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disco

DATA MAINTENANCE MANUAL

Fully Automatic In-Feed Surface Grinder

DFG841

Software Version: ENM0000X-Series

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READ CAREFULLY BEFORE USING THIS MANUAL

Introduction

This machine grinds silicon wafers (hereinafter called wafers) and, therefore, has rotary sections which rotate at high speed, high-voltage sections which present electric shock hazard and drive sections which may catch the operating personnel's body and clothing.

If the machine is not properly operated, safety hazards that could result in serious injury or death may occur.

Read before using the manual

Thoroughly read this manual beforehand and follow the instructions set forth in it when you handle the machine.

To assure safety in operating and maintaining the machine, it is important that you know the locations of the potential safety hazards. It is difficult for DISCO to predict each and every potential hazard. However, this manual carries various precautionary notes and warnings for the machine wherever presence of any safety hazard is foreseeable. For increased safety assurance, therefore, it is essential that you observe all the precautions and other relevant instructions set forth in this manual.

If you modify the machine without prior consent of DISCO or repair it in a manner not stated in this manual, the safety assurance features of the machine may be seriously affected.

Never attempt to modify or repair the machine in a manner not approved by DISCO.

The safety precautions set forth in this document are classified into DANGER, WARNING and CAUTION categories, representing the three levels of hazards latent in the machine. These categories are defined as detailed below in accordance with the seriousness and occurrence probability of the hazards. In addition to the above three safety precaution levels, CAUTION without the safety alert symbol (⚠) and NOTICE are used to give safety usage instructions to the user.
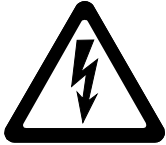
Before using the machine, be sure to read and understand all the associated safety precautions set forth in the manual.

The hazard levels defined for the machine are detailed as follows:

⚠ DANGER	A critical situation in which either critical injury or death is very likely to result if the incident in question cannot be avoided This symbol is used for the incident in which the injury is critical and there is a high probability of occurring it.
⚠ WARNING	A serious situation in which either critical injury or death may result if the incident in question cannot be avoided This symbol is used for the incident in which the injury is serious but the probability of occurring it is not so high.
⚠ CAUTION	If you cannot avoid the incident in question, a medium or slight injury may result. This symbol is used for the incident in which the injury is slight and the probability of occurring it is not so high.
CAUTION	If you cannot avoid the incident in question, an accident involving property damage may result.
NOTICE	Indicates the safe way of using the machine as well as the instructions to prevent accidents involving property damage from occurring.

The safety labels as defined below are attached to the hazardous sections of the machine. Before using the machine, confirm the label positions and thoroughly read and understand the precautions and warnings represented by the labels.

Label	Hazard Level	Meaning of Label
Rotary Blade Label WARNING	WARNING	Your hands or fingers may be cut off by the rotating blade. Observe the following precautions for at least 15 seconds after stopping spindle rotation. - Do not position your hands or fingers near the wheel. - Keep the safety cover closed.
Capture Label CAUTION	CAUTION	There is a danger that your hands, fingers or clothing may be captured and, as a result, wounded or cut off. Do not position your hands or fingers in any drive section.
Driving Section Label CAUTION	CAUTION	There is a danger that your hands or fingers may get caught in a drive section. Do not position your hands or fingers in any drive section.
Electrical Shock Hazard Label	WARNING	A risk of receiving an electric shock exists. Be alerted.
General Label	WARNING	Warnings (including danger/caution) in general

INTRODUCTION

About this manual

This Data Maintenance Manual, written for data maintenance personnel, describes about the operation screens as well as the procedures to set up and manage various machine data on them for Fully Automatic In-Feed Surface Grinder Model DFG841.

To ensure safety

To ensure safety, be sure to thoroughly read and understand the contents of this manual before operating the machine.When you set up or manage machine data, be sure to follow the procedures set forth in the manual.

