have stopped after pressing the <EMERGENCY> emergency stop button.  
Operations may not stop instantaneously when the <EMERGENCY> emergency stop button is pressed due to the inertia of moving machine parts. Approaching the machine carelessly may result in entrapment in moving parts and serious injury.
- Do not place nonessential items such as tools and rags inside the machine.  
Using the machine with tools or rags left inside may result in serious accidents or damage to the machine if tools or objects are entrapped in moving parts and ejected.
- Implement all necessary safety measures for operators.  
Depending on the cutting conditions, noise levels of 85 dB or higher may be generated while the machine is operating. Working close to noise sources may impair operator health (e.g., hearing impairment). Either alter cutting conditions to reduce noise levels or use protective equipment appropriate for the noise generated.



## CAUTION

- Machine programs, parameters, and offset data registered by the customer after delivery must be backed up periodically.  
This will safeguard against the possibility of corrupted data or loss of data. Fuji Corporation rejects all liability for damages resulting from failure to back up data.
- Do not touch chips or cutting tools with bare hands.  
Touching chips or cutting tools with bare hands may result in injury.
- Contact Fuji Corporation to clear the memory.  
Accidentally clearing the memory will delete all of the data stored within the memory, and may cause the machine to fail.
- Provide the necessary lighting for work.  
Failure to provide adequate lighting for work may result in falling, impaired ability to perform accurate work and checking, and accidents or damage to the machine.



## CAUTION

- Stack materials and finished products in a stable condition.  
Stacking items in an unstable manner may lead to collapse and injury to operators. Doing so may also result in damage to the materials or finished products and consequent nonconformance.
- Be sure to clear away any chips or debris that have fallen around the machine.  
Fallen chips and debris may lead to operator injuries due to tripping.
- The work bench used must be stable and able to withstand the weight of the workpiece and tools.  
An unstable work bench may lead to falling of the workpiece or tools and injury to operators.

### IMPORTANT

If a machine or control unit alarm occurs, take the appropriate action described in 'Chapter 6 Dealing with Faults' in the 'Maintenance Manual'.  
If the problem cannot be resolved, contact Fuji Corporation or Fanuc Corporation.

## 1-1-2 Machine Installation Instructions

### 1-1-2-1 Installation Environment Precautions



## CAUTION

- Refer to the installation drawings and ensure adequate space is provided to remove the chip conveyor and coolant tank. Additionally, provide maintenance space to allow opening and closing of the control panel door.  
Failure to provide adequate maintenance space will prevent appropriate maintenance and adversely affect the service life of the machine.
- Install the machine in a location where neither the machine nor the control unit are exposed to direct sunlight.  
Direct sunlight may cause the machine temperature to rise, resulting in thermal displacement and affecting machining accuracy.
- Install the machine in a location at an elevation not exceeding 1,000 m, with ambient temperatures in the range from 10 °C to 40 °C, ambient humidity not exceeding 75 %, and no condensation.  
Failure to install the machine in a suitable location may result in machine failure due to electrical problems in the control unit or peripheral equipment.
- Install the machine in a location free of debris, dust, and vapor.  
Debris or dust accumulating on the cooling fan inside the machine may impair cooling and result in machine failure.
- Install the machine in a location where it will not be exposed to splashing or ejected chips, water, or oil.  
Exposure to splashing or ejected chips, water, or oil may result in machine failure.
- Install the machine in a location free of significant vibration (vibration standard not exceeding 4.9 m/s<sup>2</sup> (0.5 G)).  
Subjecting the machine to significant vibration may result in machine failure. It will also adversely affect machining accuracy.

**CAUTION**

- Install the machine in a location free of significant electrical noise sources, such as electric welding equipment and electric discharge machines.  
An unstable power supply voltage may cause malfunctions resulting in injury or damage to the machine.
- Install the machine on a flat, level surface of ground with adequate bearing strength.  
Installing the machine on an uneven or sloped surface may distort the machine, affecting machining accuracy.

**1-1-2-2 Installation Precautions****DANGER**

- Work involving the use of a forklift or crane must be performed by qualified forklift or crane operators.  
Serious injury or damage to the machine may result if equipment is operated by individuals without forklift or crane operation safety knowledge.
- Check to confirm no nonessential items like tools and rags are left inside the machine before lifting or hoisting the machine.  
Serious injury may result if tools or other items fall from the machine as it is being lifted.
- Do not move the machine while it is hoisted by a crane.  
Serious injury or damage to the machine may result if the machine becomes unstable and falls while being hoisted and moved.
- Do not use a forklift to move the machine while it is lifted high up.  
Serious injury or damage to the machine may result if the machine becomes unstable and falls while being lifted and moved.
- Use a forklift or crane adequately capable of bearing the weight of the machine.  
Serious injury or damage to the machine may result if the machine is lifted or hoisted using a forklift or crane unable to bear its weight and it falls.
- Make sure you know where the machine's center of gravity is located before lifting or hoisting.  
Serious injury or damage to the machine may result if the machine becomes unbalanced and falls while being moved due to misidentification of the center of gravity.
- Do not move the forklift suddenly, drive at high speed, or make sudden stops.  
Serious injury or damage to the machine may result if the machine becomes unbalanced and falls.
- If two or more individuals are involved when lifting the machine, they must signal to each other and exercise appropriate care while working.  
Inadvertently operating the machine while other persons are working inside or near the machine may result in serious injury or damage to the machine.



### WARNING

- Make sure there are no individuals in the vicinity of the forklift or crane or along the route of travel between the point where the machine is lifted or hoisted and the installation location. Serious injury may result due to collision or entrapment. Where necessary, call out while working.
- When using a forklift to transport the machine, to prevent falling/toppling, ensure that the forks are inserted fully beneath the machine to prevent it from toppling.



### CAUTION

- Check to confirm that all parts are clamped before lifting the machine.  
Damage to the machine may result if parts are not adequately clamped while the machine is being lifted.
- When using dollies to move the machine, make sure the materials, planking, loading ramps, and number of dolly wheels are sufficient to bear the weight of the machine.  
The planking, loading ramps, and dolly wheels may deform and prevent movement if they are unable to bear the weight of the machine.

### 1-1-2-3 Power Supply Connection Precautions



### DANGER

- Electrical wiring work must be carried out by qualified electricians.  
Serious accidents (e.g., electric shock) may result if work is carried out by individuals without electrical installation safety knowledge.
- Check to confirm that the sheathing of the power cables is free of damage before installing electrical wiring.  
Damage to the power cable sheathing is extremely hazardous, as it may result in current leakage and electric shock.
- Always turn off the factory primary power supply before installing electrical wiring.  
Electric shock may result if work is carried out with the power turned on.
- Before performing electrical wiring work, place a notice on the primary power supply outlet reading "Work in progress. Do not turn on power!"  
Serious injury may result if another individual turns on the power and moves the machine while work is underway.
- Be sure to ground the machine.  
Failure to ground the machine may lead to serious injury (e.g., electric shock).

**WARNING**

- Use electrical wiring capable of adequately providing the power supply capacity indicated on the electrical specification nameplate affixed to the control panel door. Avoid using cables that are longer than necessary.  
Failure to use the appropriate wiring may lead to overheating and fire, serious accidents, or damage to the machine due to voltage drops.
- Use a dedicated cable to connect the machine directly to the input power supply.  
Under conditions in which the capacity of the factory power supply is insufficient, serious accidents or damage to the machine may result if the machine malfunctions due to excessive voltage drops.
- Ground using a dedicated grounding wire. Never connect the grounding wire for the machine to the structural steelwork of the factory if grounding wires for equipment such as electrical welding equipment and electric discharge machines are grounded to the steelwork of the factory.  
Failure to use a dedicated grounding wire may result in malfunctions due to electrical noise from other machinery and serious accidents or damage to the machine.
- Before turning on the power, use a phase sequence indicator to confirm the input power supply voltage and the L1, L2, L3 (R, S, T) phase sequence are correct.  
Incorrect phase sequences may lead to malfunctions and serious accidents or damage to the machine.

**1-1-2-4 Compressed Air Precautions****CAUTION**

- Use a compressed air supply of clean, dry air with a dew-point temperature not exceeding 10 °C at a pressure of at least 0.3 MPa.  
Using moist or dusty air may cause the air unit to malfunction, leading to machine failure.
- Check to confirm that the compressed air supply has at least the stipulated capacity.  
Insufficient compressed air supply capacity may cause the air unit to malfunction, leading to machine failure.

**1-1-3 Power Supply On/Off Instructions****1-1-3-1 Precautions Before Turning On Power****CAUTION**

- Check to confirm that all bolts are fully tightened.  
Operating the machine with bolts not fully tightened may result in damage to the machine.
- Check to confirm that all connectors are connected correctly.  
Operating the machine without correctly connected connectors may result in machine failure.
- Check to confirm that all compressed air and hydraulic pipe connections are fully tightened.  
Operating the machine with connections not fully tightened may result in machine failure due to oil or air leakage when the power is turned on.



### CAUTION

- Check to confirm that the wiring and pipes are correctly connected for special specification external auxiliary equipment. Operating the machine and external auxiliary equipment without the wiring or pipes correctly connected may cause the external auxiliary equipment or machine to fail.
- Remove all corrosion inhibitor applied to sliding parts.  
Allowing axis movement without completely removing corrosion inhibitor may result in machine failure.

### 1-1-3-2 Precautions After Turning On Power



### WARNING

- Open and close the spindle chuck several times to confirm that the jaws and jigs are mounted securely.  
If the jaws and jigs are not securely mounted, the gripping force of the spindle chuck will be reduced. This may lead to ejection of the workpiece or parts when the spindle rotates and serious accidents or damage to the machine.
- Remove any workpiece gripped in the robot chuck when the machine is stopped for extended periods.  
Leaving the workpiece in the chuck may result in serious accidents or damage to the machine if the workpiece falls out.
- If the machine stops due to a power outage, immediately press the <EMERGENCY> emergency stop button to shut off the power.  
If the power is not shut off, serious accidents or damage to the machine may result if the machine moves in unexpected ways when the power is restored.
- Stop the machine and shut off the power if there is any risk of abnormal voltage fluctuations in the power supply—for example, in the event of a power outage or lightning strike.  
If the power is cut off momentarily due to a power outage or lightning strike while the machine is operating, serious accidents or damage to the machine may result if the machine moves in unexpected ways.
- Check to confirm the absence of oil leaks. Check to confirm that the oil pressure and air pressure gauges provide normal readings.  
Using the machine when oil is leaking or the oil pressure and air pressure gauges provide abnormal readings may result in serious accidents or damage to the machine.



### CAUTION

- Check to confirm the cooling fan is functioning normally.  
Operating the machine with a malfunctioning fan may result in damage to or failure of the machine due to inability to dissipate heat from inside the machine.
- Check to confirm the lubricating oil pump is functioning normally.  
Operating the machine with a malfunctioning pump may result in inability to feed lubricating oil to sliding parts and damage to or failure of the machine.
- Do not start the machine immediately when using the machine after an extended period without use. Manually run the lubricating oil pump first to supply lubricating oil to sliding parts.  
Performing axis movement with no supply of lubricating oil may result in damage to or failure of the machine due to ball screw seizure or wear in sliding parts.

**CAUTION**

- Allow the spindle to run in for approximately 15 minutes after turning on the power. Failure to allow the spindle to run in will adversely affect the service life and machining accuracy of the machine.
- Before turning off the power, check to confirm that there are no alarms or other abnormalities, then press the <EMERGENCY> emergency stop button to shut off the power.  
If the power is cut off suddenly while the machine is operating, the machine may move in unexpected ways resulting in damage to the machine.
- Check to confirm that the programs, parameters, and offset data are free of corruption before turning the power back on again after the machine has stopped due to a power outage or similar issue.  
Using the machine with corrupted data may result in damage to the machine.

**1-1-4 Setup Work Instructions**

Setup work refers to the series of tasks from turning on the machine power to mass-production machining.

Setup work includes procedures such as program input, soft jaw forming, tool mounting and setting, and test machining.

**WARNING**

- The machine should be operated by a single appropriately trained operator. If two or more individuals are involved, they must signal to each other and exercise appropriate care during operations.  
Serious injury may result if an operator operates the machine without checking for the presence of other personnel while another operator is in the process of replacing a workpiece, jaws, a jig, or tool.
- Be sure to maintain a safe distance from the rotational plane of rotating parts like the spindle and spindle chuck.  
Serious injury may result if the workpiece or tools are ejected during test machining.
- Be sure to remove the chuck handle and any tightening tools from the chuck and jigs after hand-tightening the chuck or using jigs.  
Operating the spindle with the chuck handle or tightening tools still attached may result in serious accidents or damage to the machine if the chuck handle or tightening tools are ejected.
- Be sure to set the spindle rotation speed to a speed that does not exceed the permitted rotation speed for the spindle chuck, jigs, chuck cylinder, and inducer.  
Operating the spindle at speeds beyond the permitted rotation speed for the spindle chuck, jigs, chuck cylinder, and inducer may result in serious accidents or damage to the machine if the workpiece is ejected during machining or if the inducer fails.
- Clamp the workpiece securely.  
Serious accidents or damage to the machine may result if the workpiece is clamped improperly and is ejected during machining.
- Set machining conditions like cutting depth and feed rate for test machining with suitable safety margins. Always put safety before productivity.  
Rushing into test machining with machining conditions that put productivity before safety may result in unexpected machine movement and serious accidents or damage to the machine.
- Select appropriate tools and jigs to ensure the workpiece can be machined correctly.  
Carefully consider the workpiece material, shape, and machining methods.  
Failure to select appropriate tools and jigs may result in serious accidents or damage to the machine if the workpiece is ejected during machining. It will also adversely affect machining accuracy.



## WARNING

- Check to confirm that the tool, holder, and jaws are all clamped securely.  
Improper clamping of the tool, holder, or jaws during machining may result in ejection of the workpiece or tool, leading to serious accidents or damage to the machine.
- Check the workpiece grip and chuck pressure thoroughly before starting the spindle.  
Allowing the spindle to rotate with an improperly clamped workpiece or with inappropriate chuck pressure or rotation speed may result in ejection of the workpiece and serious accidents or damage to the machine.
- Set the chuck pressure carefully taking into account the spindle chuck and chuck cylinder being used.  
The chuck gripping force will vary depending on the manufacturer and type of spindle chuck and chuck cylinder used. If the chuck gripping force is inappropriate, the workpiece may be ejected during spindle rotation, resulting in serious accidents or damage to the machine. It will also adversely affect machining accuracy. Check with the chuck and cylinder manufacturers for more information on chuck gripping force.
- Do not machine the countersinking depth in the soft jaw mounting bolt holes.  
Machining the countersinking depth will reduce the strength of the soft jaws. Doing so will also cause the mounting bolts to strike the bottom of the T slot in the master jaw, preventing complete retention of the soft jaws. Machining in this state poses the risk of serious accidents or damage to the machine due to ejection of the workpiece and soft jaws.



## CAUTION

- Contact Fuji Corporation before dry-machining workpieces made of materials such as cast iron and ceramic that generate swarf in powder form.  
Failure to use the machining method appropriate for the workpiece material may result in machine failure.
- Turn on the interior lights for safety before setting up for machining.  
Failure to turn on the interior lights will make it difficult or impossible to accurately confirm the internal condition and machining status, potentially resulting in damage to the machine and machining defects. It may also lead to injury when working inside the machine.
- If an internal diameter tool is mounted in the turret head, check the amount of protrusion from the rear of the internal diameter holder.  
If the amount of protrusion from the rear of the internal diameter holder is inappropriate, the tool may interfere with the turret when the turret head turns, damaging the machine.
- Mount tools in the turret head in a balanced configuration. Make sure that the tools or holders do not interfere with the workpiece or machine.  
If the amount of tool protrusion is excessive, the tools may interfere with the workpiece or slide cover when the turret head turns, damaging the machine.
- When mounting the tools, refer to the tooling system diagram to ensure no interference occurs. (Refer to '3-4 Tooling System'.)  
Damage to the machine may result if the tools interfere with the workpiece or the machine.

## 1-1-5 Machine Operation Instructions



### DANGER

- Data setting work must be carried out by the maintenance supervisor.  
Incorrect operation may result in serious injury, damage to the machine, and data corruption.
- Fuji Corporation rejects all liability for any injury, machine damage, or data corruption caused by data setting changes or operations.



### WARNING

- Be sure to maintain a safe distance from the rotational plane of rotating parts like the spindle and spindle chuck.  
Serious injury may result if the workpiece or tools are ejected during test machining.
- Be sure to set the spindle rotation speed to a speed that does not exceed the permitted rotation speed for the spindle chuck, jigs, chuck cylinder, and inducer.  
Operating the spindle at speeds beyond the permitted rotation speed for the spindle chuck, jigs, chuck cylinder, and inducer may result in serious accidents or damage to the machine if the workpiece is ejected during machining or if the inducer fails.
- Clamp the workpiece securely.  
Serious accidents or damage to the machine may result if the workpiece is clamped improperly and is ejected during machining.
- Set machining conditions like cutting depth and feed rate for test machining with suitable safety margins. Always put safety before productivity.  
Rushing into test machining with machining conditions that put productivity before safety may result in unexpected machine movement and serious accidents or damage to the machine.
- Do not open the front door to remove chips or touch the workpiece or tool while the spindle or live tool is rotating.  
There is a risk of serious accidents due to entanglement in the spindle or live tool. Chips wound around the workpiece or tool may pose injury risks.
- Carefully check that the tool is properly mounted before starting the live tool.  
Starting the live tool with the tool insecurely mounted may result in serious accidents or damage to the machine due to ejection of the tool.
- Do not operate the machine with its covers removed.  
Serious injury may result due to entrapment in rotating or moving parts if these parts are exposed. Opening the front door may also allow coolant and chips to enter the machine, resulting in machine failure.
- Do not place items on top of the machine or on top of moving parts.  
Items can become entrapped in moving parts, resulting in machine failure. Additionally, serious injury may result if items fall from the machine due to vibration.
- Special specification machines must be used in accordance with their specifications.  
Serious accidents or damage to the machine may result if the machine moves in unexpected ways due to incorrect operation.
- Keep hands and feet out of the chip conveyor while it is running.  
Serious injury may result due to entrapment in the chip conveyor.



## WARNING

- Be sure to stop the machine before attempting to clear chips from inside the machine. Additionally, be sure to stop the machine and the coolant flow before adjusting coolant discharge rates.  
Serious injury may result due to entrapment in rotating or moving parts if you attempt this while the machine is operating.
- Install an automatic or similar fire extinguishing system before dry machining or using highly flammable coolant such as oil-based coolant. Take great care to prevent fire.  
Serious accidents or damage to the machine may result if the machine catches fire for some reason. Fuji Corporation rejects all liability for any damages resulting from fire.
- Check and inspect the machine periodically, even if it is operated unmanned for extended periods.  
Abnormalities may arise in the machine for some reason. Additionally, early detection of machine damage will enable faster recovery.



## CAUTION

- Before starting mass-production machining, be sure to run the program for a single block or so to check the program and perform test machining.  
Starting mass-production machining without checking the program or test machining may result in the tool striking the workpiece and damage to the machine. It will also adversely affect machining accuracy.
- Before starting mass-production machining, be sure to run through the robot program steps to confirm robot operations.  
Starting mass-production machining without checking robot operations may result in the robot striking the machine or peripheral equipment and damage to the machine.
- Operate the chip conveyor continuously during automatic operation.  
Allowing chips to build up on the chip conveyor may prevent discharge of chips and result in damage to the chip conveyor.
- Check to confirm the machine operates free of abnormal noise and vibration.  
If any abnormal noise or vibration occurs, identify the cause and take appropriate corrective action. Continuing to operate the machine may result in machine failure.

## 1-1-6 Maintenance and Inspection Instructions

The machine must be maintained and inspected to maintain accuracy. Keep the following precautions in mind:



### DANGER

- Always turn off the power before carrying out maintenance or inspection work. Carrying out maintenance or inspection work while the power is turned on may result in serious injury due to electric shock or entrapment in rotating or moving parts. Proceed with great care in cases in which the power must be turned on for maintenance or inspection work.
- Before performing maintenance or inspection work, place a notice on the machine in a prominent location reading "Maintenance underway. Avoid any contact with the machine!" Serious injury may result if another individual accidentally turns on the power and moves the machine while maintenance or inspection work is underway.
- Electrical wiring work must be carried out by qualified electricians. Serious accidents (e.g., electric shock) may result if work is carried out by individuals without electrical installation safety knowledge.
- Be sure to turn off the factory primary power supply before performing maintenance or inspection work inside the control panel. Some parts inside the control panel will remain live even after the main switch on the control panel is turned off. Inadvertent contact is extremely hazardous, as it may result in electric shock. In cases in which the power must be turned on for maintenance or inspection work, check whether parts are live. Proceed with great care.
- Be sure to turn off the power before mounting, detaching, or inspecting the spindle chuck and when replenishing oil. Working on the machine while the power is turned on may result in entrapment in the rotating spindle and serious injury, if for some reason the spindle rotates. For more information on spindle chuck maintenance and inspection procedures, refer to the manuals provided by the chuck and cylinder manufacturers.
- Be sure to turn off the power and open the front door before cleaning, maintenance, or inspection work inside the machine. Performing cleaning, maintenance, or inspection work inside the machine while the power is turned on may result in entrapment in rotating or moving parts and serious injury, if for some reason the machine operates suddenly.



## WARNING

- Do not climb on the machine.  
Serious injury may result if you lose your balance and fall.
- Disassemble and clean the spindle chuck periodically. Grease daily.  
Infiltration of chips or coolant into the spindle chuck or insufficient grease may affect the spindle chuck gripping force. This may lead to ejection of the workpiece or parts when the spindle rotates and serious accidents or damage to the machine.
- Clean the cooling fan and filter inside the control panel periodically.  
Debris accumulating on the cooling fan and filter may reduce cooling capacity and cause machine malfunctions, leading to serious accidents or damage to the machine.
- Always use parts specified by Fuji Corporation when replacing parts.  
Using parts other than those specified may impair machine performance and safety, resulting in serious accidents or damage to the machine.  
Fuji Corporation rejects all liability for any accidents arising due to use of parts other than those specified.
- The spindle chuck must be mounted and removed by hoisting with a crane and using eye bolts and hoisting belts. Be sure to remove the eye bolts and hoisting belts once lifting work is complete.  
If the spindle rotates with these parts left in place, serious accidents or damage to the machine may result due to ejection of the eye bolts or hoisting belts or entrapment in the spindle.  
For more information on mounting and removing the spindle chuck, refer to the manuals provided by the chuck and cylinder manufacturers.



## CAUTION

- Perform the daily and periodic inspections described in the Maintenance Manual.  
Failure to perform daily and periodic inspections will adversely affect the service life and machining accuracy of the machine.
- Do not open the door on the control panel or main operation panel except for maintenance and inspections.  
Opening the doors may let in dust and moisture, resulting in machine failure.
- Any abnormalities discovered during inspections must be rectified immediately.  
Leaving the machine with abnormalities unresolved may result in machine failure.
- Clean the tanks and filters of the individual units periodically. Inspect equipment and pipes to ensure they remain free of damage.  
Damage to equipment or pipes may result in machine failure.
- Replenish/replace the oil and clean the filters for each unit periodically in accordance with the Maintenance Manual.  
Failure to replenish/replace the oil and clean the filters may result in machine failure. It will also adversely affect the service life of the machine.
- Use only the lubricating oil and hydraulic oil specified by Fuji Corporation. Make sure the oil is neither degraded nor contaminated with foreign matter.  
Using oil contaminated with foreign matter may result in machine failure.
- Check to confirm proper oil levels in the lubricating oil tank, hydraulic oil tank, and coolant tank.  
Inappropriate oil levels may result in machine failure.



## CAUTION

- Check to confirm that the air unit pressure is appropriate.  
Use with inappropriate air pressure may result in machine failure.
- Check to confirm that the lubricating oil is being supplied to sliding parts.  
Performing axis movement without supplying lubricating oil to sliding parts may result in damage to or failure of the machine due to ball screw seizing and wear in sliding parts.
- Drain the water from the air filter.  
Air filter performance will be impaired if excessive water is allowed to accumulate. This may cause the air unit to malfunction, resulting in machine failure.
- Clean the drain on the spindle front cover to prevent blockage due to dust or debris. Avoid using compressed air for cleaning.  
Using compressed air inside the machine when the drain is blocked with dust or debris may force coolant to enter the spindle bearings, causing the bearings to seize and resulting in damage to the machine.
- Clean the spindle chuck and inside the machine after completing work.  
Allowing chips and other debris to accumulate over extended periods may result in machine failure.
- When using a hollow chuck, clean the coolant drain behind the spindle periodically to prevent chip blockage.  
If the drain becomes blocked with chips, coolant may seep into the hydraulic oil tank via the chuck cylinder drain, resulting in machine failure.
- Periodically clean the interior of the machine to prevent chip accumulation, particularly when dry machining or machining cast iron workpieces.  
Performing axis movement with an accumulation of chips may result in machine failure.
- Inspect and adjust the slide seals periodically. Replace before sealing efficacy is impaired.  
Damaged slide seals will no longer maintain a uniform oil film, allowing entry of dust and debris inside the machine (e.g., into sliding parts and bearings), potentially resulting in damage to the machine.
- Avoid inadvertent contact with the solenoid valve. Similarly, do not touch the solenoid valve immediately after turning off the power.  
The solenoid valve is hot. Proceed carefully to avoid burn injuries.
- Securely tighten the bolts on the draw bar connecting the spindle chuck to the chuck cylinder and other screws.  
Loose draw bar bolts may cause vibration and reduce strength, resulting in damage to the machine. They will also adversely affect machining accuracy.
- Do not tighten screws or bolts more than necessary.  
Overtightening may distort the machine or break the screws and bolts, resulting in damage to the machine.

## 1-1-7 Coolant Use Instructions

Consult the coolant manufacturer when deciding on the coolant to use.