Definition of a manager and an operator

This manual defines a manager and an operator of the machine as follows:

Category	Applicable Personnel	Job and Responsibility
Manager	Management representative	Engages in overall management of the machine and its operators.
Operator	Maintenance personnel	Qualified person who has completed DISCO's machine maintenance training to engage in maintenance of the machine.
	Data maintenance personnel	Qualified person who manages the software data of the machine.
	Machine operator	Engages in operation of the machine for grinding wafers.

Documentation for this machine

The following five manuals are provided for the machine.
This manual is the Data Maintenance Manual in the list below indicated by an arrow.

Manual	Who should read	Contents
Installation Manual	Maintenance personnel	Procedures to install the machine and to make installation-related adjustments
Operation Manual	Machine operator	Operational procedures to be performed by the machine operator
Data Maintenance Manual	Data maintenance personnel	- Contents of the screens on which data entries are made - Data setting procedures
Maintenance Manual	Maintenance personnel	Servicing, inspection and adjustment procedures to be performed by the customer
Technical Reference	Maintenance personnel	Machine specifications, circuit diagrams, illustrations and part lists

Unit notation

International System of Unit is adopted to express any unit. The values in the parenthesis are reference data. Also, all the pressure values are expressed in gauge pressure.

The machine consists of the following sections.

Wafer washing section

Grinding section

Transport section   Monitor

Operation control
section
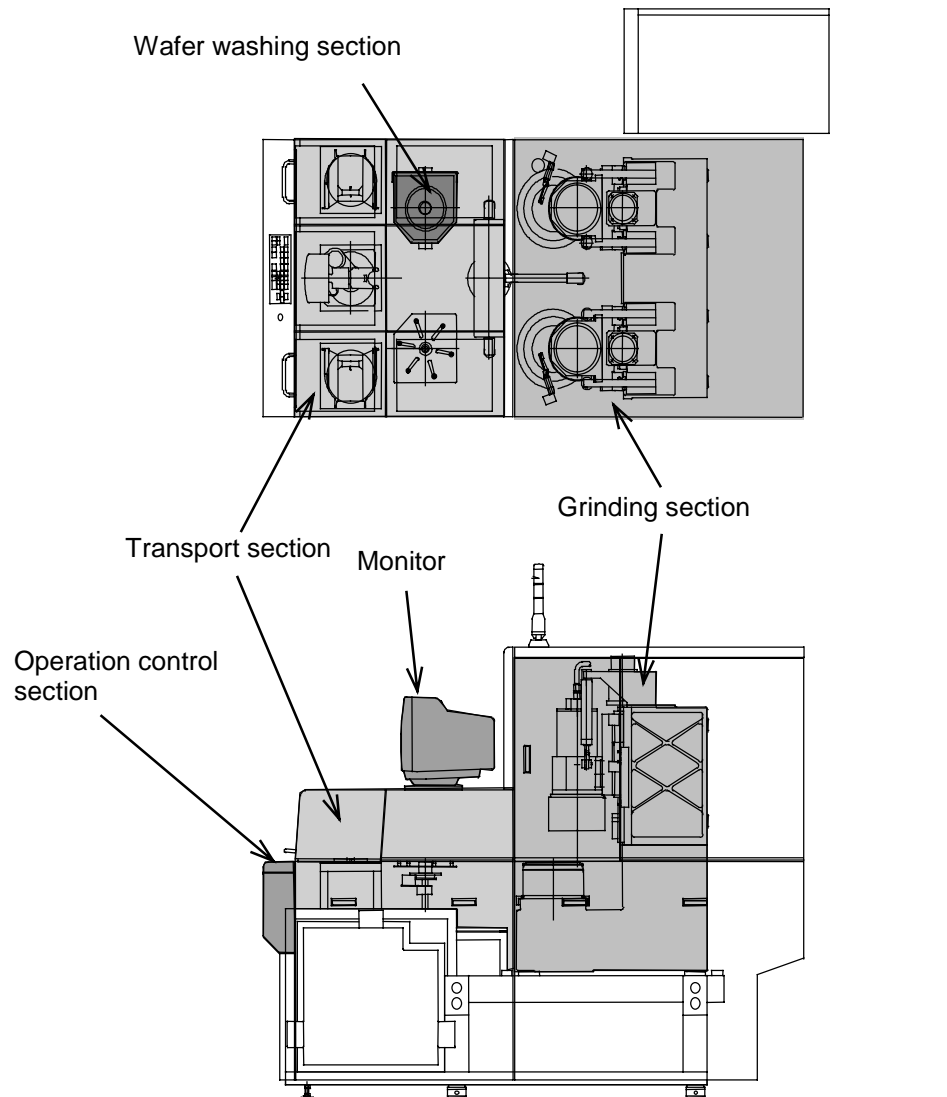
Name	Function
Operation control section	Through its operation panel, inputs machine data and manipulates various operations.
Monitor	Displays the various screens operated from the operation panel.
Transport section	- Takes out wafers from the cassette to transport them to the grinding section. - Returns the ground wafers back into the cassette.
Wafer washing section	Washes the ground wafers on the spinner table.
Grinding section	Grinds wafers.

External view (Machine front-side and rear-side)

The external views of the machine front-side and rear-side are described here.

Front cover

EMO switch

Vacuum/coolant unit exhaust port
(User-specified spec.)

Vacuum/coolant unit
water supply port

Wheel coolant water/cleaning
water supply port

Main duct port

Vacuum/coolant unit
drainage port

Spindle coolant
water supply port

Main air supply port

Wheel coolant
water/cleaning water
drainage port

Spindle coolant
water drainage port

Vacuum/coolant unit
drain-pan drainage port

Name	Function
EMO switch	Switch used to shut OFF the machine power when the machine becomes faulty or acts abnormally.
Front cover	Inside of this cover are the meters and gauges of the machine.
Vacuum/coolant unit exhaust port (User-specified spec.)	Exhaust port of the vacuum/coolant unit
Vacuum/coolant unit water supply port	Water supply port of the vacuum/coolant unit

External view (Machine front-side and rear-side) (Continued)

Name	Function
Wheel coolant water/cleaning water supply port	Supply port of wheel coolant water and cleaning water (Vacuum/coolant unit)
Vacuum/coolant unit drainage port	Drainage port of the vacuum/coolant unit
Spindle coolant water supply port	Supply port of spindle coolant water
Vacuum/coolant unit drain-pan drainage port	Drainage port of the vacuum coolant unit drain-pan
Spindle coolant water drainage port	Drainage port of spindle coolant water
Main air supply port	Supply port of main air
Wheel coolant water/cleaning water drainage port	Drainage port of wheel coolant water and cleaning water
Main duct port	Duct port of the machine main body

External view (Machine top side and right side)

The external views of the machine top-side and right-side are described here.