Failure to observe the following precautions may adversely affect the health of operators and others in the vicinity, and may result in serious accidents or damage to the machine. It will also adversely affect machining accuracy.

Fuji Corporation rejects all liability for any damages arising from the use of inappropriate coolant.

### **WARNING**

- Avoid using coolant containing ingredients with adverse effects on the human body, such as emitting bad odors and causing rashes.  
Coolant containing ingredients with adverse effects on the human body may harm the health of operators and others in the vicinity.
- Do not use coolant with a low ignition point.  
This may result in fire.
- Clean the mesh filters in the coolant tank periodically to prevent clogging.  
Clogged mesh filters may impede coolant flow, resulting in fire. They will also adversely affect machining accuracy.

### **CAUTION**

- Avoid using coolant containing ingredients that may promote corrosion of the machine.  
Corrosion may result in damage to the machine.
- Avoid using coolant containing ingredients that will cause the paint on the machine to peel.  
Peeling paint may result in damage to the machine.
- Avoid using coolant containing ingredients that will cause chemical products (e.g., rubber, synthetic resin) on the machine to harden or swell.  
Hardening or swelling of chemical products may result in damage to the machine.
- Avoid using coolant that will degrade during storage.  
Cooling and lubrication performance of the coolant will be reduced if the coolant degrades, adversely affecting machining accuracy.
- Avoid using coolant containing ingredients that reduce machining accuracy.  
Insufficient cooling will adversely affect machining accuracy.
- Avoid using high-viscosity coolant.  
This will prevent achievement of the specified coolant discharge rate and adversely affect machining accuracy.
- Avoid using coolant containing chlorine or synthetic coolant.  
This may damage acrylic resins, harden or swell seals and rubber hoses, cause paint to peel, and corrode copper, aluminum, or other metal parts, resulting in damage to the machine.
- Avoid using highly flammable coolant.  
Heat from electrical equipment or cutting heat during machining may result in ignition and damage to the machine.
- When replenishing water-soluble coolant, dilute coolant with water before adding it to the coolant tank.  
Adding only water to the coolant tank may cause corrosion, resulting in damage to the machine.



### CAUTION

- Use the coolant at the concentration specified by the coolant manufacturer.  
Failure to adhere to the concentration specified by the coolant manufacturer may adversely affect cutting performance and cause corrosion of the machine and workpiece, resulting in damage to the machine. It will also adversely affect machining accuracy.
- Keep the coolant in a fresh state.  
The coolant must be properly maintained to ensure its anti-rusting effect, deodorization, cleaning performance, and lubrication performance.

## 1-1-8 Overseas Relocation of the Machine or Resale to a Third Party



### CAUTION

- Please contact Fuji Corporation or a Fuji Corporation agent before relocating the machine outside Japan or reselling the machine to a third party either within or outside Japan.  
Replacement parts and maintenance services may prove unavailable if the machine is relocated outside Japan or resold to a third party before notifying Fuji Corporation.

## 1-2 Warning Label Locations

Warning labels are affixed to the machine to prevent operator accidents.

Make sure you fully understand and observe the details indicated on these warning labels when performing work such as machine installation, operation, and maintenance.

### **WARNING**

- Be sure to observe instructions on the warning labels and nameplates affixed to the machine.

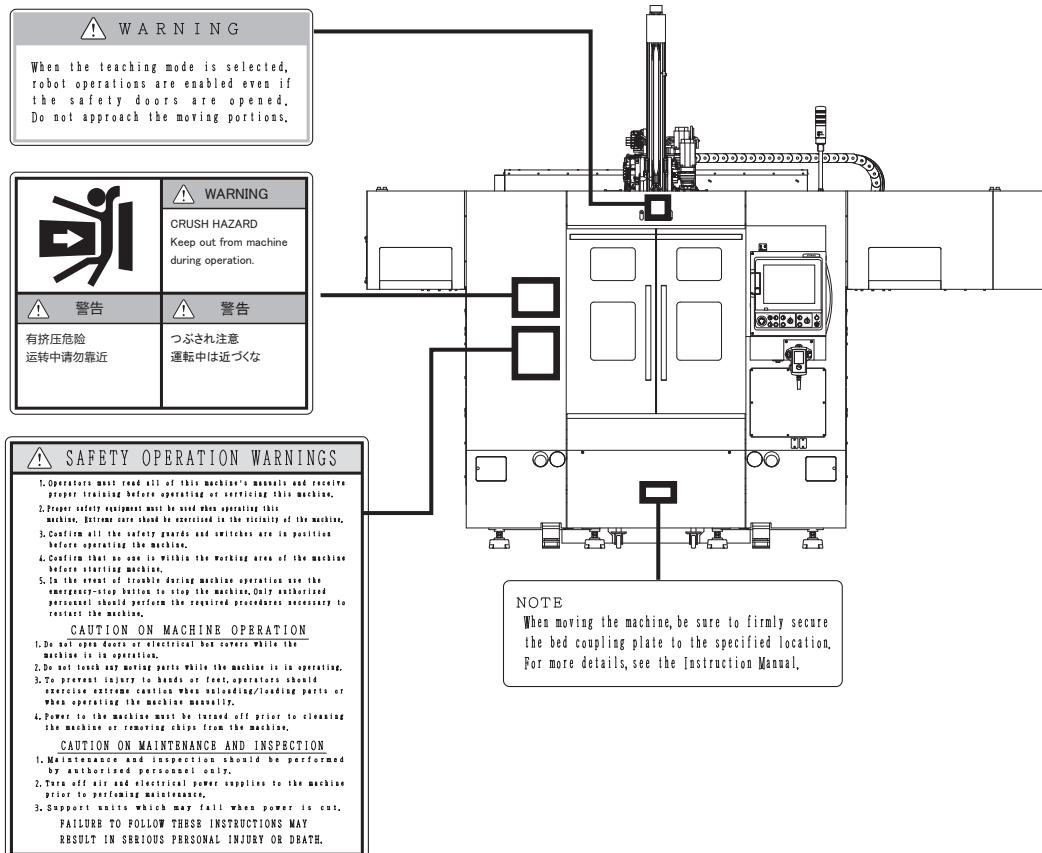
Using the machine without observing the nameplate instructions or properly understanding the details indicated may result in malfunctions, serious accidents, or damage to the machine.

Clean warning labels periodically to maintain their legibility. Contact Fuji Corporation if nameplates are damaged, fall off, or become illegible.

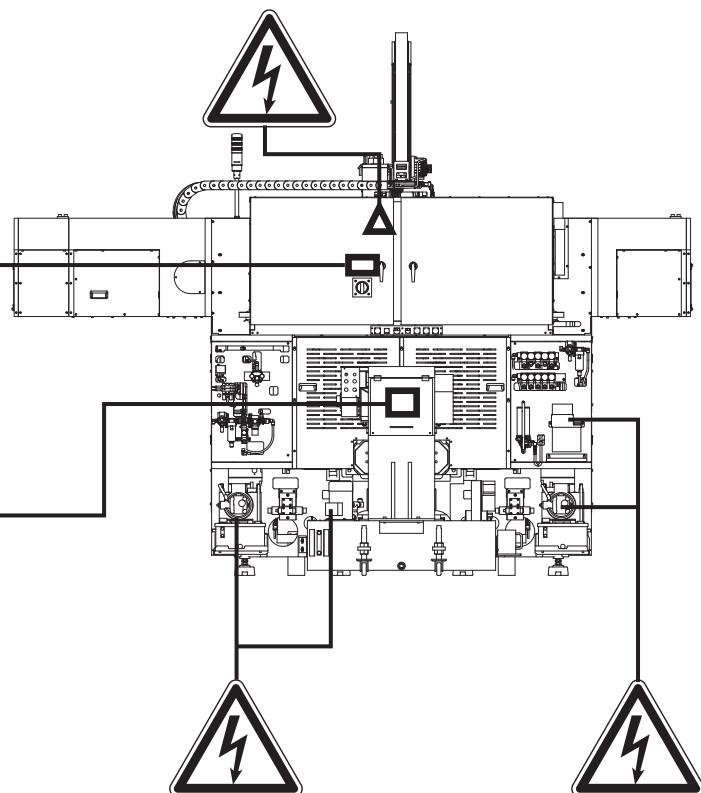
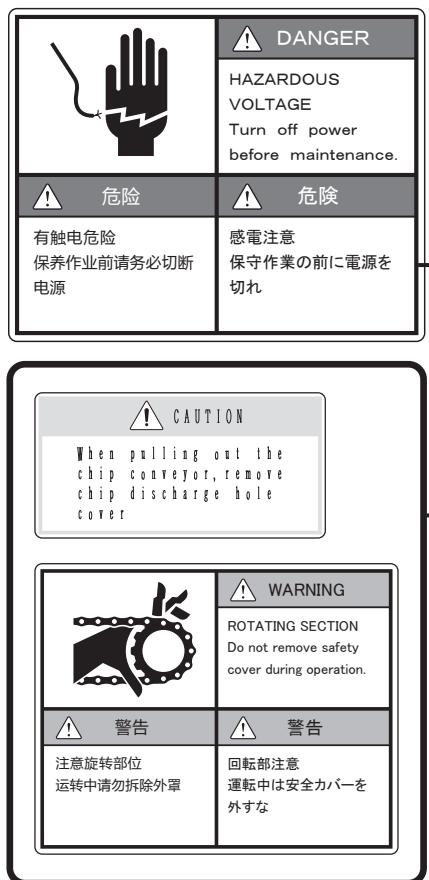
### REFERENCE

Electric shock warning labels are also affixed to the motors, relay boxes, and auxiliary boxes (option).

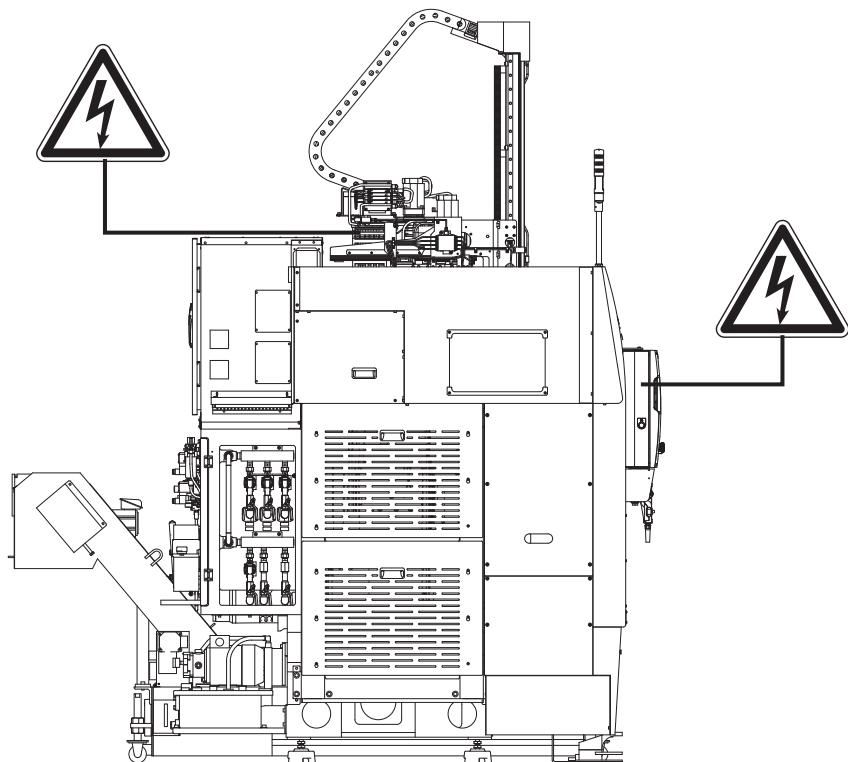
#### ■ Front



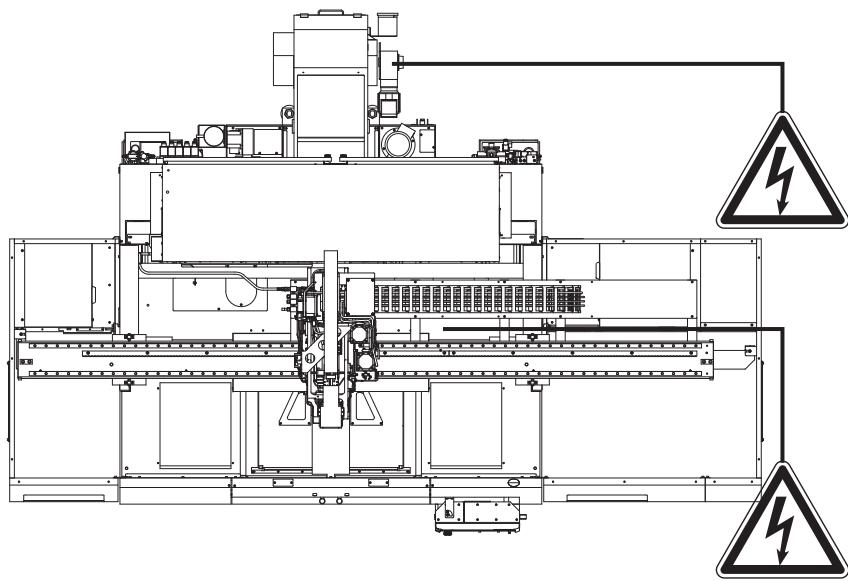
■ Rear



■ Left side



■ Top



## 1-3 Using the Door Interlock Function

The door interlock function is the most important safety system provided on the machine.

Take great care when handling the door interlock function to ensure safe operation of the machine by the customer during maintenance, inspection, or other work.



### WARNING

- The machine cannot be operated with the front door open if the door interlock function is in normal mode.
- If the door interlock function is switched to setting mode, the spindle and turret can be rotated with certain restrictions when the front door is opened or already open. Work with great care when operating the machine with the front door open. Keep safety in mind at all times.
- Do not modify the front door by disassembling the <DR ILK> door interlock selector key switch or using a dummy switch.  
Modifying the machine to enable unrestricted operation while the front door is open may result in serious accidents or damage to the machine.

### 1-3-1 About the Door Interlock Function

The door interlock function ensures customer safety by preventing machine operation when the front door is open.

Set the door interlock function to normal mode when operating the machine manually or automatically.

In cases in which work must be performed with the front door open—for example, for setup work, maintenance, or inspections—set the door interlock function to setting mode.

For more information on the manual operations enabled when the front door is open, refer to '7-1-2-2 Front Door Status and Manual Machine Operations' and '7-1-2-3 Front Door Status and Manual Robot Operations' in the 'Operating Manual'.



### WARNING

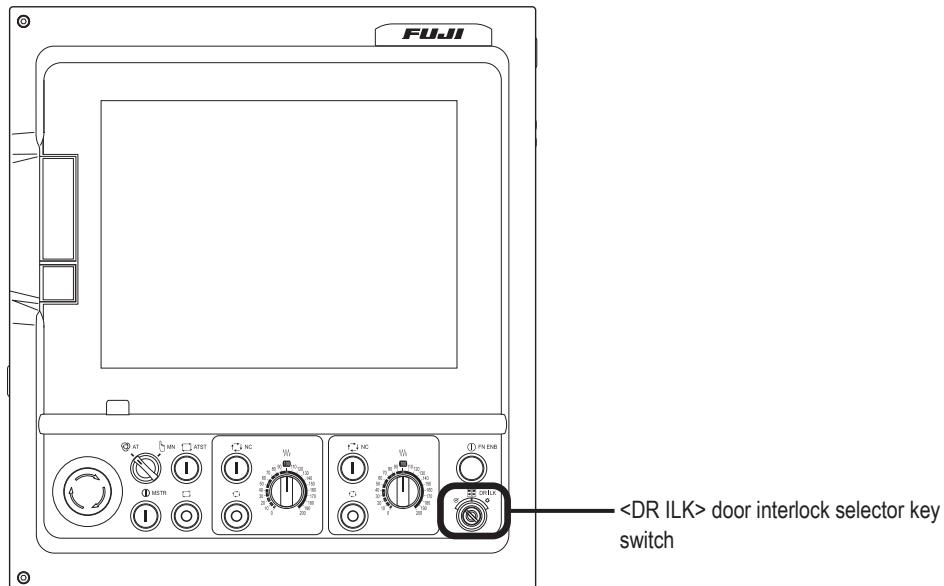
- The key to the <DR ILK> door interlock selector key switch must be removed and rigorously managed at all times.  
It is dangerous for the <DR ILK> door interlock selector key switch to be operated by individuals who do not understand the door interlock function.
- Normally, the machine must be operated with the door interlock function set to normal mode.  
Setting the door interlock function to setting mode allows the machine to operate with the door open and is therefore hazardous.
- Handle the machine with great care in cases in which work must be performed with the door interlock function set to setting mode—for example, for setup work, maintenance, or inspections. Keep the numerous hazards in mind.  
Be sure to return the door interlock function to normal mode after finishing any work with it set to setting mode.



## CAUTION

- Before returning the door interlock function to normal mode, check to confirm that no tools or other items are left inside the machine.

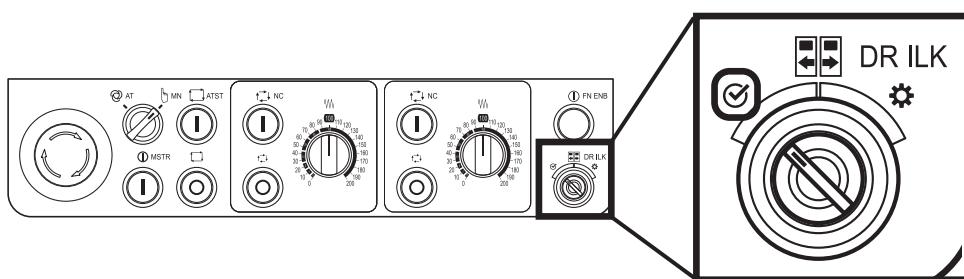
Use the <DR ILK> door interlock selector key switch on the main operation panel to set the door interlock function to normal mode or setting mode.



### ■ Setting the door interlock function to normal mode

Insert the key into the <DR ILK> door interlock selector key switch, then turn to the left to select normal mode.

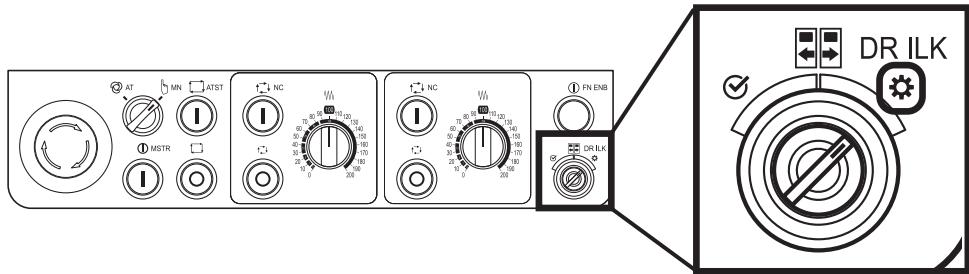
Turning the <DR ILK> door interlock selector key switch to normal mode enables the door interlock function and prohibits operation of the machine while the front door is open.



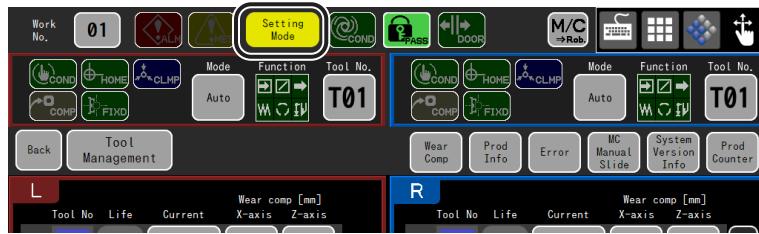
## ■ Setting the door interlock function to setting mode

Turn the <DR ILK> door interlock selector key switch to the right to select setting mode.

Turning the <DR ILK> door interlock selector key switch to setting mode disables the door interlock function and allows partial operation of the machine while the front door is open.



When the door interlock function is set to setting mode, the [Setting Mode] lamp lights up in the common header area of the Feons screen and FANUC screen.



## 1-4 Dealing with Emergencies

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### 1-4-1 Dealing with Emergency Situations

In the event of emergencies like fires, lightning strikes, and earthquakes, proceed with the first priority on protecting human life.

Press the <EMERGENCY> emergency stop button to prevent secondary disasters. Turn the main switch to **OFF** to shut off the power, then evacuate. (Refer to '5-2 Shutting Off the Power' in the 'Operating Manual'.)

### 1-4-2 Dealing with Power Outages

Power outages may corrupt machine control data. Once the power outage has ended, turn the main switch to **OFF** to shut off the power, then turn the machine power back on again.

Even in cases of momentary power outages in which the machine does not stop and the display does not disappear, first turn the main switch to **OFF**. (Refer to '5-2 Shutting Off the Power' in the 'Operating Manual'.)

### 1-4-3 Restarting Operation

Use the following procedure to restart if the machine stopped due to an emergency or if the power was shut off due to a power outage:

- (1) Inspect the tool to confirm that it is not damaged or worn.  
Replace the tool if it is damaged or worn. (Refer to '6-1 Mounting Tools' in the 'Operating Manual'.)
- (2) Confirm that the machine is in a safe and normal operating state.
- (3) After shutting off the power, and confirm the absence of external damage or abnormal odors.
- (4) Turn the power back on. (Refer to '5-1 Turning On the Power' in the 'Operating Manual'.)
- (5) Check to confirm the absence of any alarm indications.  
Reset if any alarms are indicated. (Refer to '6-1 Dealing with Faults' in the 'Maintenance Manual'.)
- (6) Press the <MSTR> operation standby button.
- (7) Return the slide to the home position. (Refer to '7-1-6-4 Resetting the Slide Home Position' in the 'Operating Manual'.)
- (8) Index the turret home position. (Refer to '7-1-7 Turret Operation' in the 'Operating Manual'.)
- (9) Manually return the machine and robot to the home position.
- (10) Check to confirm that the tool number indicated for [Tool No.] in the header area of the operation screen matches the actual cutting tool number. (Refer to '4-1-2-2 Machine Status Display Button Names and Functions' in the 'Operating Manual'.)  
If they do not match, refer to '3-10-3 Setting the Turret Home Position' in the 'Maintenance Manual' and initialize the turret home position.
- (11) Check to confirm the absence of any alarm indications.  
Reset if any alarms are indicated. (Refer to '6-1 Dealing with Faults' in the 'Maintenance Manual'.)
- (12) Check program operation. (Refer to '7-7-2 Checking Program Operation' and '8-3-2 Checking Robot Program Operation' in the 'Operating Manual').  
Start normal machining operations if no program problems are found.



# Chapter 2

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## Overview

The CSII Series (Two-System Machine) is a front-facing twin-spindle CNC lathe machine tool incorporating a gantry robot. The lathes on either side can be operated simultaneously to dramatically improve productivity per unit space.

This chapter describes the applications and features of the CSII Series (Two-System Machine).

## 2-1 CSII Series (Two-System Machine) Applications

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The CSII Series (Two-System Machine) is a front-facing twin-spindle CNC lathe machine tool. Capable of performing a wide range of cutting operations on rotated cylindrical workpieces, the CSD300II makes it possible to machine large quantities of products of identical shape and quality. Complex curved profiles can be machined automatically with high accuracy by setting machining parameters in the control unit, including cutting position, rotation speed, and cutting tool feed rate. It also features a three-axis gantry robot to automatically install and move workpieces inside the machine.

## 2-2 CSII Series (Two-System Machine) Features

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### 2-2-1 Cutting Functions

#### CSD300 II

#### CSD300 II DG

- The lathes on either side can be operated simultaneously to dramatically improve productivity per unit space.
- The space-saving bed includes thermal displacement countermeasures and features a slide, zero-core headstock, and high-speed indexing turret.
- The high rigidity slide allows deep cutting.
- The indexing turret incorporates a three-piece coupling and hydraulic clamping mechanism to minimize chattering during high-load cutting.

#### CSD300 II R

- The lathes on either side can be operated simultaneously to dramatically improve productivity per unit space.
- The space-saving bed includes thermal displacement countermeasures and features a slide, zero-core headstock, and high-speed indexing turret.
- The turret allows live tools to be mounted. In addition to cutting, the machine is capable of drilling and other machining operations.
- The spindle is equipped with a rotating C-axis spindle to allow machining of more complex profiles.
- The high rigidity slide allows deep cutting.

### 2-2-2 Robot Functions

#### CSD300 II

#### CSD300 II R

- The machine features a three-axis gantry robot capable of moving and mounting/removing workpieces at high speed to reduce cycle times.
- The robot can be operated using the same commands as the machining program.
- The machine supports various production arrangements, including obverse/reverse process machining and left/right identical process machining.

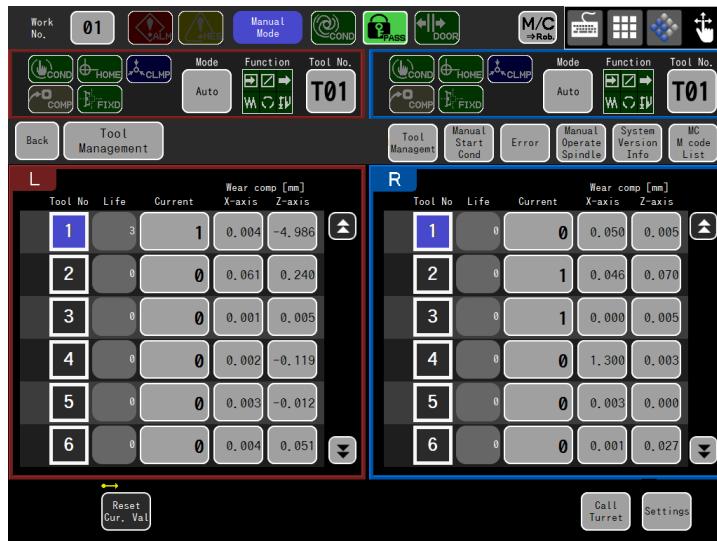
#### CSD300 II DG

- The machine features two three-axis gantry robots, allowing cycle times to be reduced.
- The robot can be operated using the same commands as the machining program.
- The machine supports various production arrangements, including obverse/reverse process machining and left/right identical process machining.