Vacuum/coolant unit

EMO switch

Operation panel

EMO switch

EMO switch

Z-axis side cover

Pilot lamp

monitor

Cassette cover
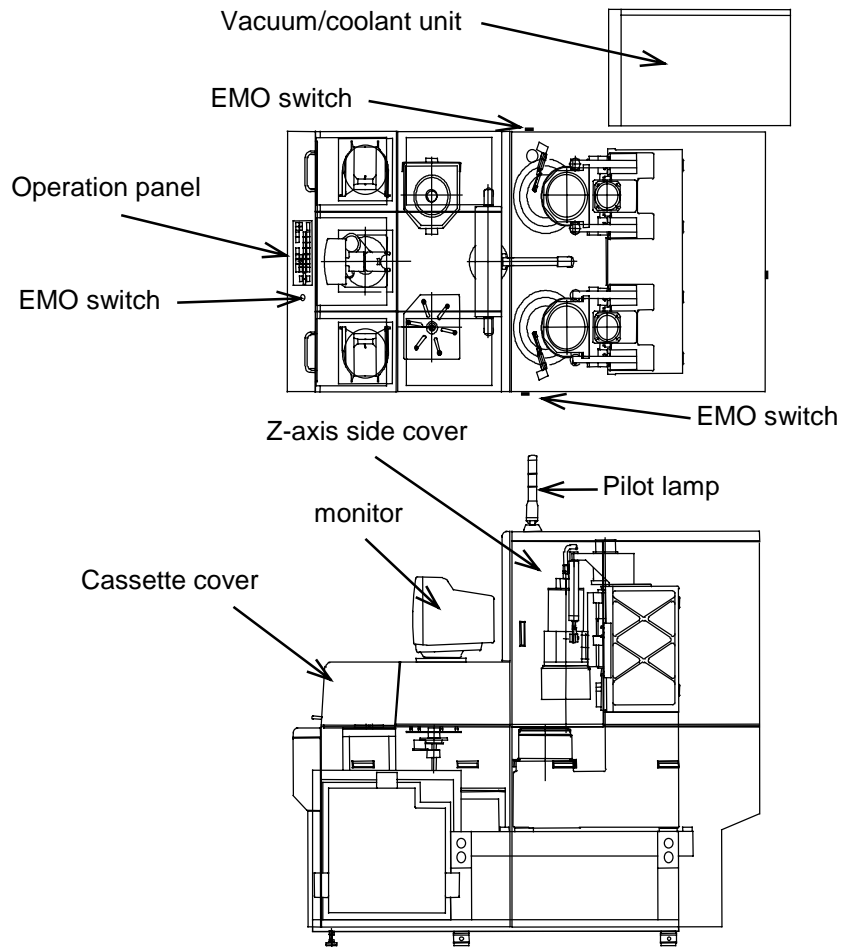
Name	Function
Operation panel	Operating control key panel.
EMO switch	Switch used to shut OFF the machine power when the machine becomes faulty or acts abnormally.
Vacuum/coolant unit	- Produces a vacuum and supplies it to the machine main body. - Pressurizes wheel coolant water and supplies it to the machine main body.
Cassette cover	Functions as a safety device.
Monitor	Displays the various operation screens used to operate the machine.
Z-axis side cover	Functions as a safety device.
Pilot lamp	The green and yellow lights of the pilot lamp indicate the operating status of the machine. The red light flashes when an error occurs.

Gauges and meters inside the front cover

Z1 wheel coolant flowmeter

Z2 chuck table vacuum gauge

Z1 height gauge adjustment dial

Z2 wheel coolant flowmeter

Spinner table vacuum gauge

POWER lamp

Robot pick vacuum gauge

Z1 chuck table vacuum gauge

Manual keyboard connection terminal

Main vacuum gauge

Main switch

T-arm M pad vacuum gauge

Z2 height gauge adjustment dial

Floppy disk drive

T-arm L pad vacuum gauge

T-arm R pad vacuum gauge

Name	Function
Z2 wheel coolant flowmeter	Flow meter of Z2 wheel coolant water
Z1 wheel coolant flowmeter	Flow meter of Z1 wheel coolant water
POWER lamp	Lamp that lights while the machine power is turned ON.
Spinner table vacuum gauge	Gauge to indicate the vacuum pressure of the spinner table
Robot pick vacuum gauge	Gauge to indicate the vacuum pressure of the robot pick
Z2 chuck table vacuum gauge	Gauge to indicates the vacuum pressure of the Z2 chuck table
Z1 chuck table vacuum gauge	Gauge to indicates the vacuum pressure of the Z1 chuck table
Z1 height gauge adjustment dial	Adjustment dial for the Z1 height gauge.
Z2 height gauge adjustment dial	Adjustment dial for the Z2 height gauge.
Main vacuum gauge	Gauge to indicates the supply pressure of vacuum supplied from the vacuum/coolant unit.
Manual keyboard connection terminal	Terminal (front-side) for connecting the manual keyboard to individually operate such machine units as the robot, position table, T-arm and spinner table for maintenance purposes.