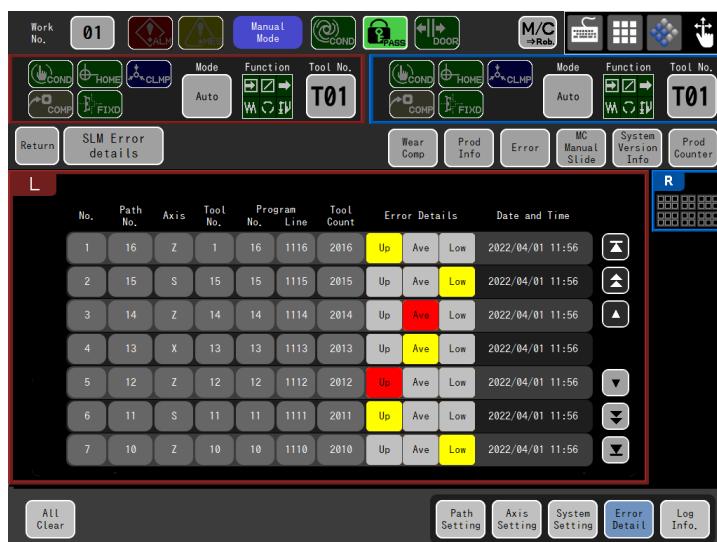
## 2-2-3 Ease of Operation

- The machine features an operation panel equipped with a standard 15-inch touch panel. In conjunction with physical switches, this interface provides easy and efficient control.
- The machine uses Fuji Corporation's custom screens (Feons) to provide an intuitive and easy to use operating environment that offers tool management and offset management functions.
- In the event of anomalies, corrective action display and abnormal load detection functions (SLM and ILM Light) minimize machine downtime.
- The machine includes functions for storing production information and history information to support quality control.
- You can switch between different display languages on Fuji Corporation's proprietary Feons screen. This allows the machine to be used worldwide.
- The pendant style operating unit (teaching pendant) features a touch panel and can be used to control the machine from a distance.

### ■ Tool management screen



### ■ SLM error detail screen





# Chapter 3

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## Specifications

This chapter describes the CSII Series (Two-System Machine) specifications, movable range, locations of specification nameplates, and tooling system.

To ensure safety, make sure you are fully aware of the movable range of the machine. Be sure to check these details in conjunction with the specifications.

## 3-1 CSII Series (Two-System Machine) Specifications

### 3-1-1 Machine Specifications

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Capacity	Number of systems	2	
	Swing over bed	φ310 mm	
	Maximum machining diameter	φ260 mm	
	Standard machining diameter	φ200 mm	
	Maximum machining length	190 mm	
Spindle	Spindle rotation speed	1,000 - 4,000 min <sup>-1</sup>	
	Spindle bore diameter	φ56 mm	
	Spindle bearing inner diameter	φ100 mm	
	Spindle motor	15/11 kW	
	C-axis unit	—	CS contour control CZi
	Spindle brake	—	PC450Y-01 310 Nm
	Positioning accuracy	—	±0.010°
Slide	X-axis stroke	140 mm	
	Z-axis stroke	200 mm	
	Fast feed speed	X/Z: 24 m/min	
	Axis feed motor	X: 1.2 kW, Z: 1.8 kW	
	Gear ratio	X: 1/1, Z: 1/1	
Tooling	Cutter holder type	SM42R/L	SM40MII
	Shank used	25 mm square φ32 mm	
	Standard chuck external diameter	φ300 mm	
	Chuck cylinder	C1FB90, C1FB120	
Live tool	Rotation speed	—	4,000 min <sup>-1</sup> 10,000 min <sup>-1</sup>
	Collet	—	AR25 AR11
	Max. shank	—	φ16 mm φ7 mm
	Live tool motor	—	Output: 2.7 kW Model: aiS12/4000
Control unit	FANUC 0i-TF Plus		
Hydraulic unit	Tank capacity	10 × 2 L	
Coolant unit	Tank capacity	265 L	
Lubricating oil unit	Tank capacity	2 L	

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Other equipment	Cover	Overall cover	
	Door	Front door	
	Chip discharge direction	To rear of machine	
Machine size	Machine weight	Approx. 5,500 kg	Approx. 6,000 kg
	Footprint	2,260 mm × 2,990 mm	

### 3-1-2 Robot Specifications

LX30HII M: Traveling table standard position (center mounting position)  
 L: Traveling table left side position (moved 300 mm to left of standard position)  
 ML: Traveling table standard position, left-hand extension  
 RL: Traveling table right side position, left-hand extension (moved 300 mm to right of standard position)

#### 3-1-2-1 Robot Specifications

Item	Specification			
	CSD300 II	CSD300 II DG	CSD300 II R	
Control axes	Number of systems	1	2	
	Number of control axes	Three axes per system		
	Configuration	Orthogonal: three axes; head rotation: one axis; hand chuck: two		
Setting data	Number of workpieces	Up to 99		
	Number of points	99 per axis		
	Number of operation sequence programs	Up to 10		
	Number of PSW data items	24		
Left/right axis	Maximum left/right traveling stroke	LX30HII-M/L: 3,160 mm LX30HII-ML/RL: 3,760 mm	LX30HII-M/L: 3,960 mm LX30HII-ML/RL: 5,074 mm	LX30HII-M/L: 3,160 mm LX30HII-ML/RL: 3,760 mm
	Maximum left/right traveling speed	175 m/min		
	Left/right traveling drive	Servo motor (1.0 kW) FANUC αiS 4/6000-B		
	Number of left/right traveling stop points	99 per workpiece, up to 99 workpieces		
	Left/right traveling repetitive positioning accuracy	±0.05 mm		
	Gear ratio	1/5		
	Drive system	Rack and pinion		

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Vertical axis	Maximum vertical traveling stroke	700 mm	
	Maximum vertical traveling speed	155 m/min	
	Vertical traveling drive	Servo motor (1.0 kW, with off brake) FANUC αiS 4/5000-B	
	Number of vertical traveling stop points	99 per workpiece, up to 99 workpieces	
	Vertical traveling repetitive positioning accuracy	±0.05 mm	
	Gear ratio	1/7	
	Drive system	Rack and pinion	
Front/back axis	Maximum front/back traveling stroke	250 mm	
	Maximum front/back traveling speed	70 m/min	
	Front/back traveling drive	Servo motor (500 W) FANUC βiS 2/4000-B	
	Number of front/back traveling stop points	99 per workpiece, up to 99 workpieces	
	Front/back traveling repetitive positioning accuracy	±0.05 mm	
	Gear ratio	1/7	
	Drive system	Rack and pinion	
Head rotation axis	Head rotation angle	180° (in both directions)	
	Head rotation time	Minimum 0.6 sec/180° (3 + 3 kg)	
	Head rotation drive	Air rotary actuator (air cylinder internal diameter 32 mm), mechanical stopper	
	Rotation control	Solenoid valve switching	
	Head rotation repetitive positioning accuracy	±0.1 mm	
Hand chuck	Drive source	Air	
	Chuck stroke	φ32 mm	
	Open/close control	Solenoid valve switching	
	Position switch	Unclamping check, empty clamping check	
Carrying capacity		3 + 3 kg (option: 5 + 5 kg)	
Centralized lubrication		Manual grease pump	

### 3-1-2-2 Reversing Chuck Specifications

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Control axes	Orthogonal: three axes; right chuck left/right: one axis; chuck rotation: two axes; number of chucks: 2		
Chuck	Drive source	Air	
	Chuck stroke	$\phi 20$ mm	
	Open/close control	Solenoid valve switching	
Chuck rotation axis	Drive source	Air (number of air cylinders: 2)	
	Rotation angle	Left chuck: 90° (in both directions); right chuck: 90° (in both directions)	
	Drive system	Linear cylinder (Linear motion converted into rotary motion by link mechanism)	
	Rotation control	Solenoid valve switching	
	Position switch	Rotation end check, return end check	
Right chuck left/right axis	Drive source	Air (number of air cylinders: 1)	
	Stroke	Max. 300 mm	
	Drive system	Linear cylinder	
	Left/right control	Solenoid valve switching	
	Position switch	Left end, right end (home position)	

### 3-1-3 Control Unit Specifications

#### 3-1-3-1 Machine Control Specifications (FANUC 0i-TF Plus)

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Control axes	Number of systems	2	
	Number of simultaneous control axes	Two axes per system (X axis, Z axis)	
Control resolution	Setting resolution	X axis, Z axis: 0.001 mm	
	Movement resolution	X axis: 0.0005 mm Z axis: 0.001 mm	
Position commands	Imperial/metric selection	G20, G21	
	Decimal point input	1 μm, 1 mm (parameter setting)	
	Diameter/radius specification	X-axis diameter specification	
Interpolation commands	Positioning	G00	
	Linear interpolation	G01	
	Circular interpolation	G02/G03: CW/CCW	

Item		Specification		
		CSD300 II	CSD300 II DG	CSD300 II R
Feed function	Dwell	G04		
	Handle feed	Teaching pendant Axis selection: X axis, Z axis Magnification selection: × 1, × 10, × 100		Teaching pendant Axis selection: X axis, Z axis, C axis Magnification selection: × 1, × 10, × 100
	Feed specification	G98/G99	Feed per minute/per revolution selection	
	Fast feed override	0, 1, 5, 10, 25, 50, 100 %		
	Cutting feed override	0 - 200 % (in 10 % increments)		
Program storage/edit	Storage capacity	2 Mbytes (total for all systems including robot control)		
	Program storage capacity	800 programs (total for all systems including robot control)		
	Program edit	Delete, insert, change operation, background edit		
	Program number search, sequence number search	Supports multipoint workpiece switching.		
	Data protection	[PASS] button on Feons screen displayed on 15-inch panel iH		
Program assistance functions	Single shape fixed cycles	G90, G92, G94		
	Corner chamfering, corner radius	Chamfering, corner radius		
	Subprograms	M98, M99 (10 nested programs)		
	Custom macro B	G65, G67		
	Auto tool offset	G36, G37 (option)		
	Program offset input	G10 (measurement increment offset) (option)		
Tool offset function	Tool length offset (profile), wear offset	Tool coordinate system setting, tool wear offset		
	Cutting tip radius offset	G41, G42, G40		
	Number of tool offsets	128 (for all systems)		
	External data input	External tool offset (option)		
Coordinate system setting	Manual reference point reset	Manual home position reset auto		
	Automatic reference point reset	G28		
	Reference reset checking	G27		
	No. 2 reference point reset	G30		

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Spindle, M, S, T functions	Spindle function (S function)	S5 digit command	
	Constant peripheral speed control	G96, G97	
	Spindle override	50 - 120 % (in 10 % increments)	
	Spindle orientation	Position coder system	
	Tool function (T function)	T4 digit command (First two digits: tool number; last two digits: tool offset number)	
	Auxiliary function (M function)	M3 digit command, multiple commands (×3)	
Operation support functions	Single block	Step operation	
	Machine lock	Servo axis lock	
	Block skip	"/" (slash) ON/OFF	
	Dry run	Feed rate selection	
	Optional stop	M01	
Interlock	Stored stroke limit	Interference range setting	
Input/output function	Input/output interface	PCMCIA, USB, memory card	
Display functions	Display, indication	15-inch panel iH, touch panel, status indicators, alarm indicators, monitor indicators	
Servo system	Servo amplifiers, motors	Digital servo amplifiers, servo motors	
	Absolute position detector	Absolute system	
Sequencer	Internal PLC	FANUC 0i-TF Plus	
	Memory	FROM/SRAM	
	Ladder monitor	Sequencer circuit diagnosis	

### 3-1-3-2 Robot Control Specifications (FANUC 0i Loader Control)

Item	Specification			
	CSD300 II	CSD300 II DG	CSD300 II R	
Control axes	Number of systems	1	2	1
	Number of simultaneous control axes	Three axes per system		
Control resolution	Setting resolution	0.001 mm (all axes)		
	Movement resolution	0.001 mm (all axes)		
Position commands	Imperial/metric selection	G20, G21		
Interpolation commands	Positioning	G00, G01		
	Linear interpolation	G00, G01		
Feed function	Dwell	G04		
	Handle feed	Teaching pendant Axis selection: X axis, Y axis, Z axis Magnification selection: × 1, × 10, × 100		
	Feed specification 1	G94 (feed per minute)		
	Feed specification 2	G90, G91 absolute system, incremental system		
	Fast feed override	0, 1, 5, 10, 25, 50, 100 %		
	Cutting feed override	0, 1, 5, 10, 25, 50, 100 %		
Program storage/edit	Storage capacity	2 Mbytes (total for all systems including machine control)		
	Program storage capacity	800 programs (total for all systems including machine control)		
	Program edit	Delete, insert, change operation, background edit		
	Program number search, sequence number search	Supports multipoint workpiece switching.		
	Data protection	[PASS] button on Feons screen displayed on 15-inch panel iH		
Program assistance functions	Subprograms	M98, M99		
	Custom macro B	G65		
Auxiliary function	M function	M3 digit command, multiple commands (×3)		
Operation support functions	Single block	Step operation		
Interlock	Stored stroke limit	Interference range setting		
Input/output function	Input/output interface	USB, memory card		
Display functions (Main operation panel)	Display, indication	<ul style="list-style-type: none"> <li>• Status display</li> <li>• Alarm display</li> <li>• Monitor display</li> <li>• Robot operation</li> <li>• Robot program creation and editing</li> <li>• Robot point setting</li> <li>• Robot program operation and execution</li> </ul>		

Item		Specification		
		CSD300 II	CSD300 II DG	CSD300 II R
Display functions (Teaching pendant)	Display, indication	<ul style="list-style-type: none"> <li>Monitor display</li> <li>Manual pulse operation</li> <li>Robot operation</li> <li>Robot point setting</li> <li>Robot program operation and execution</li> </ul>		
Teaching pendant*	Interface	<ul style="list-style-type: none"> <li>3.5-inch color LCD (touch panel)</li> <li>Emergency stop button</li> <li>Dead man's switch</li> <li>Pulse handle</li> <li>Feed rate override rotary switch</li> </ul>		
Servo system	Servo amplifiers, motors	Digital servo amplifiers, servo motors		
	Absolute position detector	Absolute system		
Sequencer	Internal PLC	FANUC 0i-TF Plus		
	Memory	FROM/SRAM		
	Ladder monitor	Sequencer circuit diagnosis		

\* Can be removed when using shorting plug (option).

### 3-1-4 Chip Conveyor Specifications

Item		Specification		
		CSD300 II	CSD300 II DG	CSD300 II R
Model		FCH-1S		
Motor		0.1 kW, 200/220 V (50 - 60 Hz)		
Reduction gear		TMH2-01-400P-018		
Conveyor chain		RF2060-HPR 138 link		
Speed		1.0/1.2 m/min		
Safety device		Rotation detection		
Chips		Curled chips		
Scraper		Every 10 links		

## 3-2 CSII Series (Two-System Machine) Movable Range

Make sure you are fully aware of the movable range of both the machine and robot before working inside the machine or checking for interference between the tool and workpiece.

### 3-2-1 Machine Movable Range



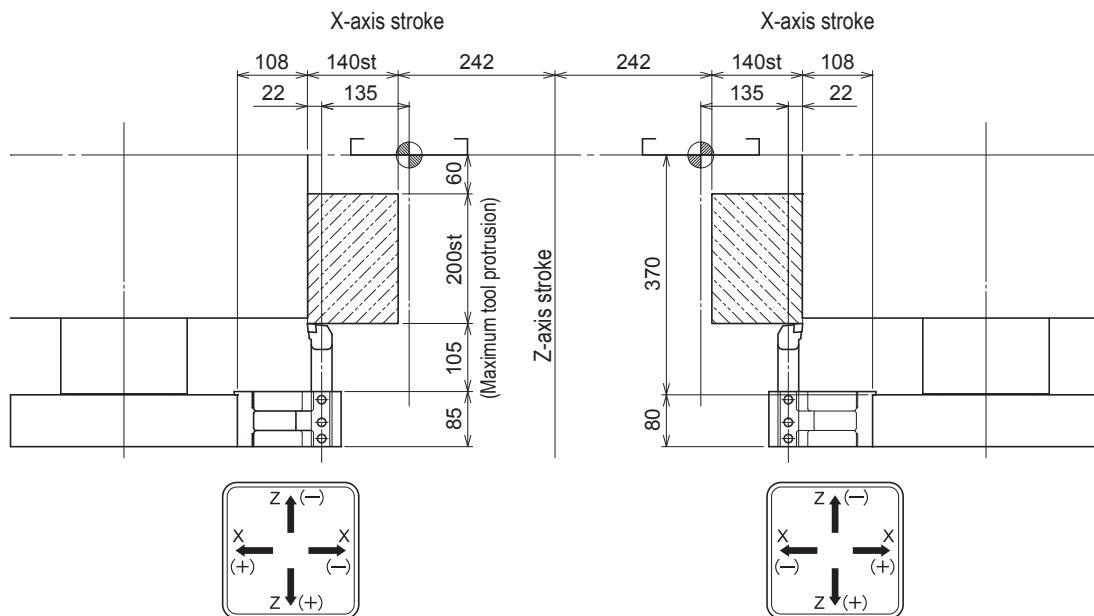
#### DANGER

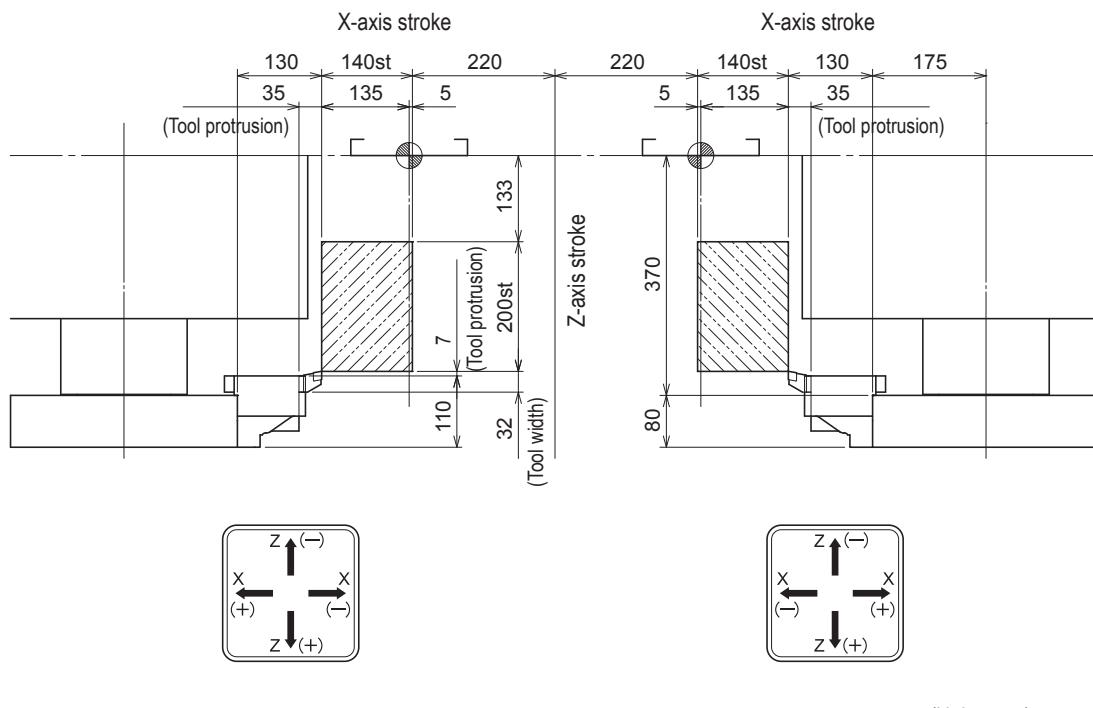
- Always turn off the power before carrying out maintenance work within the machine movable range.  
Carrying out maintenance or inspection work while the power is turned on may result in serious injury due to electric shock or entrapment in rotating or moving parts.  
Proceed with great care in cases in which the power must be turned on for maintenance or inspection work.
- Before performing maintenance or inspection work, place a notice on the machine in a prominent location reading "Maintenance underway. Avoid any contact with the machine!"  
Serious injury may result if another individual accidentally turns on the power and moves the machine while maintenance or inspection work is underway.

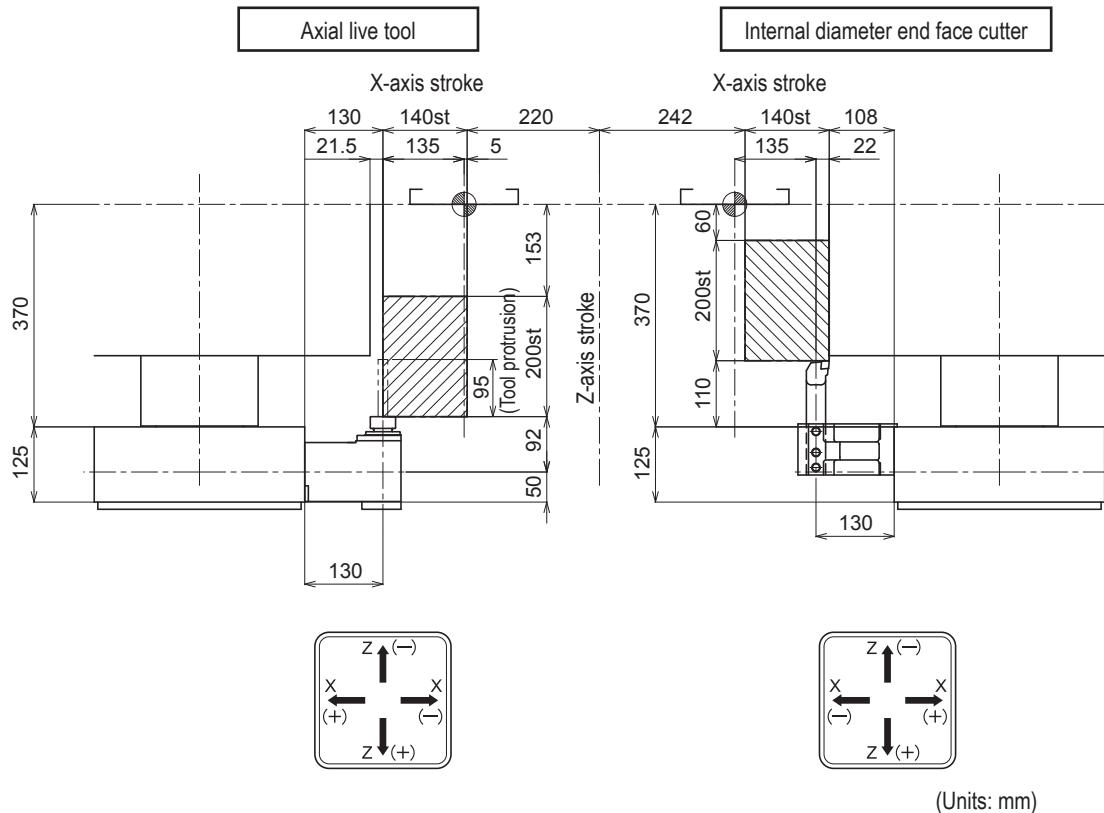
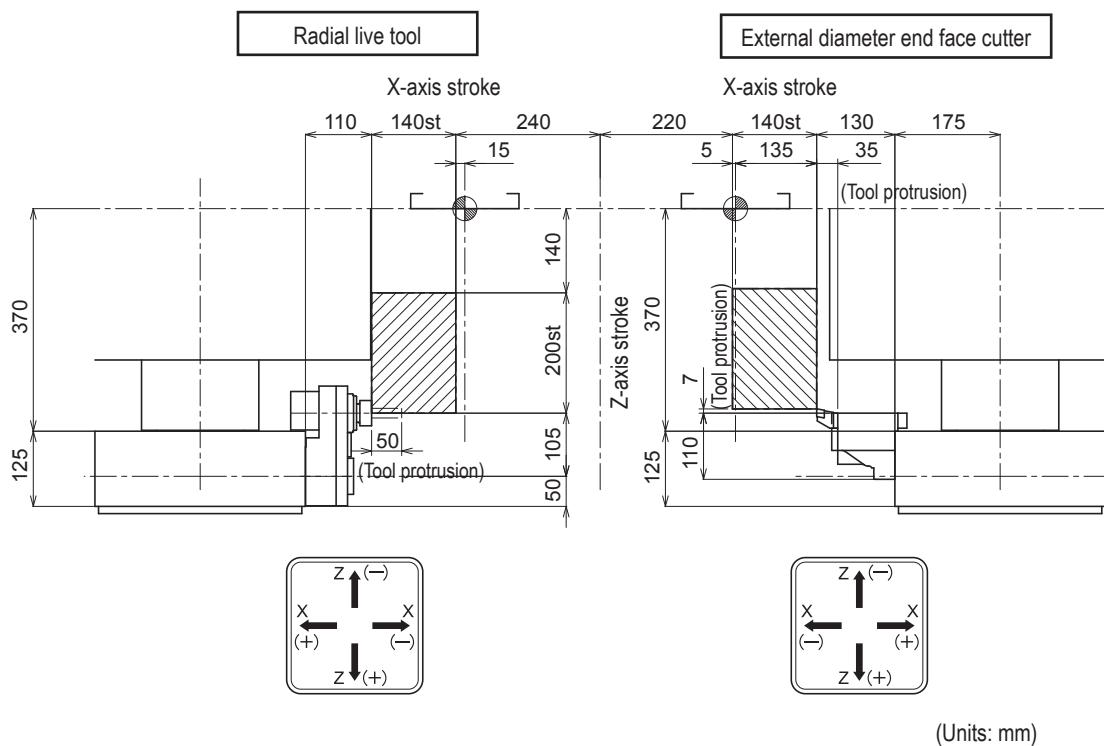
**CSD300 II**

**CSD300 II DG**

#### ■ Internal diameter end face cutting



**■ External diameter end face cutting**

**CSD300ⅡR****■ Internal diameter end face cutting****■ External diameter end face cutting**

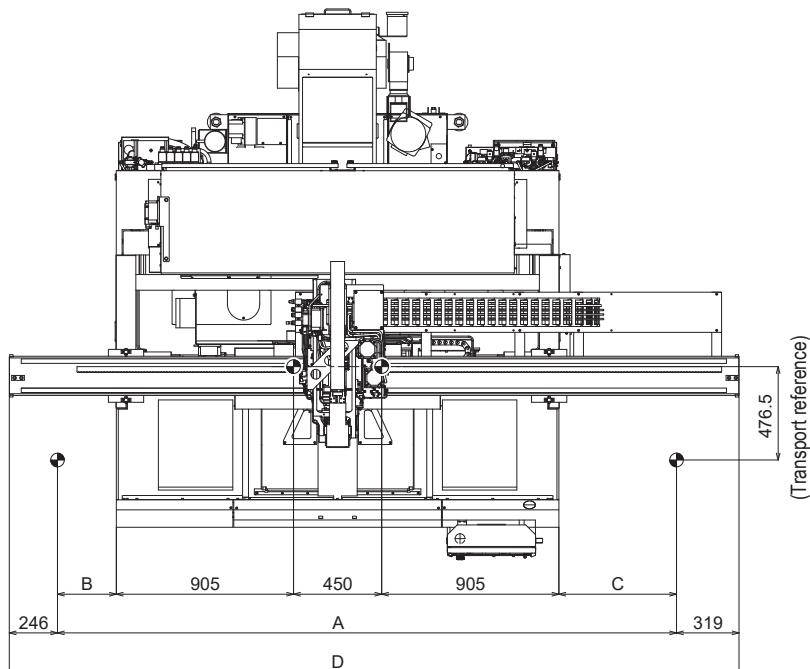
### 3-2-2 Robot Movable Range

**DANGER**

- Always turn off the power before carrying out maintenance work within the robot movable range.  
Carrying out maintenance or inspection work while the power is turned on may result in serious injury due to electric shock or entrapment in rotating or moving parts.  
Proceed with great care in cases in which the power must be turned on for maintenance or inspection work.
- Before performing maintenance or inspection work, place a notice on the machine in a prominent location reading "Maintenance underway. Avoid any contact with the machine!" Serious injury may result if another individual accidentally turns on the power and moves the machine while maintenance or inspection work is underway.

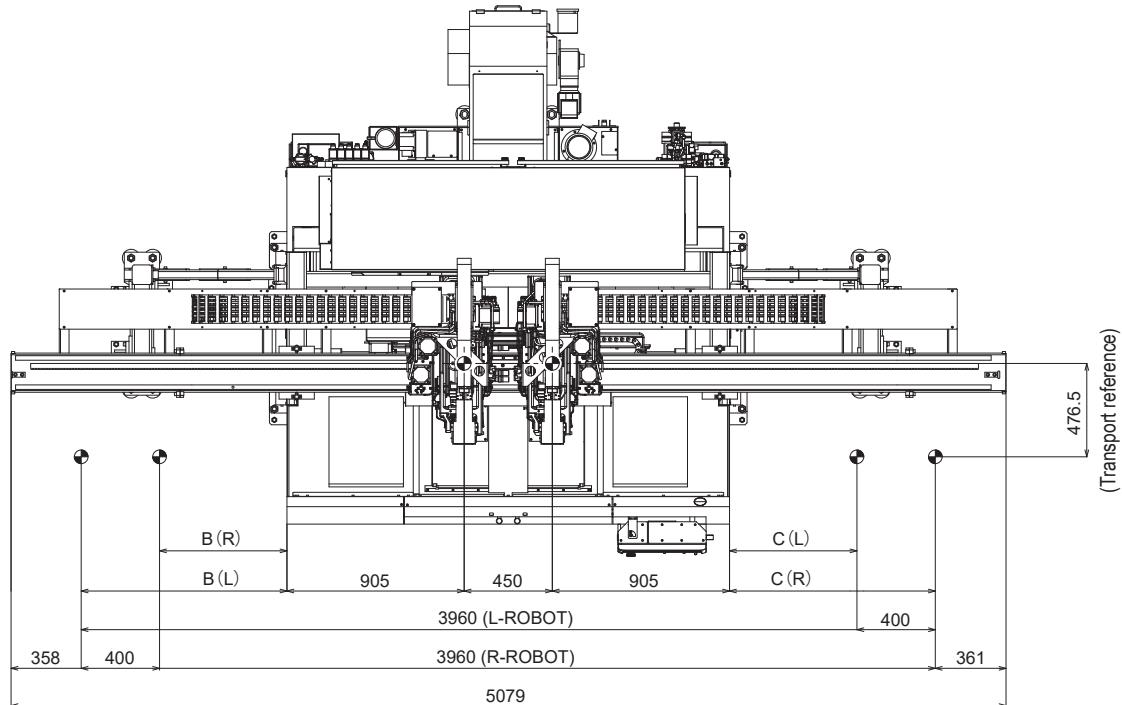
CSD300 II

CSD300 II R



(Units: mm)

Robot specifications	A (mm)	B (mm)	C (mm)	D (mm)
LX30HII-M	3,160	300	600	3,725
LX30HII-L	3,160	600	300	3,725
LX30HII-ML	3,760	900	600	4,325
LX30HII-RL	3,760	600	900	4,325

**CSD300 II DG**

(Units: mm)

Robot specifications	Robot system	B (mm)	C (mm)
LX30HII-MW	L	1,050	650
	R	650	1,050
LX30HII-LW	L	1,350	350
	R	950	700
LX30HII-RW	L	700	950
	R	350	1,350

\* W: Extension on both sides of traveling table (CSD300IIDG only)

\* L-ROBOT: Left robot

\* R-ROBOT: Right robot

## 3-3 Specification Nameplate Location

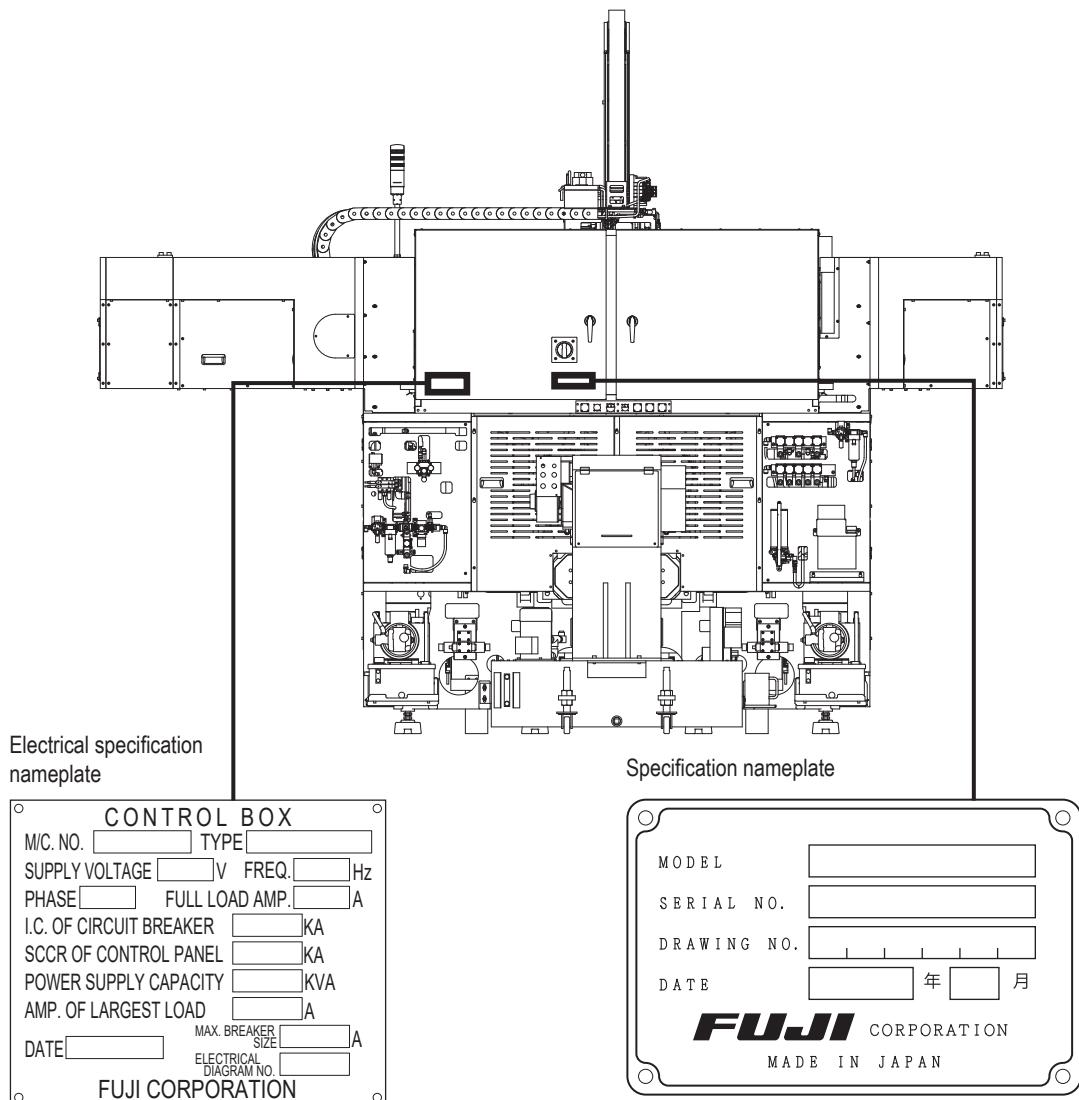
A specification nameplate and electrical specification nameplate are affixed to the door of the control panel at the rear of the machine.

When making inquiries, please provide the model name, serial number, and drawing number indicated on the specification nameplate.

Check the electrical specifications on the electrical specification nameplate.

**IMPORTANT**

- Make sure the specification nameplate is affixed to the machine.
- Clean the specification nameplate periodically to ensure the information is clearly legible.
- Contact Fuji Corporation if the details on the specification nameplate become illegible or if the nameplate comes loose.

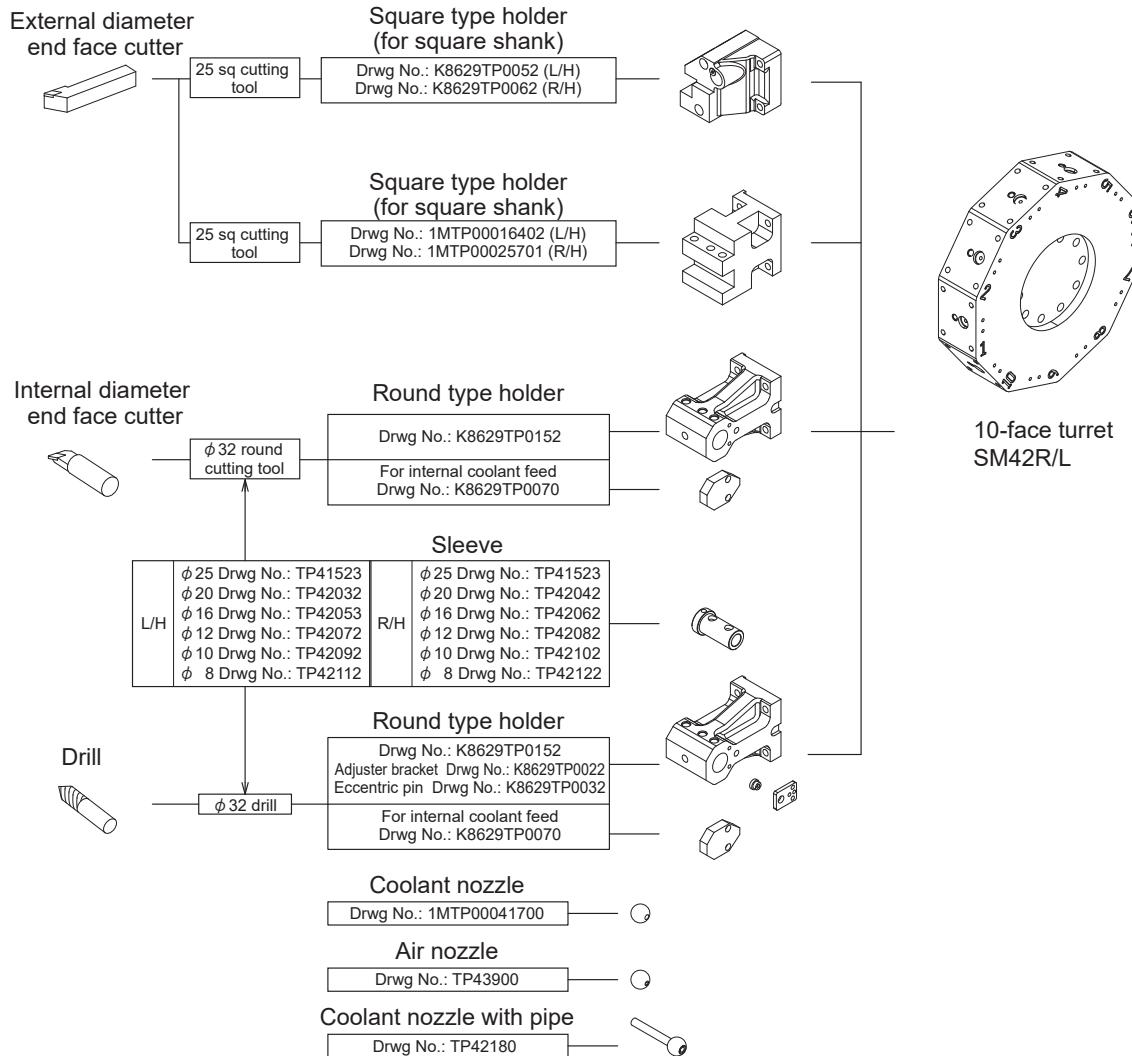


## 3-4 Tooling System

The following tools can be used with the CSII Series (Two-System Machine):

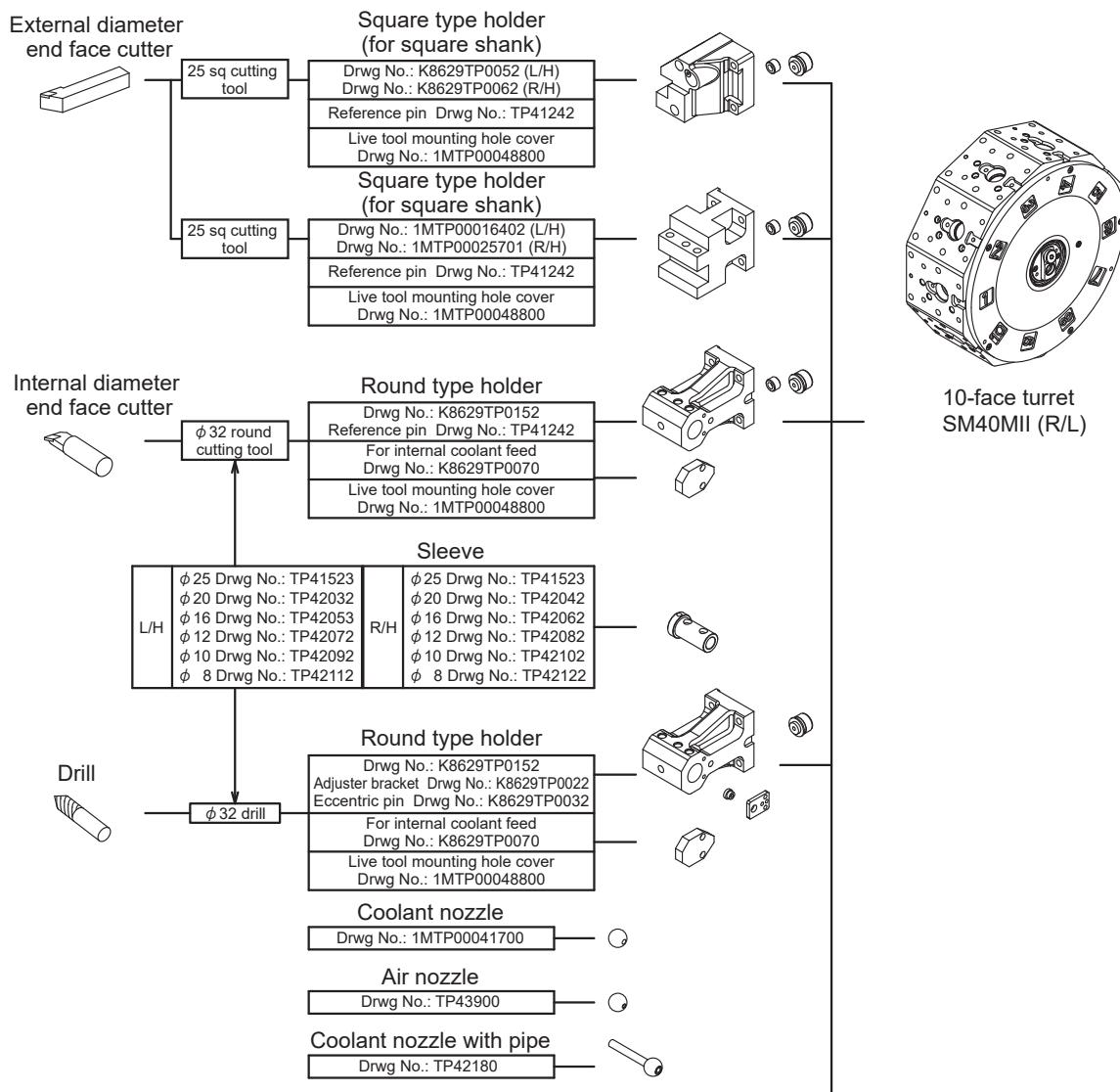
**CSD300 II**

**CSD300 II DG**



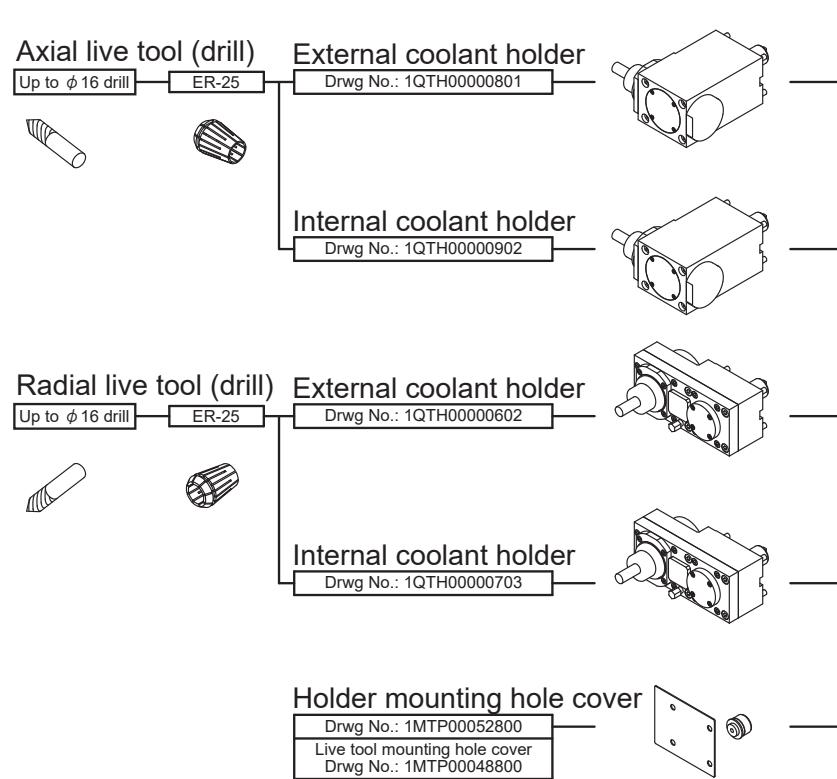
\* L/H items rotate clockwise when viewed from the front.

\* R/H items rotate counterclockwise when viewed from the front.

**CSD300ⅡR**

\* L/H items rotate clockwise when viewed from the front.

\* R/H items rotate counterclockwise when viewed from the front.



# Chapter 4

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## Part Names and Functions

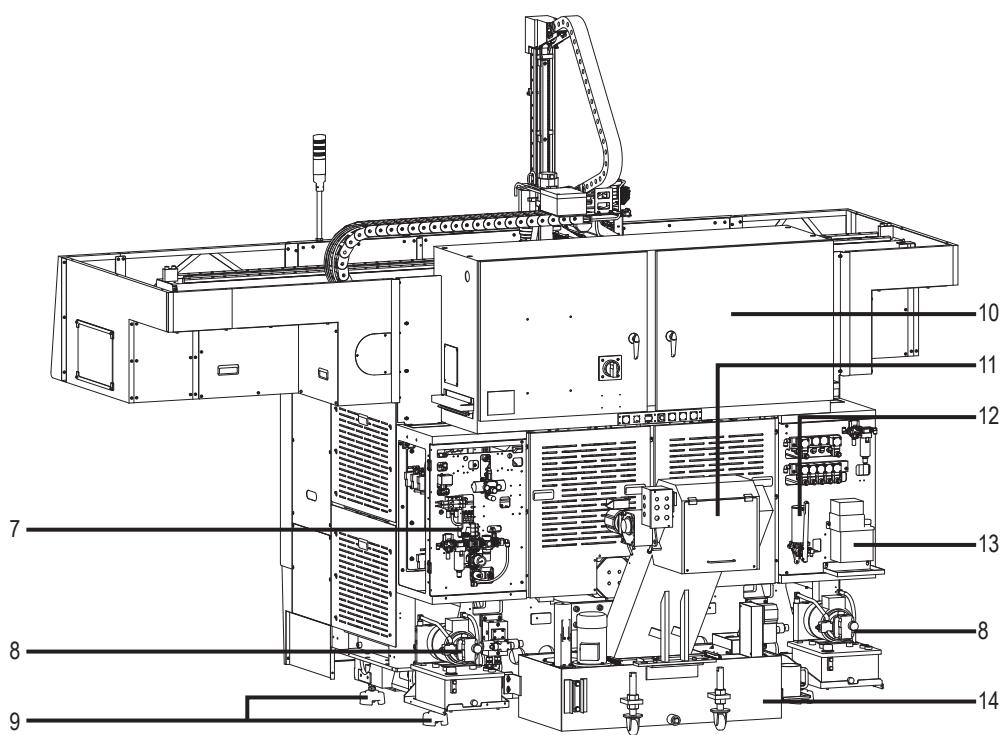
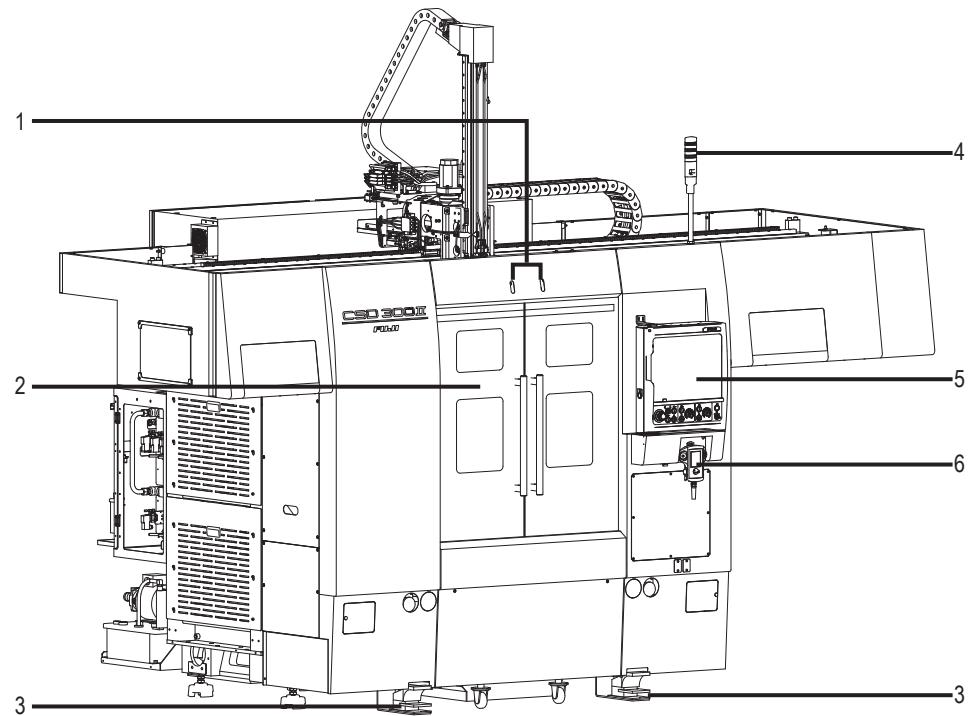
This chapter discusses the individual part names and functions of the machine, robot, and chip conveyor.

Make sure you fully understand the names and functions of individual parts before starting work.