Gauges and meters inside the front cover (Continued)

Name	Function
T-arm R pad vacuum gauge	Gauge to indicates the vacuum pressure of the T-arm R pad (located at the right-hand side of the T-arm as viewed from the machine front side)
T-arm M pad vacuum gauge	Gauge to indicates the vacuum pressure of the T-arm M pad (located at the center of the T-arm as viewed from the machine front side)
T-arm L pad vacuum gauge	Gauge to indicates the vacuum pressure of the T-arm L pad (located at the left-hand side of the T-arm as viewed from the machine front side)
Main switch	Machine power switch. The switch key is inserted here to turn ON/OFF the machine power.
Floppy disk drive	External data storage device.

Machine components and their functions

The composing parts of the machine and their functions are described here.

Z2-axis

Spinner table

Z2 spindle axis

Cassette B

T-arm

Robot arm

Cassette A

Washing unit

Z1-axis

Position table

Height gauge

Electrical section
(Breaker box)

Z1 spindle axis

Chuck table

Electrical section
(Control unit)

Main body frame
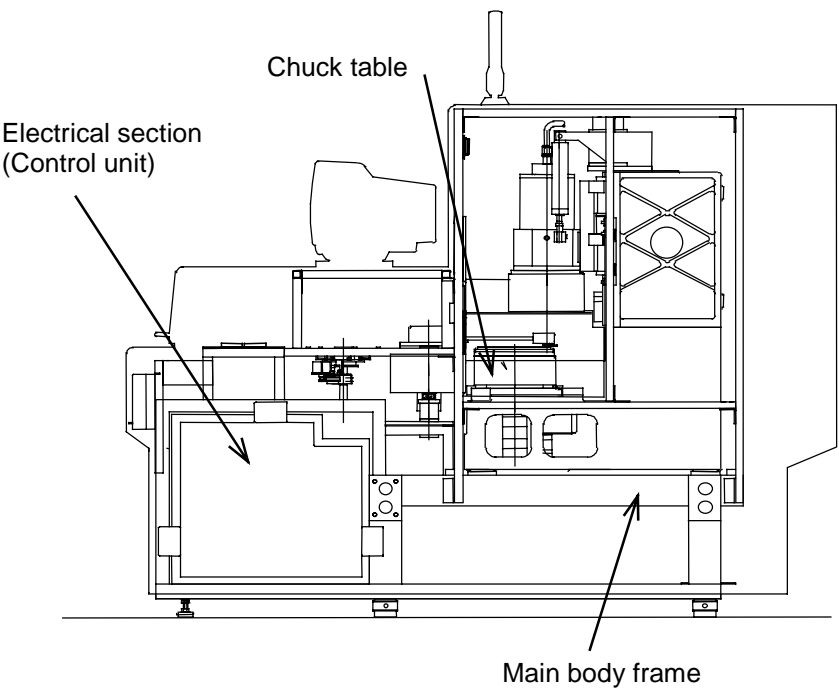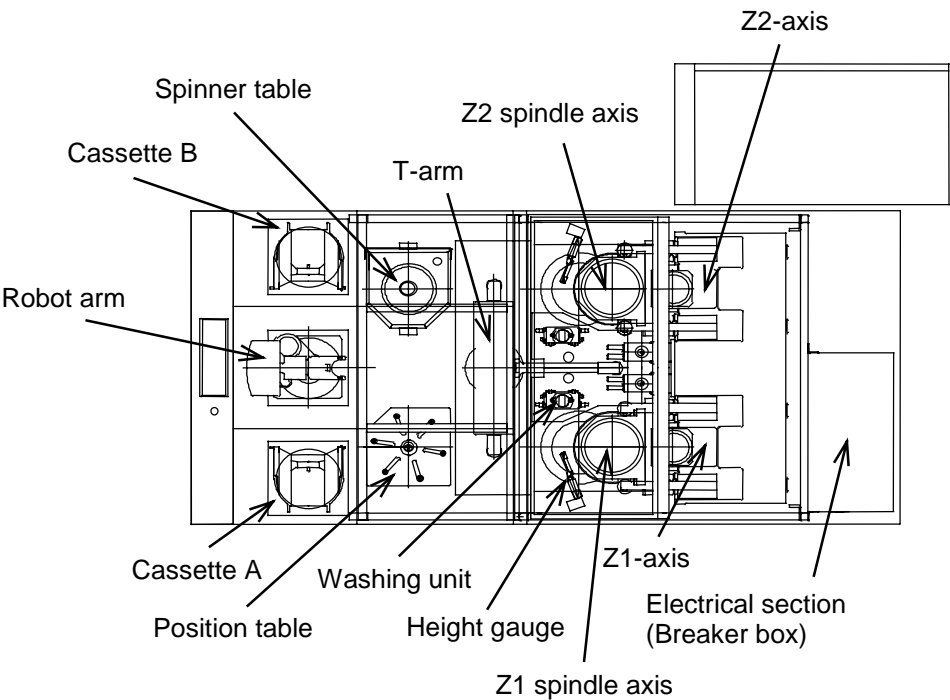
Machine components and their functions (Continued)