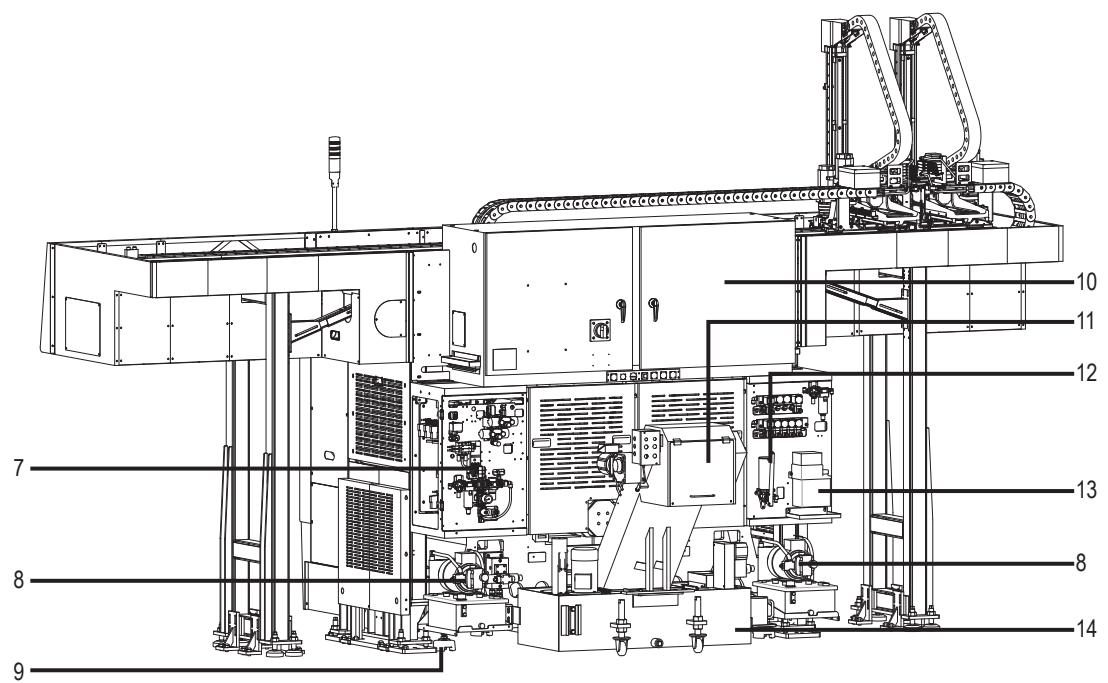
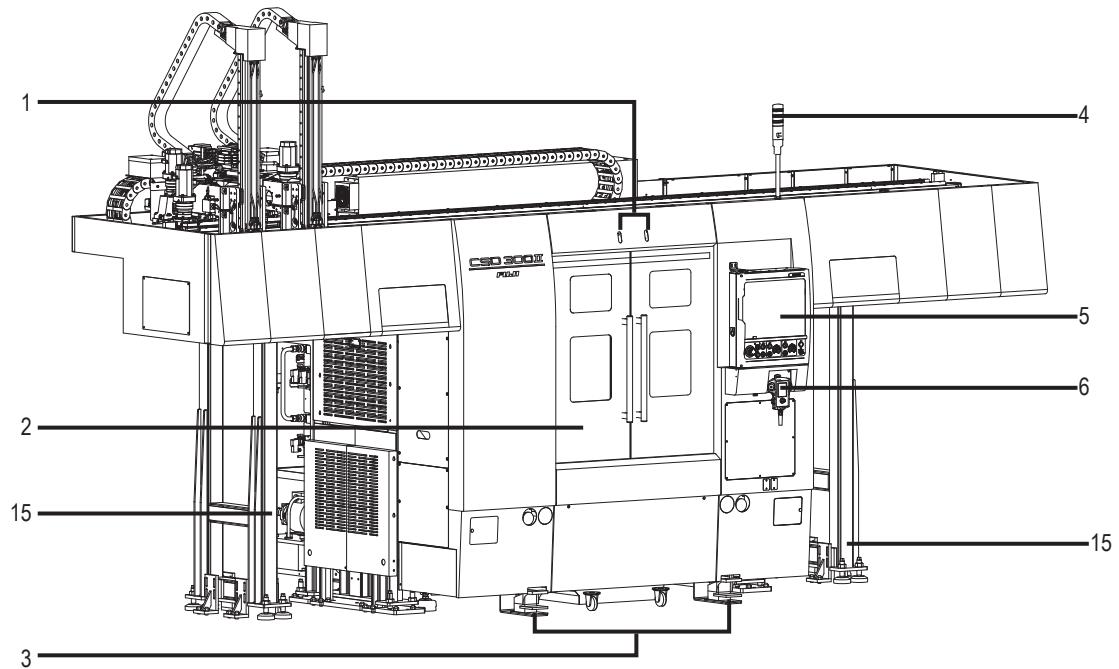
## 4-1 Machine Part Names and Functions

CSD300 II

CSD300 II R



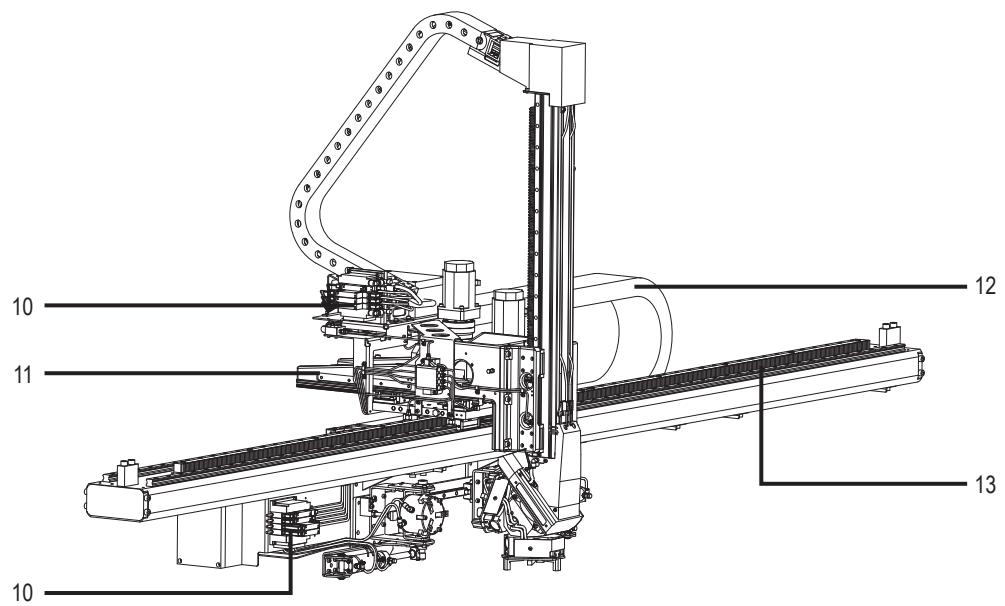
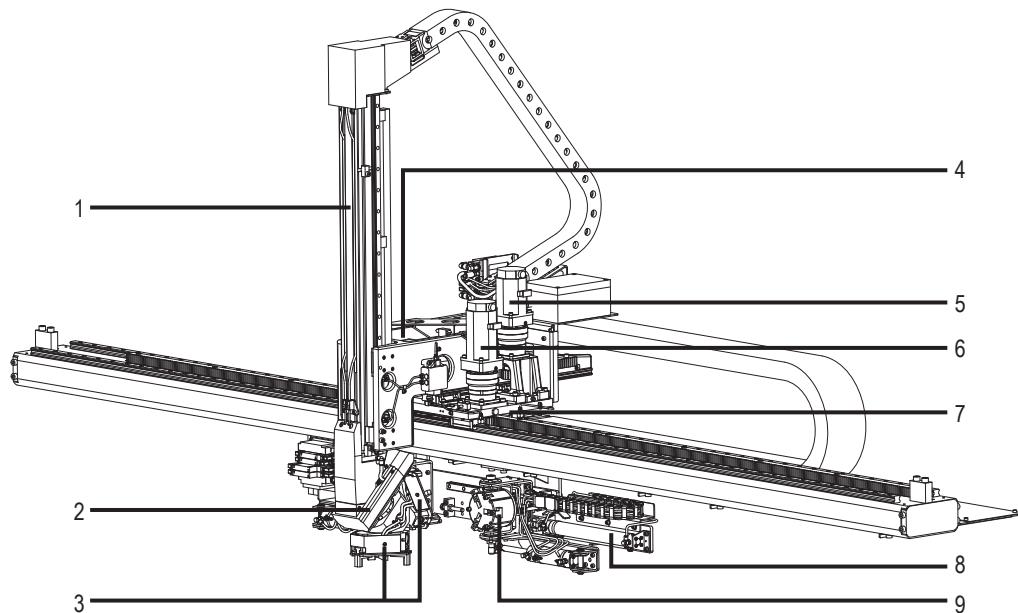
CSD300 II DG



No.	Name	Function
1	Solenoid lock switch lamps	Lamps to indicate whether the solenoid lock switches are locked or unlocked. The lamps illuminate when the solenoid lock function is disengaged, and go out when the solenoid lock function is engaged.
2	Front door	Door on the front of the machining area. The door is normally kept closed while the machine is in use.
3	Footswitch	Device for clamping and unclamping the spindle chuck jaws. Operated by depressing the pedal by foot
4	Signal tower	Device for indicating alarms and machine status via lamps and audible buzzers. The lamp illumination conditions and buzzer status can be set individually for each operation.
5	Main operation panel	This is used to operate the machine. Consists of operation related switches, buttons, lamps, and an LCD (liquid crystal display).
6	Teaching pendant	This device is used to operate the robot and set robot points. The handle on the teaching pendant can also be used to move the slide and rotate the turret.
7	Air unit	Unit for supplying air to the machine Applies air pressure to operate actuators (e.g. robot chucks).
8	Hydraulic unit	Unit for supplying hydraulic oil to the machine Applies hydraulic pressure to operate actuators (e.g. spindle chuck jaw opening/closing and turret rotation).
9	Leveling bolts	Bolts for placing the machine stably on the floor surface Eight bolts are provided on the underside of the machine. Adjust the leveling bolts to level the machine.
10	Control panel	Unit containing equipment such as the FANUC control unit and circuit breakers for controlling the machine motors and programs
11	Chip conveyor	Unit for moving swarf and chips produced during cutting out of the machine
12	Grease pump	Unit for supplying grease to the robot left/right, front/back, and up/down traveling rails
13	Lubricating oil unit	Unit for supplying lubricating oil to the slide
14	Coolant unit	Unit for supplying coolant
15	Robot supports (CSD300IIDG)	Supports for the robot traveling table and rails.

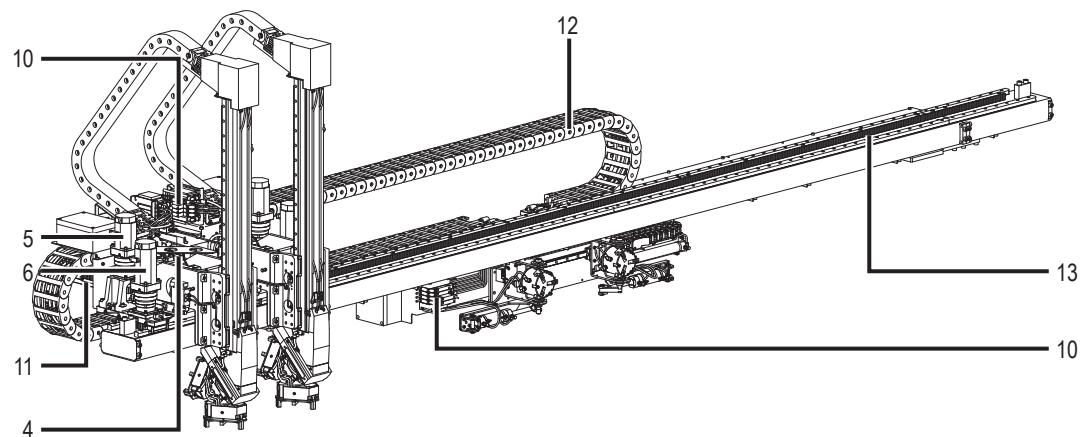
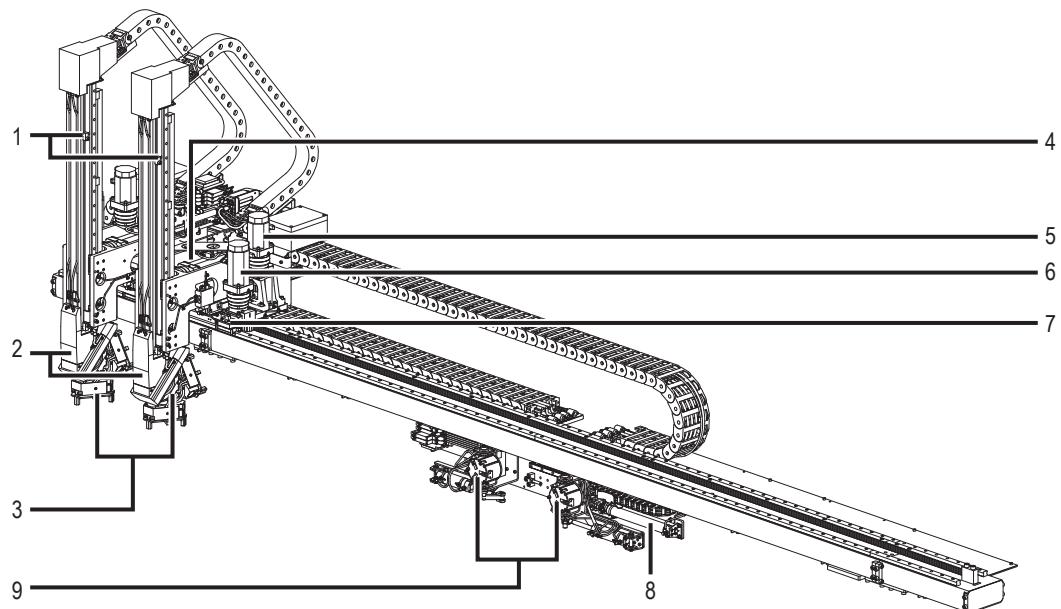
## 4-2 Robot Part Names and Functions

CSD300 II CSD300 II R



**CSD300Ⅱ DG**

The CSD300IIDG has two robots, each with the same functions. Each of the two robots includes an identical symmetrically arranged traveling drive unit.

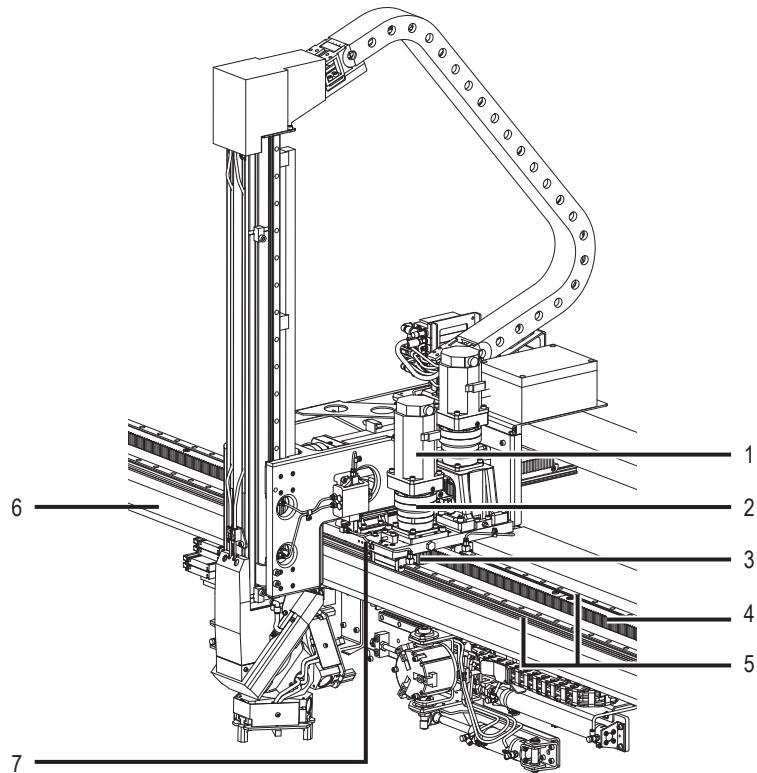


No.	Name	Function
1	Vertical axis traveling section	Vertical traveling section The vertical arm moves up and down guided by the vertical traveling rail arranged at right angles to the traveling table and front/back slide.
2	Head rotation unit	Robot chuck rotation unit Rotated 180° in either direction by the head rotation drive air cylinder
3	Robot chucks	Device for gripping the workpiece A loader chuck for loading is arranged at right angles to an unloader chuck for unloading.
4	Vertical axis traveling drive unit	Vertical traveling drive unit for the robot
5	Front/back axis traveling drive unit	Front/back traveling drive unit for the robot
6	Left/right axis traveling drive unit	Left/right traveling drive unit for the robot
7	Carriage	Movable unit traveling left and right guided by the left/right traveling rail
8	Machine reversing unit	Unit for changing the front and rear orientation of the workpiece The reversing chuck for the left-hand machine is arranged in parallel with the reversing chuck for the right-hand machine.
9	Reversing chucks	Device for gripping the workpiece received from the robot chucks. The left and right reversing chucks are rotated to reverse the orientation of the workpiece.
10	Air solenoid valve	Device for controlling compressed air supply to the robot by opening and closing the internal valve electronically It controls the following operations: <ul style="list-style-type: none"> <li>• Opening/closing the robot chucks and reversing chucks</li> <li>• Rotating the robot head and reversing chucks</li> <li>• Left/right operation of the right-hand reversing chuck</li> </ul> The solenoid valves for the robot chucks and reversing chucks feature a pilot check function that makes it possible to keep the workpiece clamped even if the power is shut off.
11	Front/back axis traveling section	Front/back traveling section The front/back slide moves guided by the front/back traveling rail arranged at right angles to the traveling table.
12	Cable carrier	Part for protecting cables and hoses connected to servo motors, air cylinders, and other equipment
13	Left/right axis traveling section	Left/right traveling section The carriage moves left and right guided by the left/right traveling rail.

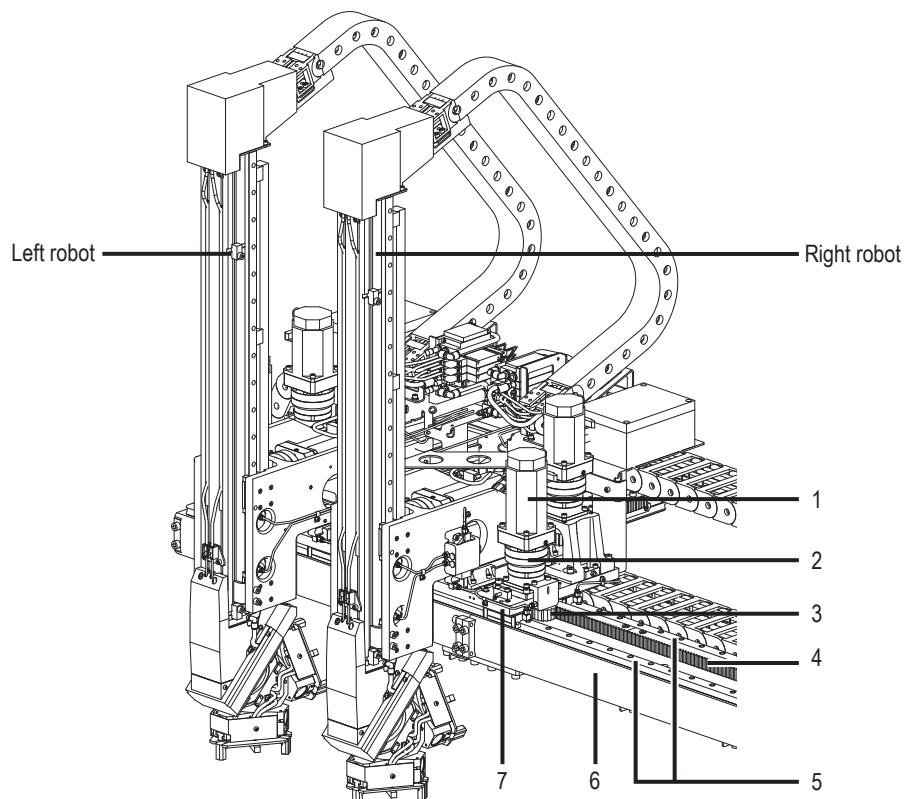
■ Left/right axis traveling drive unit

CSD300Ⅱ

CSD300ⅡR



CSD300ⅡDG

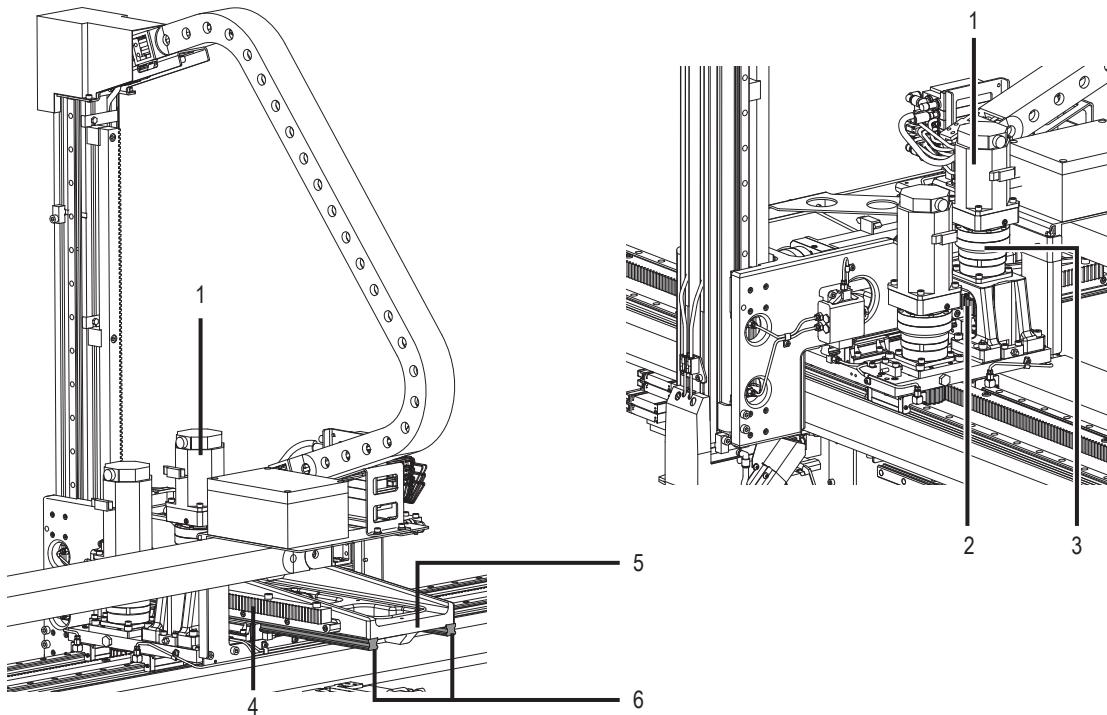


No.	Name	Function
1	Left/right axis servo motor	Powers the left/right axis traveling drive unit. The CSD300IIDG includes identical left/right axis servo motors, arranged symmetrically.
2	Reduction gear (left/right axis)	Device that reduces output speed of the left/right axis servo motor to generate torque Mounted on the rotating shaft of the left/right axis servo motor, this transmits the reduced speed output to the pinion gear.
3	Pinion gear	Gear for converting the rotating force to linear movement The pinion gear engages the rack to move the carriage left or right as it turns.
4	Left/right traveling rack	Flat gear used in conjunction with the pinion gear
5	Left/right traveling rail	Rail on which the carriage travels left and right
6	Traveling table	Table on which the left/right traveling rail and left/right traveling rack are mounted
7	Carriage	Movable unit traveling left and right guided by the left/right traveling rail

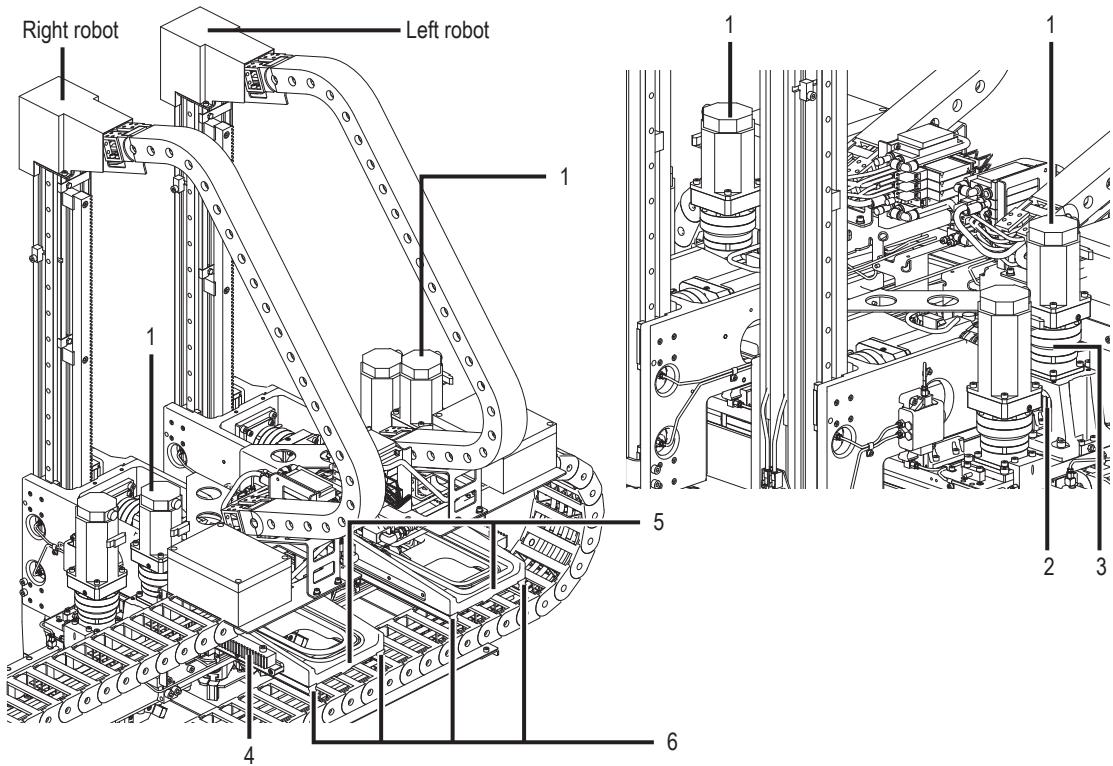
■ Front/back axis traveling drive unit

**CSD300 II**

**CSD300 II R**



**CSD300 II DG**

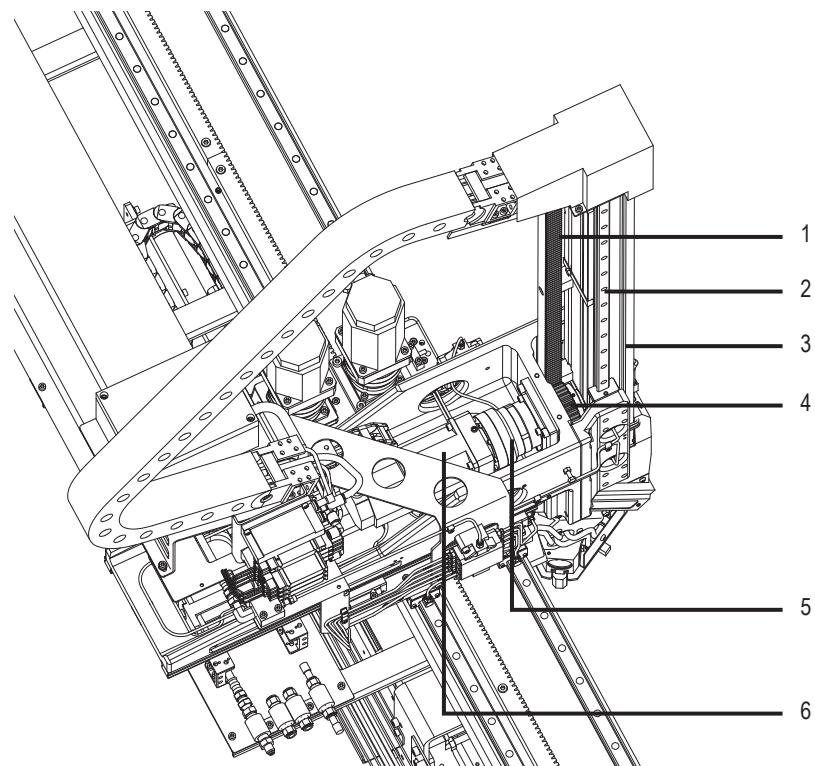


No.	Name	Function
1	Front/back axis servo motor	Powers the front/back axis traveling drive unit. The CSD300IIDG includes identical front/back axis servo motors, arranged symmetrically.
2	Pinion gear	Gear for converting the rotating force to linear movement The pinion gear engages the rack to move the front/back slide forward and backward as it turns.
3	Reduction gear (front/back axis)	Device that reduces output speed of the front/back axis servo motor to generate torque Mounted on the rotating shaft of the front/back axis servo motor, this transmits the reduced speed output to the pinion gear.
4	Front/back traveling rack	Flat gear used in conjunction with the pinion gear
5	Front/back slide	Slide to which the front/back traveling rail and front/back traveling rack are attached Travels forward and backward guided by the front/back traveling rail.
6	Front/back traveling rail	Rail on which the front/back slide travels forward and backward

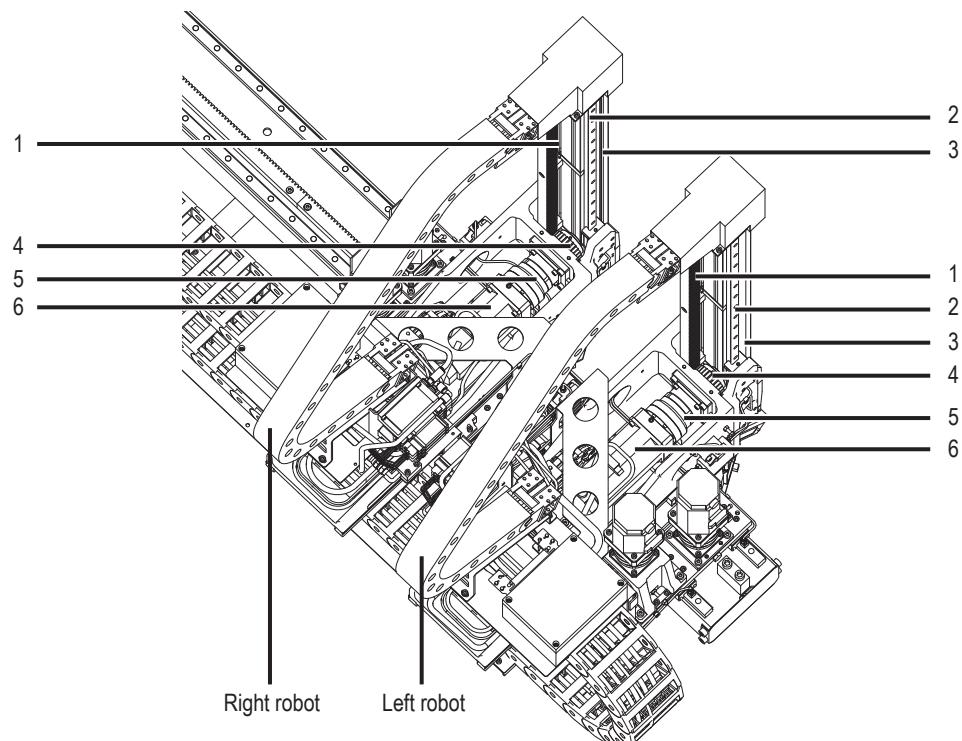
■ Vertical axis traveling drive unit

CSD300Ⅱ

CSD300ⅡR

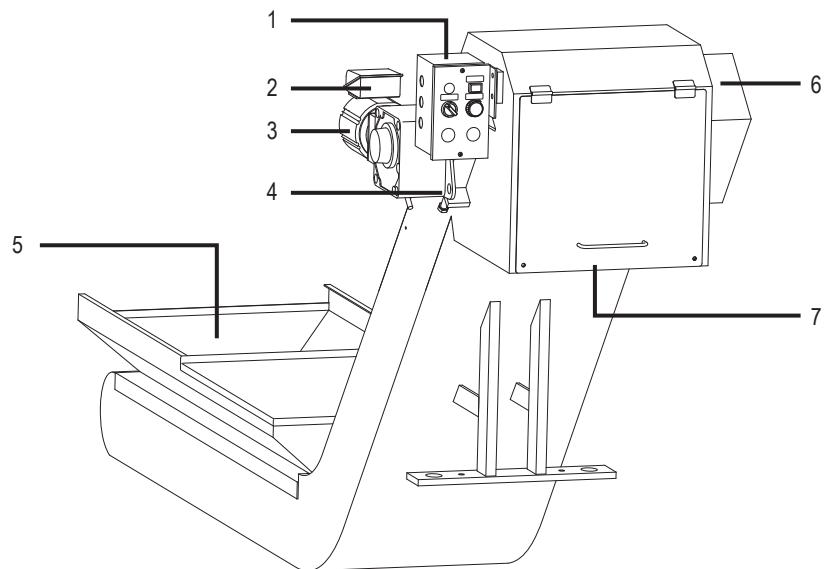


CSD300Ⅱ DG



No.	Name	Function
1	Vertical traveling rack	Flat gear used in conjunction with the pinion gear
2	Vertical Traveling rail	Rail on which the vertical arm travels up and down
3	Vertical arm	Arm to which the vertical traveling rail and vertical traveling rack are attached. Moves up and down guided by the vertical traveling rail.
4	Pinion gear	Gear for converting the rotating force to linear movement The pinion gear engages the rack to move the vertical arm up and down as it turns.
5	Reduction gear (vertical axis)	Device that reduces output speed of the vertical axis servo motor to generate torque Mounted on the rotating shaft of the vertical axis servo motor, this transmits the reduced speed output to the pinion gear.
6	Vertical axis servo motor	Powers the vertical axis traveling drive unit. The CSD300IIDG includes identical vertical axis servo motors, arranged symmetrically.

## 4-3 Chip Conveyor Part Names and Functions



No.	Name	Function
1	Operation panel	Unit used to operate the chip conveyor
2	Reduction gear	Device that reduces output speed of the gear motor to generate torque
3	Gear motor	Powers the chip conveyor.
4	Conveyor chain adjuster bolt	Bolt for adjusting conveyor chain tension Located on the left and right of the chip conveyor
5	Chip chute	Chute into which chips produced during machining are dumped
6	Safety device (rotation detection)	Unit for protecting chip conveyor from damage due to overloading Issues an abnormal stop when the sensor detects the slow rotation of the conveyor due to overloading.
7	Chip discharge outlet	Outlet from which chips are discharged

# Chapter 5

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## Installation

The environment in which the machine is installed can significantly affect machining accuracy. To ensure the machine can be used to its full potential, select an installation site that meets recommendations for the installation environment.

Proceed carefully when using a forklift to install the machine.

## 5-1 Installation Environment

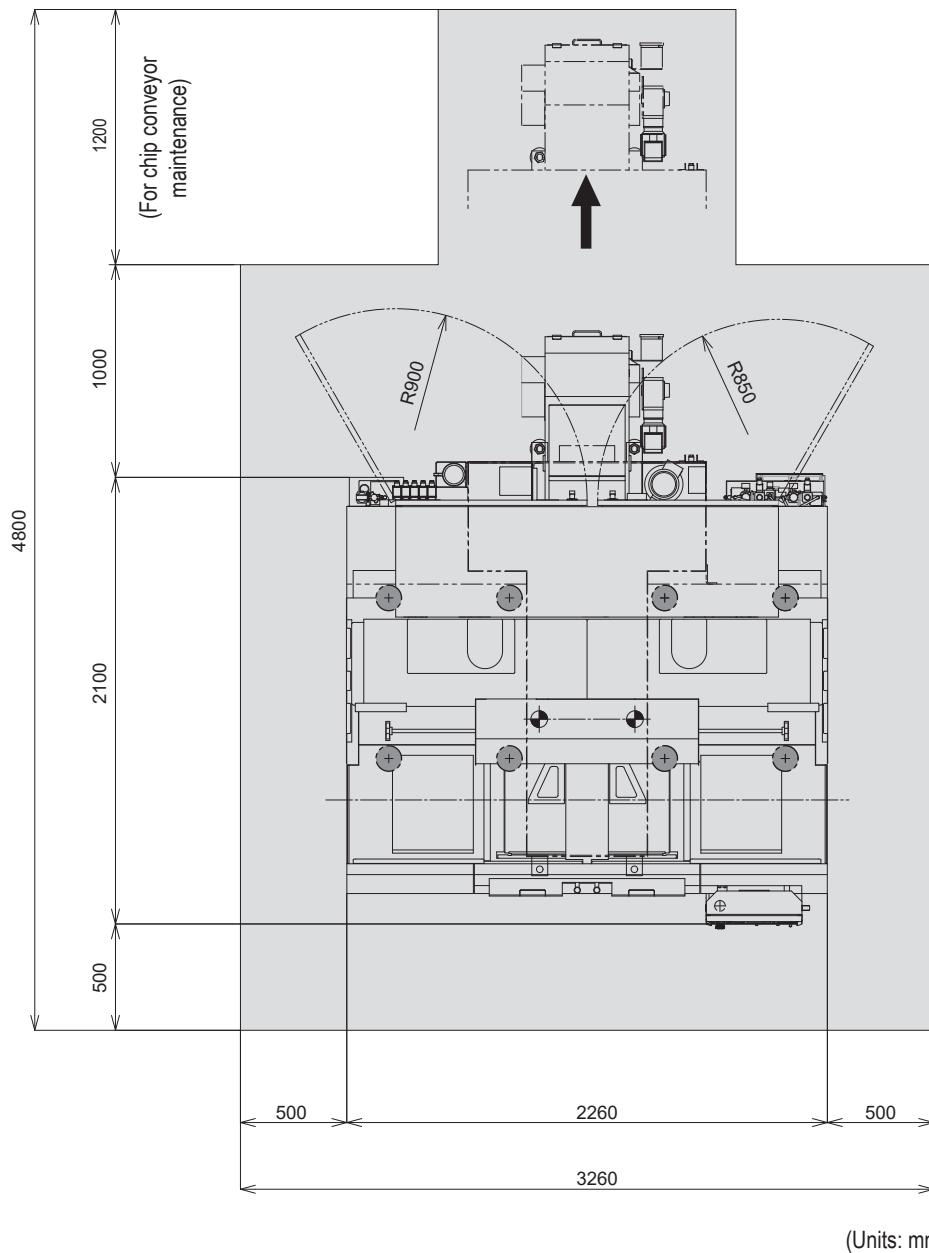
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The environment in which the machine is installed can significantly affect machining accuracy. To ensure the machine can be used to its full potential, select an installation site that meets the following conditions for the installation environment:

- Install in a location that allows sufficient space for maintenance work.  
Make sure there is adequate space to open and close each door and to remove the chip conveyor, coolant tank, and other units.
- Install in a location not exposed to direct sunlight.
- Install in a location with ambient temperatures in the range of 10 °C - 40 °C.
- Install in a location where ambient humidity does not exceed 75 % and no condensation occurs.
- Install in a location where temperature fluctuations do not exceed ±10 °C over the course of one day.
- Install in a location not exceeding 1,000 m in elevation.
- Install in a location where the machine will not be exposed to chips, water, oil, and dust.  
Keep the machine away from air conditioning outlets, equipment generating oil mist, and tool grinders or other machinery associated with flying chips. Make sure the conditions do not affect the machine cooling fan.
- Install in a location where the machine will not be subject to large impact or vibrations.  
Keep the machine away from compressors, large presses, and other equipment that generate vibrations while operating. (Vibration standard not exceeding 4.9 m/s<sup>2</sup> (0.5 G))
- Install the machine in a location free of electric welding equipment, electric discharge machines, and other major electrical noise sources.
- Install the machine on a surface of ground with adequate bearing strength.
- Install the machine on a surface of ground free of excessive unevenness.

## 5-2 Maintenance Area

Provide the maintenance area shown in the following diagram to facilitate maintenance work:



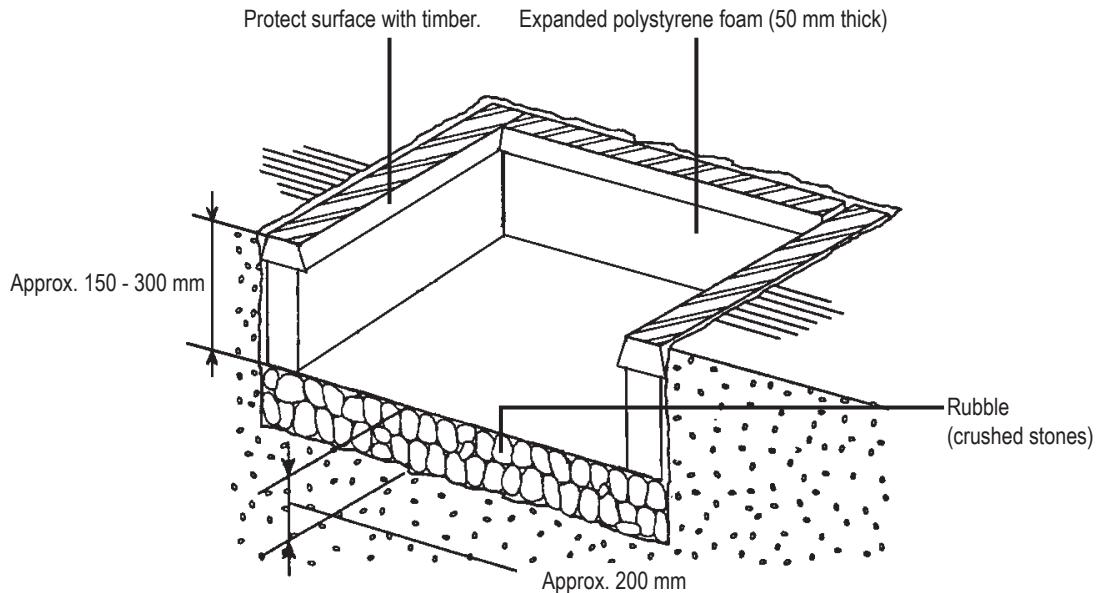
## 5-3 Foundation Work

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Prepare the foundations, where necessary. Foundation work must be carried out, particularly if the ground is soft and subsidence or tilting may occur after the machine is installed.

Ideally, prepare the foundations as follows:

- Prepare a concrete floor surface between 150 mm and 300 mm thick.
- Incorporate anti-vibration panels or sand before finishing the floor surface to minimize the effects of external vibration. Use 50 mm thick expanded polystyrene foam for the anti-vibration panels. Protect the surface with timber.



## 5-4 Machine Transportation



### DANGER

- Work involving the use of a forklift must be performed by qualified forklift operators. Serious injury or damage to the machine may result if a forklift is operated by individuals without forklift operation safety knowledge.
- Check to confirm no nonessential items like tools and rags are left inside the machine before lifting the machine. Serious injury may result if tools or other items fall from the machine as it is being lifted.
- Avoid using a forklift to move the machine while it is lifted. Serious injury or damage to the machine may result if the machine becomes unstable and falls while being lifted and moved.
- Use a forklift adequately capable of bearing the weight of the machine. Serious injury or damage to the machine may result if the machine is lifted using a forklift unable to bear its weight and it falls.
- Make sure you know where the machine's center of gravity is located before lifting. Serious injury or damage to the machine may result if the machine becomes unbalanced and falls while being moved due to misidentification of the center of gravity.
- Do not move the forklift suddenly, drive at high speed, or make sudden stops. Serious injury or damage to the machine may result if the machine becomes unbalanced and falls.



### WARNING

- Make sure there are no individuals in the vicinity of the forklift or along the route of travel between the point where the machine is lifted and the installation location. Serious injury may result due to collision or entrapment. Where necessary, call out while working.



### CAUTION

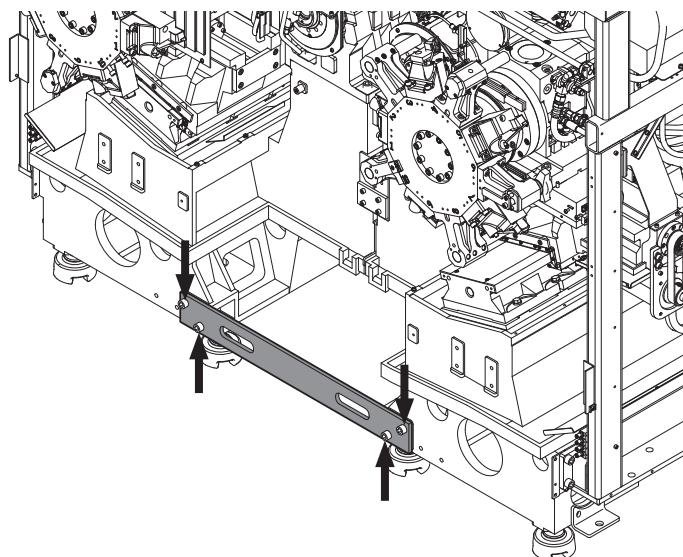
- Check to confirm that all parts are clamped before lifting the machine. Damage to the machine may result if parts are not adequately clamped while the machine is being lifted.
- When using dollies to move the machine, make sure the materials, planking, loading ramps, and number of dolly wheels are sufficient to bear the weight of the machine. The planking, loading ramps, and dolly wheels may deform and prevent movement if they are unable to bear the weight of the machine.

Fasten the left and right beds together using the transportation coupling plates before transporting the machine using a forklift.

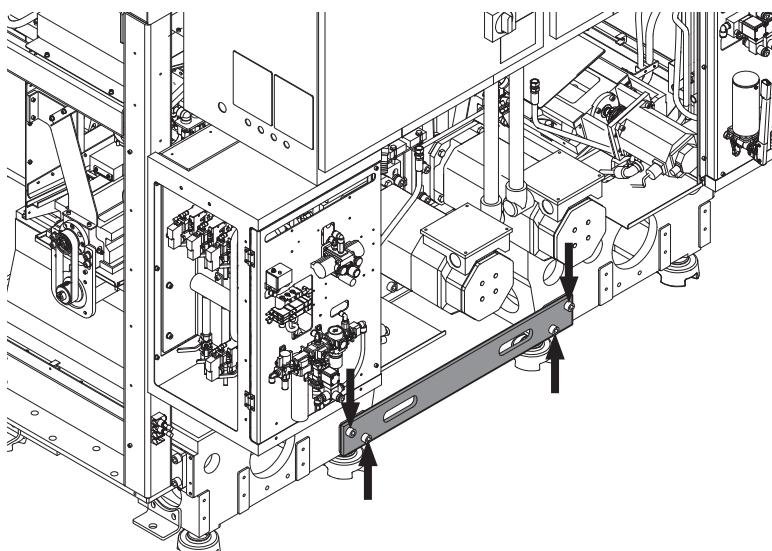
**IMPORTANT**

- Transport the machine using a forklift with a lifting capacity of at least 10 t.
- Remove the coolant tank before transporting the machine.
- When using a forklift to lift the machine, insert the forks only at the specified forklift points.
- Insert the forklift forks as far as possible.

- (1) Remove the front and rear covers from the machine.
- (2) Attach the transportation coupling plate to the beds on the front of the machine using four bolts.

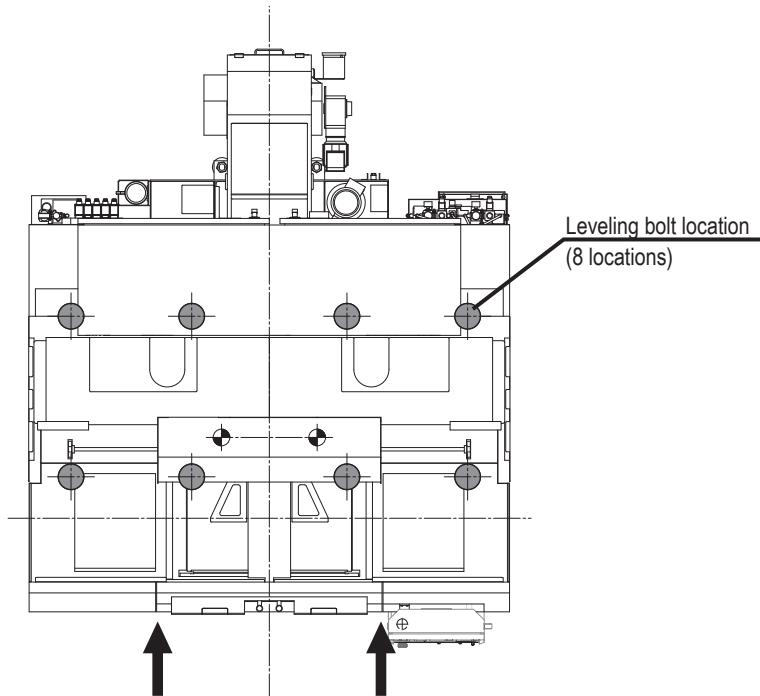


- (3) Attach the transportation coupling plate to the beds on the rear of the machine using four bolts.



- (4) Use a forklift to transport the machine.

Insert the forks from the directions marked by arrows in the following diagram:



- (5) Remove the four bolts securing the transportation coupling plates on the front and rear of the machine respectively, then remove the coupling plates.  
(6) Reattach the front and rear covers on the machine.

## 5-5 Installation Work

### 5-5-1 Machine Installation

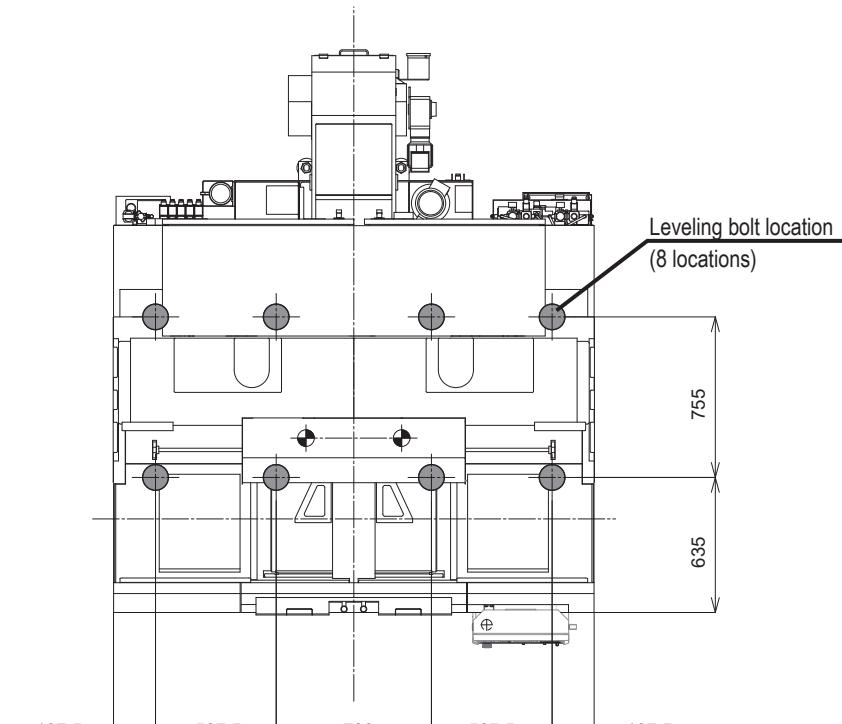
The CSII Series (Two-System Machine) is fitted with eight leveling bolts on the underside to adjust the machine level.

Place the provided sheet at the location of the leveling bolts at the installation location before placing the machine on top.

**IMPORTANT**

Adjust the leveling bolts so that they protrude initially by approximately 35 mm - 45 mm.

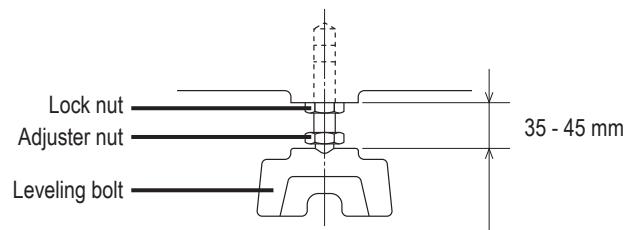
The machine will vibrate if the leveling bolts protrude too far. Make sure the leveling bolts do not protrude excessively.



(Units: mm)

- (1) Place the provided sheet at the location of the leveling bolts at the installation location.
- (2) Place the machine gently on top of the sheet.