Name	Function
Robot arm	- Takes wafers (before grinding) out of the cassette to transport them onto the position table. - Stores the ground wafers (after they are washed and dried on the spinner table) into the cassette.
Cassette B	Platform onto which a cassette containing wafers to be ground is placed (left-hand side platform as viewed from the machine front side)
Spinner table	Table on which the ground wafers are washed and air-dried
T-arm	Transports wafers to/from the grinding section and between the Z1-side chuck table and the Z2-side chuck table.
Z1/Z2 spindle axis	Rotates the wheel mounted on its end to grind wafers.
Z2-axis	Moves the Z2 spindle axis up and down.
Electric section	Electric section to control the machine movements.
Z1-axis	Moves the Z1 spindle axis up and down.
Height gauge	Measures the thickness of wafers in the grinding process.
Washing unit	Washes the chuck table surface.
Position table	Table on which wafers are centered
Cassette A	Platform onto which a cassette containing wafers to be ground is placed (right-hand side platform as viewed from the machine front side)
Chuck table (Z1-side / Z2-side)	Table on which wafers are ground. The chuck table rotates while a wafer is ground on it.
Main body frame	Supports the machine main body.

CONTENTS

CONTENTS

CONTENTS

E. PARAMETERS E-1

F. DATA AND FILE MANAGEMENT....................... F-1

CONTENTS

G. PROGRAM SETUP SAMPLES G-1

INDEX Index-1

ADDRESS LIST

IN AN EVENT OF AN ACCIDENT

A. IMPORTANT SAFETY INFORMATION

Contents of this chapter

This chapter describes about the various precautions to be observed for safety assurance when you handle the machine, as well as the protective mechanisms incorporated into the machine.

Section No.	Title	Contents
1	General Safety Precautions	- Overall safety precautions to be fully understood before you handle the machine. - Overall safety precautions to be observed when you handle the machine.
2	Safety Precautions in Operating the Machine	- Safety precautions to be fully understood before you operate the machine. - Safety precautions to be observed when you operate the machine.
3	Inherently Hazardous Areas and Ways to Avoid Hazards	- Potentially hazardous sections of the machine and the ways to avoid hazards (explained by hazard type)
4	Emergency OFF Switch (EMO Switch)	- Explanation about the emergency OFF switch (EMO switch)
5	Power Circuit Breaker	- Explanation about the power circuit breaker
6	Interlock Mechanism	- Explanation about the interlock mechanisms incorporated into the machine
7	Safety Labels	- Types of the safety labels used for the machine - Locations of the safety labels attached to the machine

1. General Safety Precautions

General safety precautions

This section describes about the general safety precautions that should be understood and observed when you handle the machine.