- (3) Adjust the leveling bolts so that they protrude by approximately 35 mm - 45 mm.
  - (a) Loosen the lock nuts on the leveling bolts.
  - (b) Rotate the adjuster nuts on the leveling bolts to adjust the amount of protrusion.
  - (c) Tighten the lock nuts to secure the leveling bolts.



## 5-5-2 Machine Leveling

Once the machine has been installed on the floor surface, adjust so that the machine is level.

Place a level gauge on the X-axis slide of the right-hand system to check the level.

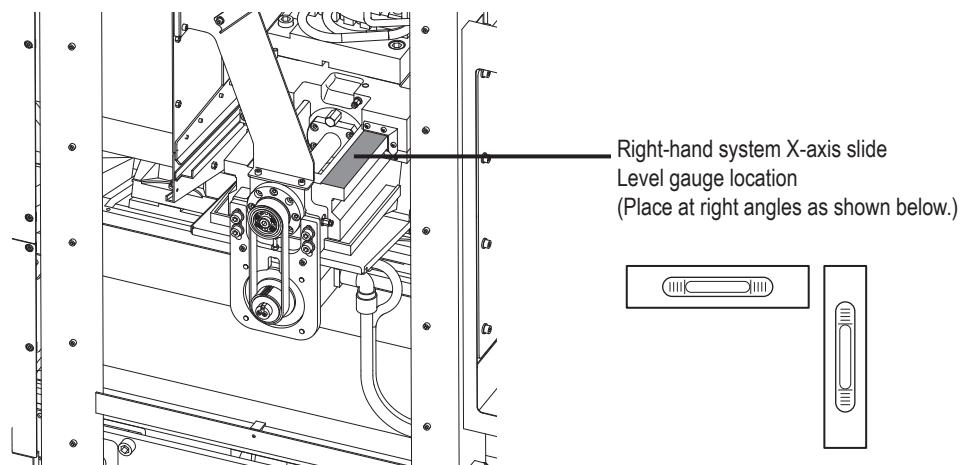
Adjust the machine level by adjusting the protrusion of the leveling bolts.

### CAUTION

- Be sure to adjust the level of the machine after installation. Make sure the level gauge readings are within the specified range. Inadequate adjustment will adversely affect machining accuracy when operating the machine.

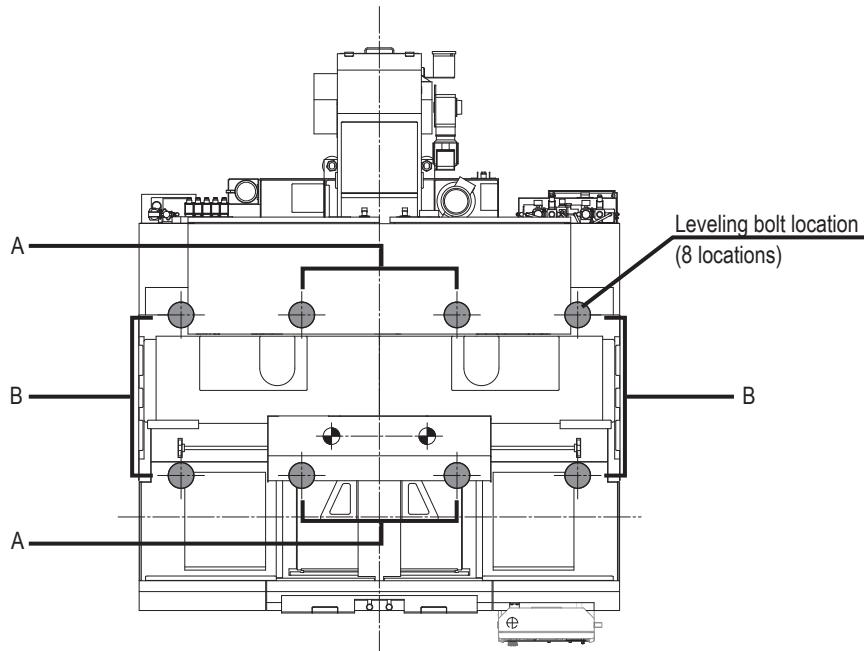
- (1) Remove the cover on the right side of the machine.
- (2) Clean the sliding part on the X-axis slide of the right-hand system where the level gauges are to be placed.
- (3) Place two level gauges on the slide in the X-axis and Z-axis directions as shown in the following diagram.

Adjust the level gauges before use.

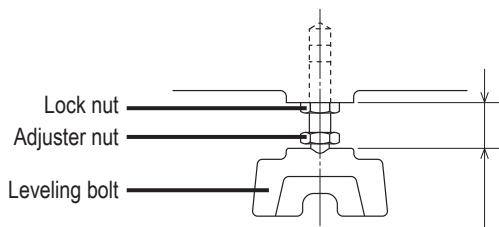


- (4) Adjust the protrusions of the four leveling bolts marked "A" until the bubbles in the level gauges are centered.

Adjust so that the level gauge levels are within 0.04/1,000.



- (a) Loosen the lock nuts on the leveling bolts.  
(b) Rotate the adjuster nuts on the leveling bolts to adjust the amount of protrusion.



- (c) Check the level on the level gauges.  
(5) Adjust the protrusions of the four leveling bolts marked "B" in the same way as in step (4).  
Adjust so that the level gauge levels are within 0.04/1,000.  
(6) Check to confirm that all eight leveling bolts are under load, then tighten the lock nuts to secure the leveling bolts.

**IMPORTANT**

Check periodically to confirm the machine remains level. Even after precise leveling, leveling accuracy may degrade over time due to floor fluctuations or the settling of the machine on the floor surface.

Recheck the level one to two months after installation, then check once a year.

## 5-6 Power Supply Connection



### DANGER

- Electrical wiring work must be carried out by qualified electricians. Serious accidents (e.g., electric shock) may result if work is carried out by individuals without electrical installation safety knowledge.
- Check to confirm that the sheathing of the power cables is free of damage before installing electrical wiring. Damage to the power cable sheathing is extremely hazardous, as it may result in current leakage and electric shock.
- Always turn off the factory primary power supply before installing electrical wiring. Electric shock may result if work is carried out with the power turned on.
- Before performing electrical wiring work, place a notice on the primary power supply outlet reading "Work in progress. Do not turn on power!" Serious injury may result if another individual turns on the power and moves the machine while work is underway.
- Be sure to ground the machine. Failure to ground the machine may lead to serious injury (e.g., electric shock).



### WARNING

- Use electrical wiring capable of adequately providing the power supply capacity indicated on the electrical specification nameplate affixed to the control panel door. Avoid using cables that are longer than necessary. Failure to use the appropriate wiring may lead to overheating and fire, serious accidents, or damage to the machine due to voltage drops.
- Use a dedicated cable to connect the machine directly to the input power supply. Under conditions in which the capacity of the factory power supply is insufficient, serious accidents or damage to the machine may result if the machine malfunctions due to excessive voltage drops.
- Ground using a dedicated grounding wire. Never connect the grounding wire for the machine to the structural steelwork of the factory if grounding wires for equipment such as electrical welding equipment and electric discharge machines are grounded to the steelwork of the factory. Failure to use a dedicated grounding wire may result in malfunctions due to electrical noise from other machinery and serious accidents or damage to the machine.
- Before turning on the power, use a phase sequence indicator to confirm the input power supply voltage and the L1, L2, L3 (R, S, T) phase sequence are correct. Incorrect phase sequences may lead to malfunctions and serious accidents or damage to the machine.

## 5-6-1 Power Supply Specifications

### WARNING

- Check the power supply capacity and select the appropriate power cable from the primary power supply.  
Failure to use the appropriate cable may result in fire and consequent risk of serious accidents or damage to the machine.

### IMPORTANT

Connect to a power supply with a capacity greater than the specified power consumption.

Item	Specification		
	CSD300 II	CSD300 II DG	CSD300 II R
Power consumption	60 kVA		
Input power supply voltage	200 V AC (50/60 Hz) ± 10 %		
Frequency	50/60 Hz ± 1 Hz		
Voltage outages	Less than 10 ms		
Effective (rms) value of line voltage	Voltage impulse not exceeding 1.5 ms at peak not exceeding 200 %		
AC power supply voltage	Waveform distortion not exceeding 7 %		
Line voltage	Not exceeding 5 % imbalance		

### REFERENCE

In regions/countries where the input power supply voltage is not 200 V AC, an external transformer is required to convert from the local power supply voltage. Select an external transformer that meets machine specifications and complies with IEC standards (international standards).

## 5-6-2 Power Supply Connection Procedure

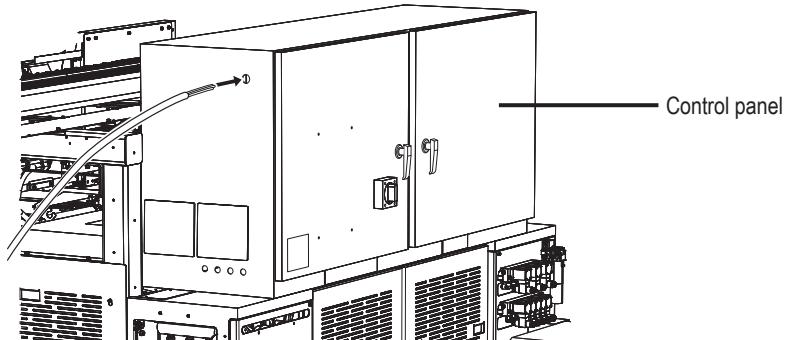
**⚠️ WARNING**

- Connect the power cable correctly.  
Incorrect phase sequences may lead to malfunctions and serious accidents or damage to the machine.

**IMPORTANT**

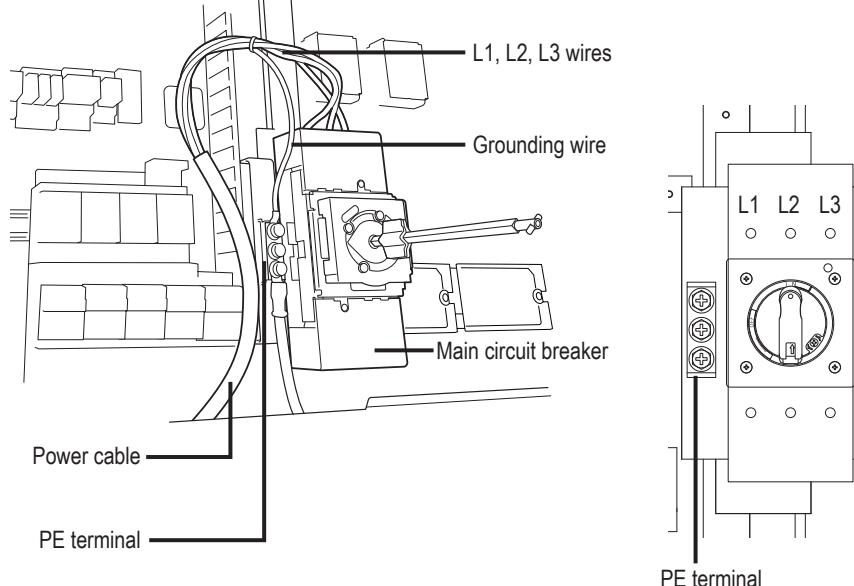
Use the shortest grounding wire possible of the same thickness as the input wire. Connect the grounding wire in accordance with the methods and conditions stipulated by local laws and regulations.

- (1) Route the power cable from the left side of the control panel and clamp inside the control panel.



- (2) Remove the cover on the top of the main circuit breaker. Wire the L1, L2, and L3 (R, S, T) phases in sequence from the left-hand terminal.
- (3) Connect the grounding wire to the PE terminal.

Use a longer grounding wire than the L1, L2, and L3 wires.



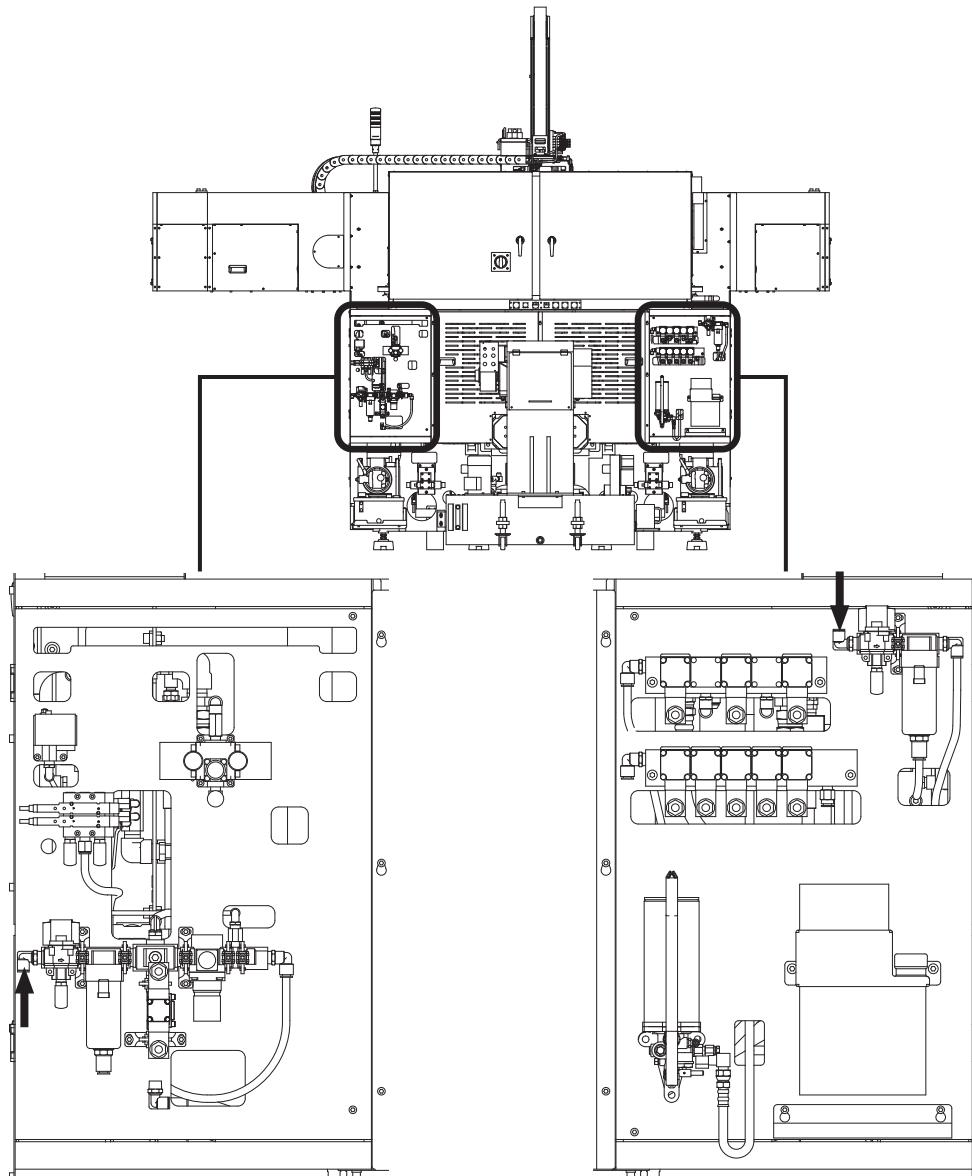
## 5-7 Primary Air Connection

Connect the primary air supply to the machine before turning on the power.  
The machine cannot operate unless the primary air supply has been connected.

### CAUTION

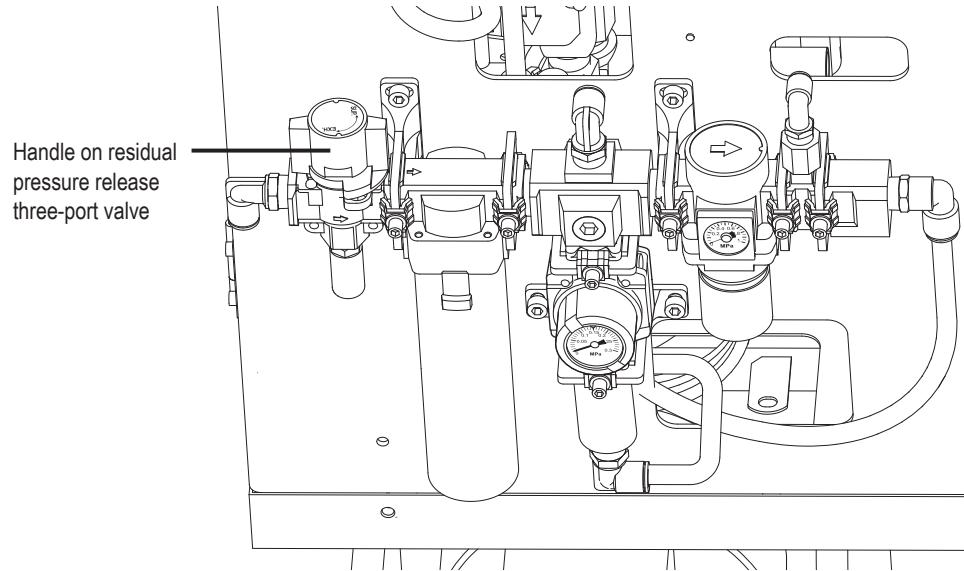
- Use a compressed air supply of clean, dry air with a dew-point temperature not exceeding 10 °C at a pressure of at least 0.3 MPa. Using moist or dusty air may cause the air unit to malfunction, leading to machine failure.
- Check to confirm that the compressed air supply has at least the stipulated capacity. Insufficient compressed air supply capacity may cause the air unit to malfunction, leading to machine failure.

(1) Connect the primary air supply to the two valve inlets.



- (2) Push down the handle on the residual pressure release three-port valve, then turn the handle to “SUP” (air supply).

To exhaust air, turn the handle to “EXH”.



\* The diagram shows the rear left-hand air unit.

## 5-8 Checking After Installation

### 5-8-1 Checks Before Turning On Power

Be sure to check the following points before turning on the power for the first time after installing the machine:

Check No.	Checkpoint
1	Use a phase sequence indicator to confirm that the input power supply voltage and L1, L2, L3 (R, S, T) phase sequence are correct.
2	Check to confirm that all bolts are fully tightened.
3	Check to confirm that all connectors are connected correctly.
4	Check to confirm that all air and hydraulic pipe connections are fully tightened.
5	Check to confirm that the wiring and pipes are correctly connected for special specification external auxiliary equipment.
6	Check to confirm that all corrosion inhibitor has been removed from sliding parts.

### 5-8-2 Checks After Turning On Power

Be sure to check the following points after turning on the power for the first time after installing the machine:

Check No.	Checkpoint
1	Check to confirm that no oil is leaking and that all gauges give normal readings.
2	Check to confirm that the lubricating oil unit pump functions normally.



#### WARNING

- Open and close the spindle chuck several times to keep the spindle chuck and chuck cylinder from seizing, then check to confirm that the jaws and holder are securely mounted before running-in operation of the spindle.  
Seizing between the spindle chuck and chuck cylinder will weaken the spindle chuck gripping force and generate risk of serious accidents or damage to the machine due to ejection of the workpiece when the spindle rotates.



#### CAUTION

- To protect sliding parts, do not begin operating the machine immediately. Operate the lubricating oil pump manually first to supply lubricating oil to the sliding parts.  
Axis movements without a supply of lubricating oil may result in machine failure due to wear of or seizing between the sliding parts and ball screws.

## 5-9 Unit Separation (Option)

### ⚠ CAUTION

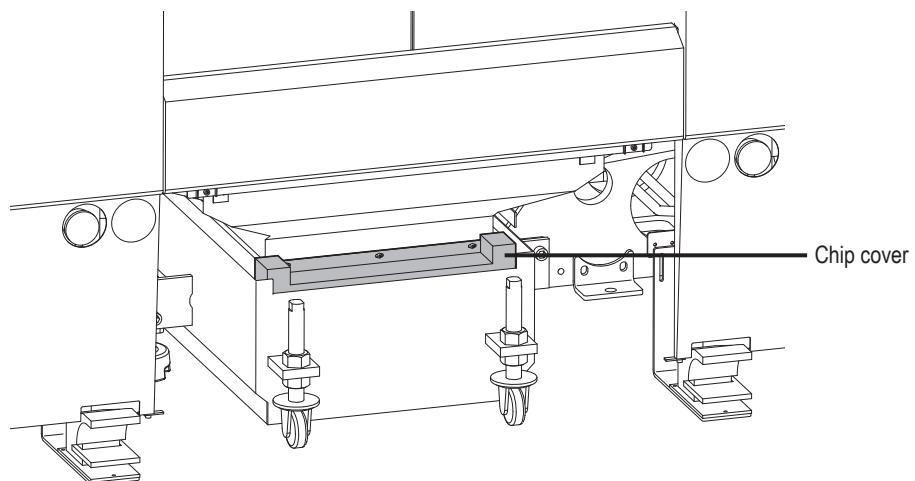
- Before separating the units, check the level of the right-hand system. Confirm that all eight leveling bolts are under load. (Refer to '5-5-2 Machine Leveling'.)  
The machine may be damaged if the units are separated when not all eight of the leveling bolts are under load.

### 5-9-1 Machine Separation

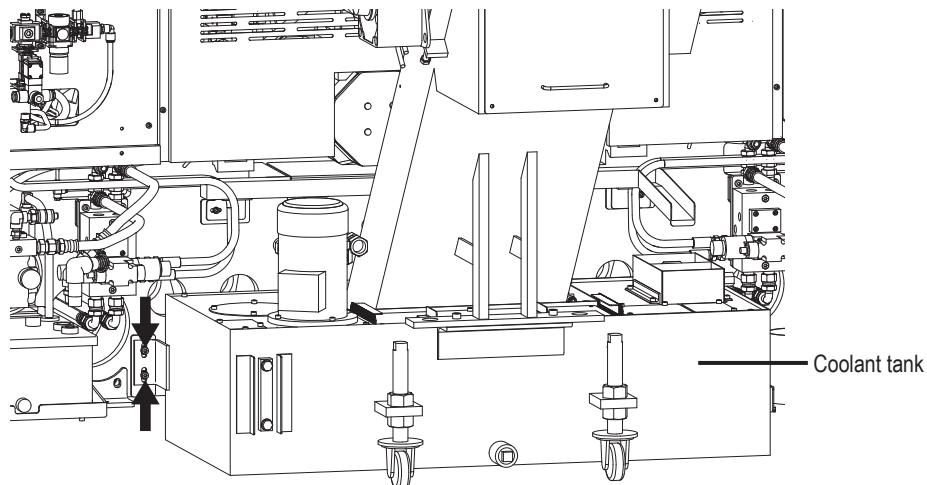
The CSII Series (Two-System Machine) consists of left and right machines. This means vibration generated by the slide, turret, or spindle on one machine and transmitted to the other machine may adversely affect machining accuracy.

The left and right machines can be separated to isolate any vibrations caused by the respective spindle operation.

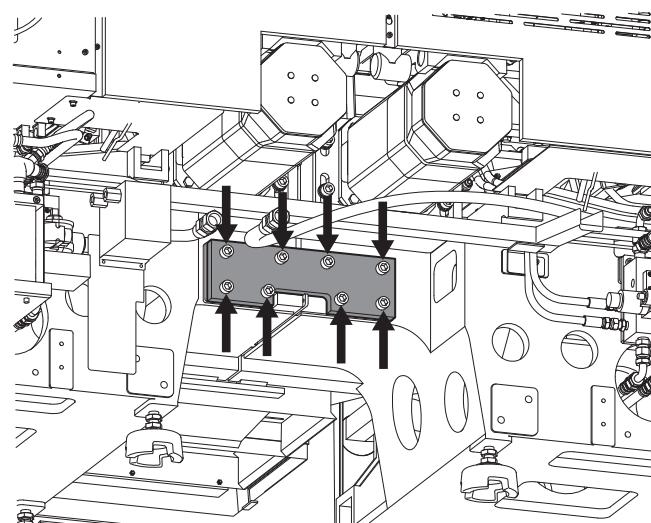
- (1) Remove the lower center cover on the front of the machine.
- (2) Remove the chip cover.



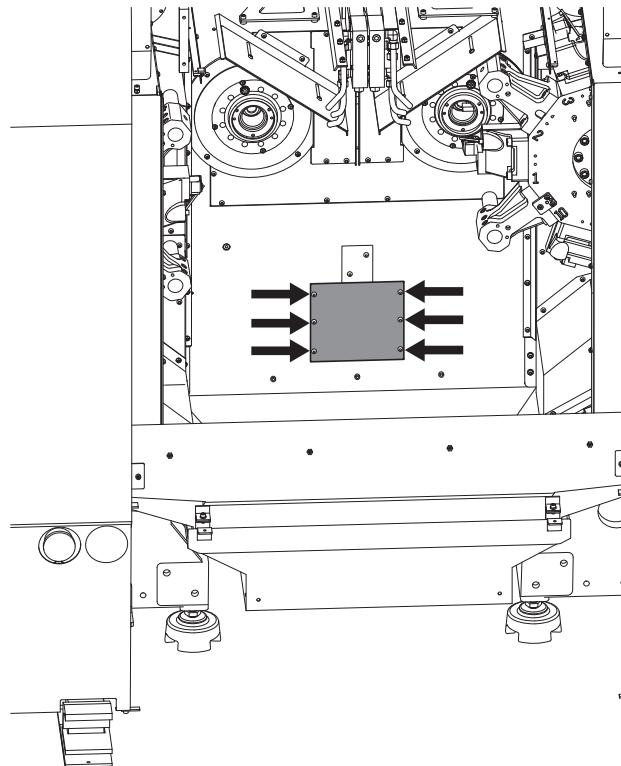
- (3) Remove the coolant tank.
- Detach the coolant hose and cables.
  - Remove the two bolts securing the coolant tank.
  - Disengage the locks on the coolant tank casters.



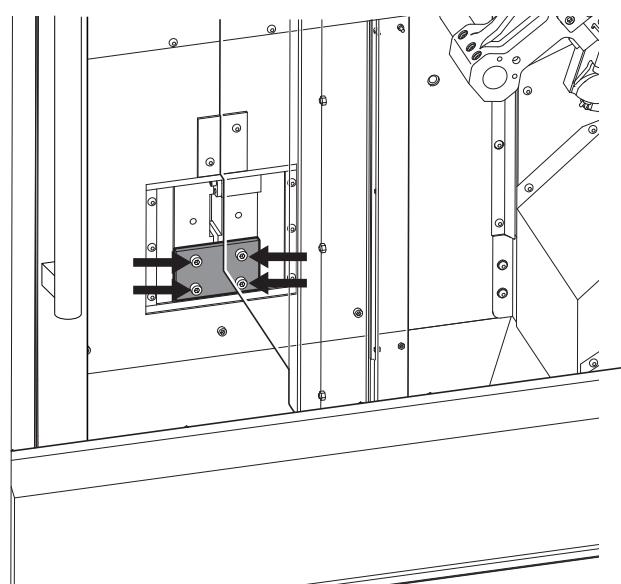
- Pull out the coolant tank to the rear.
- (4) Remove the left/right bed coupling plate on the rear of the machine.
- Remove the eight bolts securing the left/right bed coupling plate on the rear of the machine.
  - Remove the left/right bed coupling plate.



- (5) Open the front door.
- (6) Remove the left/right bed coupling plate on the front of the machine.
  - (a) Remove the six screws securing the cover below the headstock inside the machine, then remove the cover.

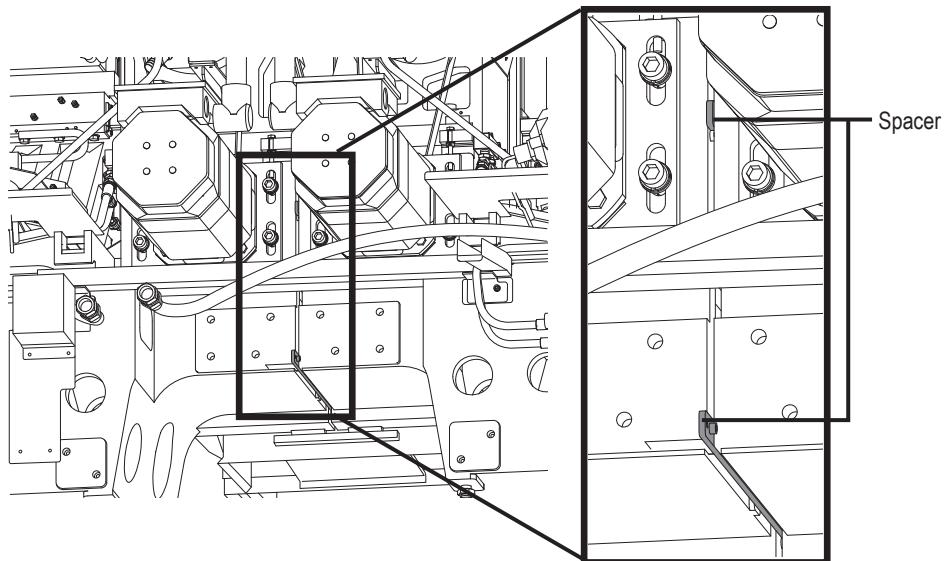


- (b) Remove the four bolts securing the left/right bed coupling plate inside the cover.
- (c) Remove the left/right bed coupling plate.



- (d) Reattach the cover below the headstock inside the machine with the six screws.

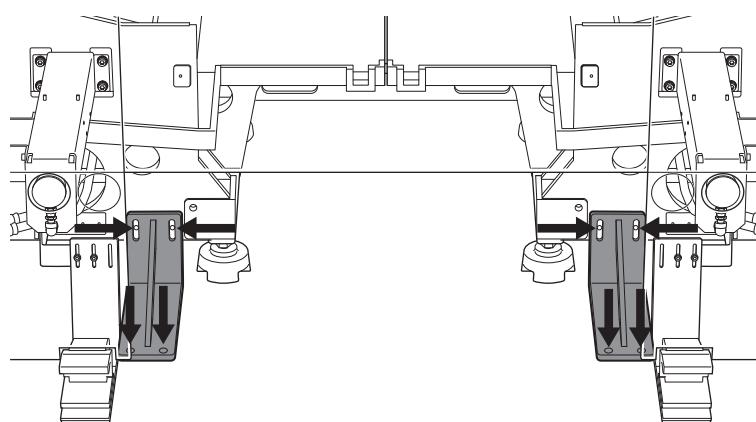
- (7) Pull out the two spacers between the left and right beds on the rear of the machine.



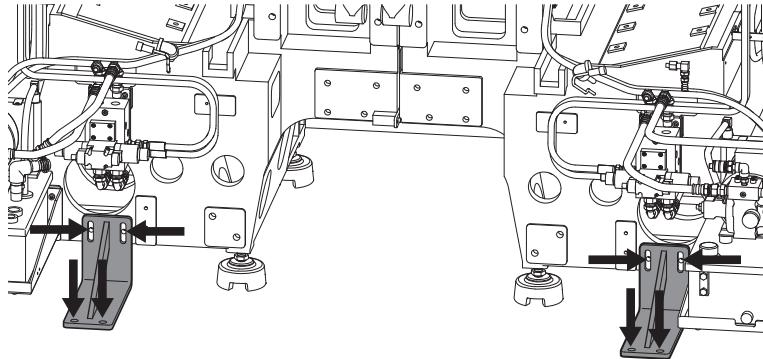
**IMPORTANT**

The left/right bed coupling plates on the front and rear of the machine removed in steps (4) and (6) and the two spacers removed in step (7) will be required when relocating the machine. Keep in a safe place. Keep in a safe place.

- (8) Attach anchor brackets to the front and rear of the machine. Secure to the floor using anchor bolts.
- (a) Attach two anchor brackets to the front of the machine with two bolts. Secure to the floor using two anchor bolts.



- (b) Attach two anchor brackets to the rear of the machine with two bolts. Secure to the floor using two anchor bolts.



- (9) Reattach the coolant tank.
- Return the coolant tank to its original position.
  - Engage the locks on the coolant tank casters.
  - Secure the coolant tank with the two bolts.
  - Reattach the coolant hose and cables.
- (10) Reattach the chip cover and the lower center cover on the front of the machine.

## 5-9-2 Robot Separation

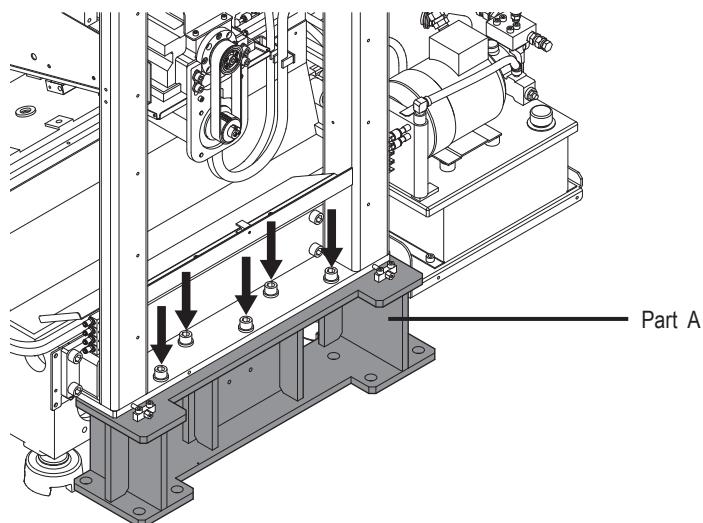
The robot can be separated from the machine to isolate any vibrations generated by robot operations.

Attach the parts for separating the robot to the supports on the left and right sides of the machine, then separate from the machine.

- (1) Remove the covers on the left and right sides of the machine.
- (2) Attach parts A and B for separating the robot below the supports on the left and right sides of the machine.

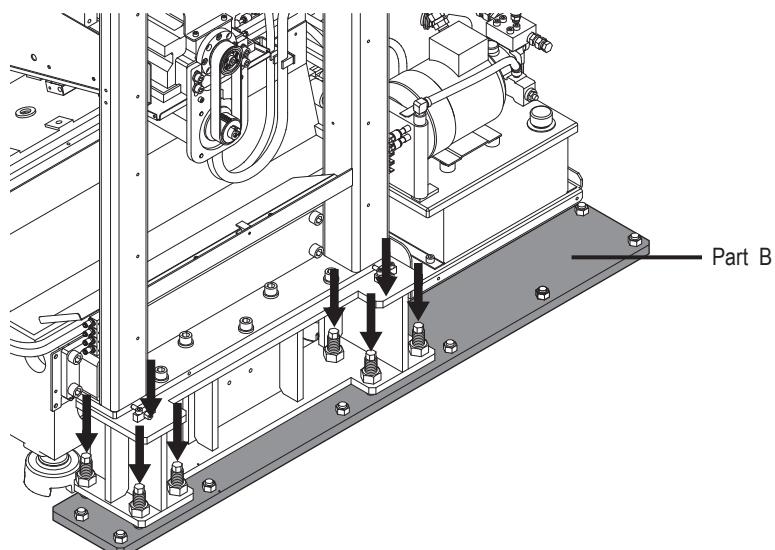
The diagram shows the right side. Attach the parts on the left side in the same way.

- (a) Attach part A below the supports using five bolts.

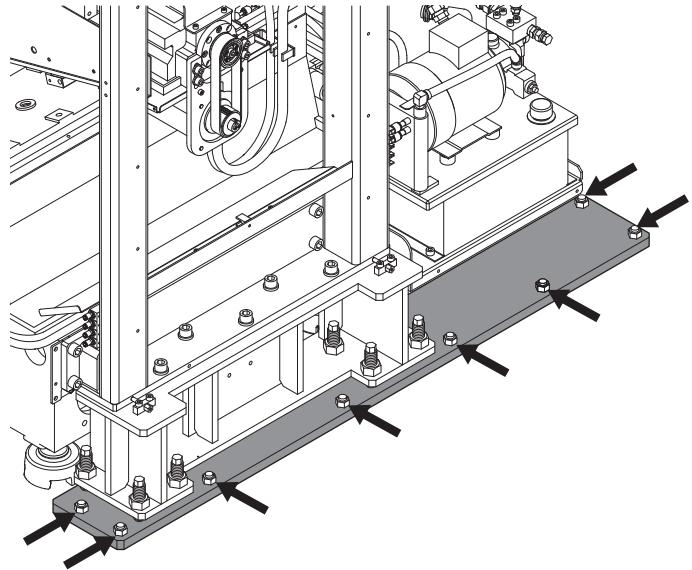


- (b) Insert part B underneath part A.

- (c) Insert eight bolts into the bottom of part A, then tighten until the ends of the bolts just touch part B.

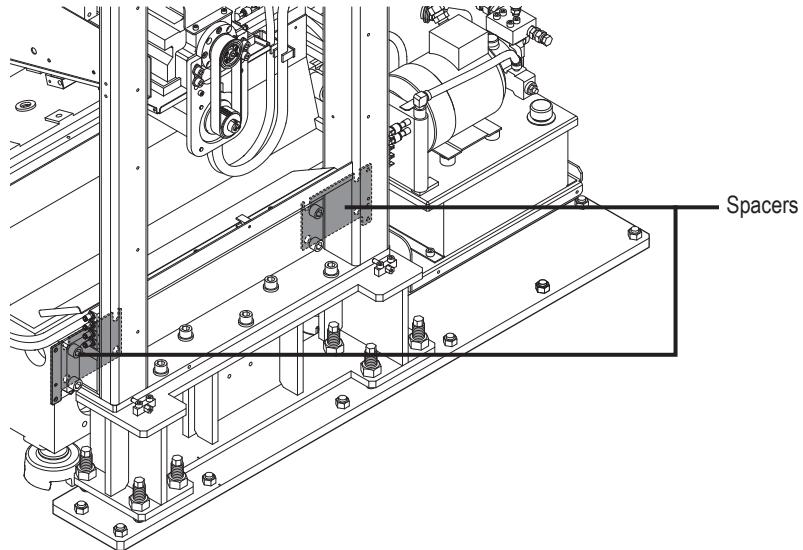


- (d) Secure part B to the floor with eight bolts.

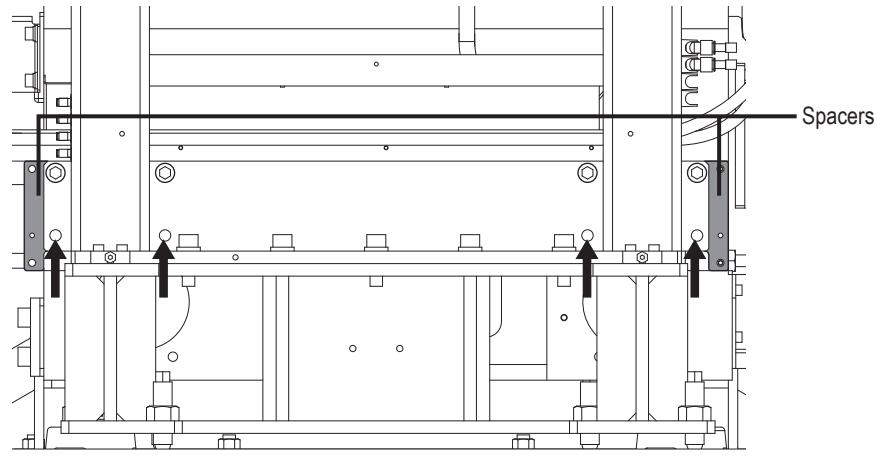


- (3) Remove the two spacers between the supports and bed on the left and right sides of the machine.

The diagram shows the right side. Remove the spacers from the left side in the same way.

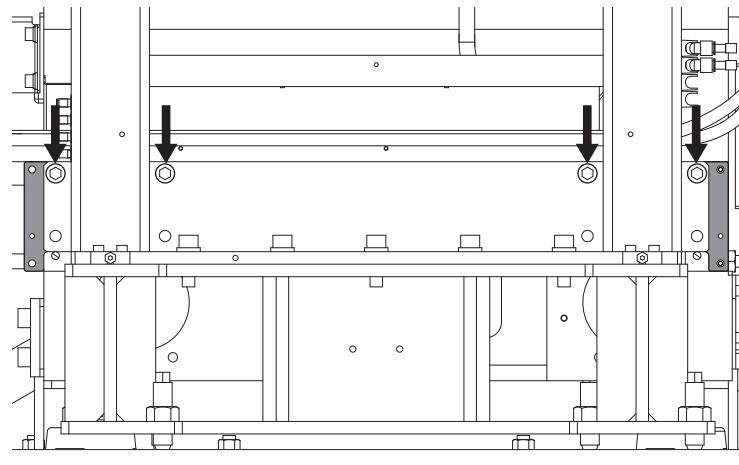


- (a) Remove the four lower bolts securing the supports to the bed on the left and right sides of the machine.

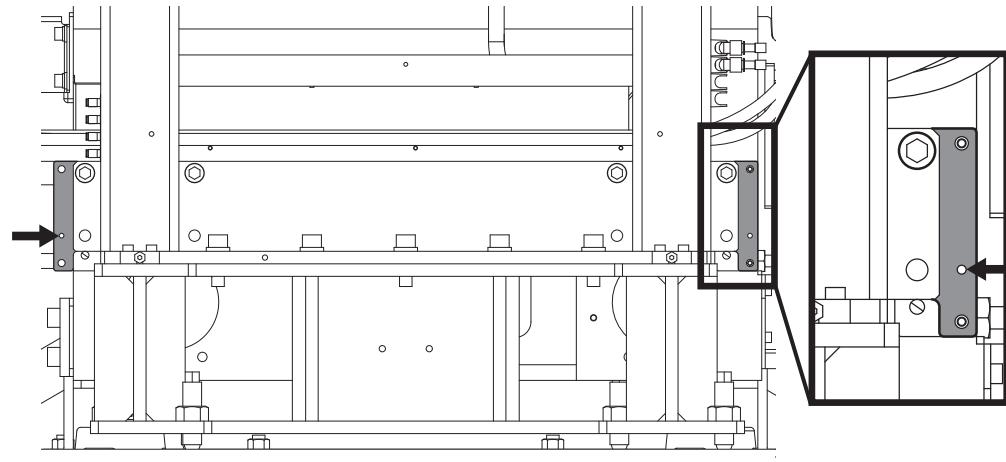


- (b) Loosen the four upper bolts securing the supports to the bed on the left and right sides of the machine.

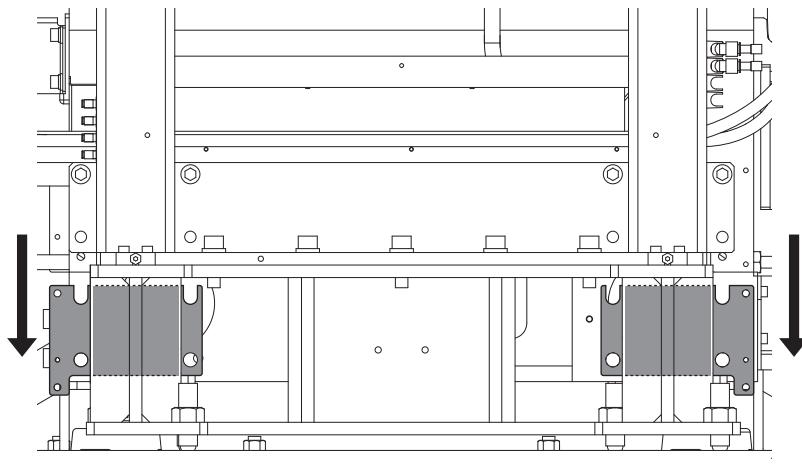
Loosen the bolts by approximately a quarter turn.



- (c) Insert the bolts into the tapped holes in the two spacers.



- (d) Push in the bolts inserted into the tapped holes, move downward, then pull out the two spacers.



**IMPORTANT**

The two spacers removed in step (3) will be required when relocating the machine. Keep in a safe place.

- (4) Secure the supports to the bed on the left and right sides of the machine.

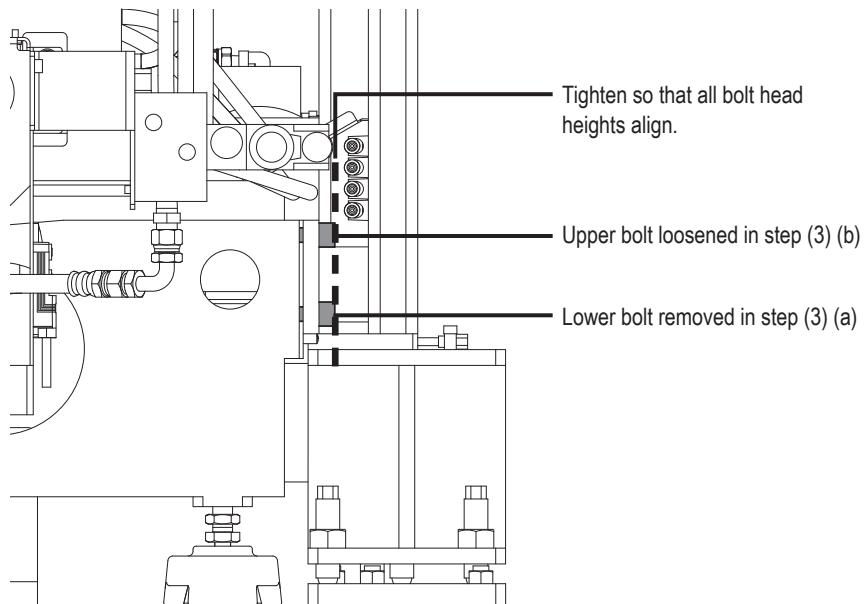
The diagram shows the right side. Secure the supports to the bed on the left side in the same way.

- (a) Reattach the four lower bolts removed in step (3) (a), then tighten.

- (b) Retighten the four upper bolts loosened in step (3) (b).

Tighten the four upper bolts so that their head heights align with the four lower bolt head heights.

The bolts cannot be fully tightened because the spacers have been removed.



- (5) Reattach the covers on the left and right sides of the machine.

## 5-10 Machine Relocation

When relocating the machine, fasten the left and right machine beds together using the transportation coupling plates before transporting the machine using a forklift.

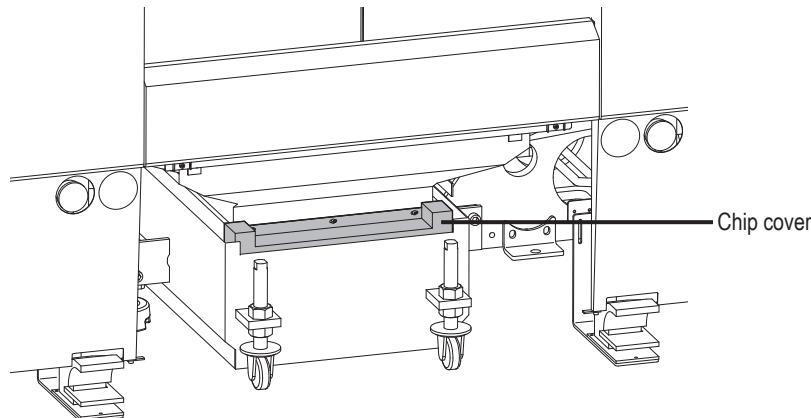
For more information on transporting the machine, refer to '5-4 Machine Transportation'.

**IMPORTANT**

- Always turn off the factory primary power supply before relocating the machine.
- The machine cannot be relocated with the units separated.  
Reconnect the machine and robot before relocating. (Refer to '5-9 Unit Separation (Option)').

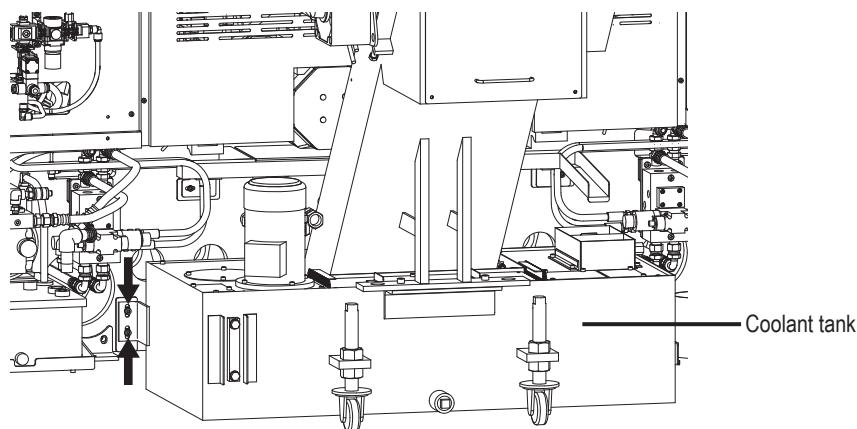
(1) Remove the lower cover on the front of the machine.

(2) Remove the chip cover.



(3) Remove the coolant tank and chip conveyor.

- Detach the coolant hose and cables.
- Remove the two bolts securing the coolant tank.
- Disengage the locks on the coolant tank casters.



- (d) Pull out the coolant tank to the rear.
  - (e) Pull out the chip conveyor to the rear.
- (4) Detach the power cable and primary air hose connected to the machine.
- (5) Transport the machine to its new location using a forklift. (Refer to '5-4 Machine Transportation'.)
- (6) Install the machine. (Refer to '5-5 Installation Work'.)
- (7) Connect to the power supply. (Refer to '5-6 Power Supply Connection'.)
- (8) Connect to the primary air supply. (Refer to '5-7 Primary Air Connection'.)
- (9) Reattach the coolant tank and chip conveyor.
- (a) Return the coolant tank and chip conveyor to their original positions.
  - (b) Engage the locks on the coolant tank casters.
  - (c) Secure the coolant tank with the two bolts.
  - (d) Reattach the coolant hose and cables.
- (10) Reattach the chip cover and the lower center cover on the front of the machine.
- (11) Perform checking after installation. (Refer to '5-8 Checking After Installation').

# Chapter 6

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## Disposal and Waste Processing

Dispose of waste items such as CSII Series (Two-System Machine) components, swarf, waste oil, and coolant in accordance with applicable national and local laws and regulations.

Take environmental concerns into account before disposing of Fuji Corporation products as industrial waste.

## 6-1 Waste Processing

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Unauthorized disposal of industrial waste is prohibited by law.

Dispose of waste items such as CSII Series (Two-System Machine) components, swarf, waste oil, and coolant in accordance with the timing and procedures specified by applicable national and local laws and regulations.

Subcontract disposal to an industrial waste disposal company or recycling company qualified to process industrial waste.

### ■ Used battery disposal

Dispose of batteries in accordance with applicable local laws and regulations.

Note that damage or leakage may occur if battery terminals are short-circuited during disposal. Insulate the terminals with adhesive tape before disposal. Take special care when disposing of lithium batteries.

### ■ Machine, robot, control unit, servo amplifier, spindle motor disposal

This equipment is composed of metal (e.g., steel, aluminum, copper), plastics, printed circuit boards, LCDs, and cables. For disposal, request dismantling and breakup by an industrial waste processing company to enable recycling of as much material as possible.

**IMPORTANT**

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Printed circuit boards contain solder (lead compound). Disposal in least controlled landfill sites after intermediate processing is prohibited by the Waste Management and Public Cleansing Act.

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### ■ Swarf disposal

Request disposal by a metal recycling company or industrial waste disposal company.

### ■ Waste oil and coolant disposal

Subcontract disposal to a qualified industrial waste disposer, gas station capable of processing waste oil, or waste oil disposal company.

## **Front-Facing Twin-Spindle Lathe CSII Series (Two-System Machine) Product Manual**

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# **FUJI CORPORATION**

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Toyota Plant: 480 Tojiri, Hasama-cho, Toyota, Aichi 470-0452 Japan  
Tel: +81-565-76-2211 Fax: +81-565-76-5413

## **Product Inquiries**

Contact form: <https://www.fuji.co.jp/support/mt/contact>

Tel: +81-565-76-2640

Business hours: Mon - Fri 8:30 am - 12 noon / 1 pm - 5 pm (except business holidays)