NOTICE

- Responsibility of instructing workers
  Make sure to instruct the workers who operate or maintain the machine to thoroughly read the safety precautions set forth in the Data Maintenance Manual before proceeding to work. Also, if the workers perform various tasks, direct them to read the safety instructions set forth in the associated manuals as well.
  For this machine, the Installation Manual, Operation Manual, Data Maintenance Manual, Maintenance Manual, and Technical Reference are provided.

- Providing guidance to workers who seem to have difficulty in understanding safety instructions
  Thoroughly explain to workers who seem to have difficulty in understanding the safety instructions set forth in Chapter A of this manual until they full grasp their meanings.

- Periodical inspection
  The machine must be inspected on a periodic basis.
  If any accidents occur while an appropriate periodic inspection program is not adhered to, DISCO shall assume no responsibility for any consequences arising therefrom.

- Maintenance personnel
  Machine maintenance must be carried out by the qualified maintenance personnel who have completed DISCO's training program.

- Installing safety devices without fail
  If any parts or covers incorporating safety interlocks (automatic stop function, etc.) are broken, immediately stop operating the machine and contact your nearest DISCO office or DISCO service office.

- Air exhaust, water drainage, and contamination (cutting dust) control
  Due to the nature of its processing characteristics, the machine may produce harmful substances depending on the types of the wafers it grinds. Air exhaust, water drainage, and contamination control/disposal must be properly implemented in compliance with the applicable environmental protection codes.

NOTICE

- Terminals for interlock connection with plant facility side (user-specified spec.)

  To allow the plant facility side to have the interlock mechanisms for air exhaust and water drainage control, this machine is equipped with the terminals for making interlock connection with the plant facility side. For details of the interlock connection, contact your nearest DISCO office or DISCO service office.

- Machine installation environment
  If the employed machine installation environment does not comply with DISCO's recommendations, rust formation may be incurred by moisture condensation or other unfavorable elements to the detriment of grinding accuracy. It is therefore essential that the recommended machine installation environmental conditions (room temperature, humidity, wheel and spindle coolant water temperatures, etc.) be complied with.
  For the recommended environmental conditions, refer to section 1, [Specifications and Environmental Requirements of the Machine] in chapter C of the Installation Manual.

- Machine transfer/disposal
  When it is necessary to transfer or dispose of the machine, contact your nearest DISCO office or DISCO service office. Disco will provide you with detailed information and precautions required in carrying out such works.

2. Safety Precautions in Operating the Machine

Safety precautions to be observed in operating the machine

This section describes about the safety precautions that should be fully understood and observed when you operate the machine.

> ⚠ WARNING
>
> - Wheel section
>   The wheel has a sharp blade edge. If your hands or fingers come into contact with it, they may be wounded or cut off. Do not place your hands or fingers beneath the wheel. While the spindle rotates, do not touch the wheel nor attempt to open the wheel cover.
>   Note that it takes up to 15 seconds for a rotating spindle (7000 min^{-1}(rpm)) to come to a standstill. It is also well to remember that once the spindle enters the free-running state (in which the rotation cannot be braked) due to power failure or error occurrence, it continues to run for about 30 minutes. Never position your hands in the spindle section.
>
> - Use of Air
>   The only gaseous material allowed to be used with this machine is air. If nitrogen (N_2) or other gas is used instead of air, it may fill the machine room and cause oxygen deficiency for breathing, thereby incurring serious personal illness or death.
>
> - Use of water
>   The only liquid material allowed to be used with this machine is water. Using other liquid than water may bring about detrimental effects on your health. If any harmful liquid contacts your skin or you inhale its vapor, it could cause serious illness or death. It may also corrode the machine to invoke abnormal movements.
>
> - Movable parts
>   If your hands or fingers are positioned in a drive section in action, they may be caught or cut off. While a drive section is operating, do not touch it. Also, avoid placing your hands or fingers in an operating space of movable parts.
>
> - Robot section/wafer transport section
>   If your hands or fingers are positioned in the robot section or wafer transport section in action, they may be caught or cut off. Keep your hands and fingers away from such sections or their operating space while they are in action.
>
> - Air supply ON/OFF during machine power OFF
>   Even if the machine power is turned OFF, the air-operated parts of the transport section and the spinner section may move when you turn ON/OFF the air system.
>   Keep your hands and fingers away to prevent them from being caught or cut off from those air-operated parts and their operating spaces when you turn ON/OFF the air system.

⚠ WARNING

- Spinner and chuck table rotary sections
  If your hands or fingers are positioned in the rapidly rotating spinner or chuck table section, they may be wounded or cut off. Do not place your hands and fingers in such sections.

- Spinner cover
  The spinner cover moves up and down. If your hands or fingers are positioned in the spinner cover section in action, they may be caught or cut off by the moving cover. While the spinner cover is operating, keep your hands and fingers away from it or its operating space.

- When the machine or floor is wet with water
  Operating the machine while its interior or floor is wet with water may cause an electric shock hazard that could result in serious injury or death. If the machine or floor is wet with water, shut off electrical power supply at the circuit breaker of this machine and at the facility power source, lock them out with padlocks or the like, and wipe the machine and floor dry. Do not turn ON the facility-side power supply until the machine and floor completely dry.

- Emergency OFF switch (EMO switch)
  When the emergency OFF switch (EMO switch) is pressed, the machine power is turned OFF. However, a hazardous voltage still remains in the machine even after the machine power is turned OFF. Do not position your hands in an energized section as you may get an electric shock that could result in serious injury or death. When you perform a maintenance work, shut OFF the facility side power first.

- Power circuit breaker lever lockout
  When you perform a maintenance work with the machine power turned OFF, lock out the power circuit breaker lever of the machine with a padlock or the like to prevent the machine from being inadvertently activated by other persons.
  1) Turn the machine main switch key to "OFF" position and pull the key out.
  2) Turn the power circuit breaker lever on the rear of the machine to "OFF" position.
  3) Lock out the breaker lever with a padlock or the like.

[Standard type]   [SEMI type]

Breaker lever   Breaker lever

⚠ WARNING
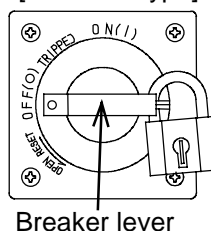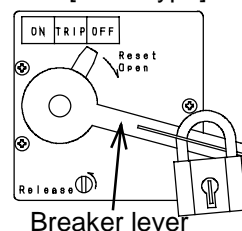
- Provision of the work step
  The EMO switches provided on each side (1 each) and on the rear
  side (1) of the machine are positioned relatively high to reach.
  Use adequately wide (flat) steps as needed during maintenance so
  that the EMO switches are easily accessible all the time.

- Machine with UPS unit (optional accessory)
  Even if the facility-side power is turned OFF, a hazardous voltage
  still remains in the machine equipped with the uninterruptible power
  supply unit (UPS). Never position your hands or fingers in an
  energized section of the machine, or you may receive an electric
  shock that could result in severe injury or death.

- Maintenance key storage
  The machine has the interlocked Z-axis side covers and breaker
  box cover that are locked by the maintenance key. This key must
  be stored with due care by the qualified maintenance personnel.
  Performing of the maintenance works that require the use of the
  maintenance key must be carefully performed by the qualified
  maintenance personnel.

- Broken wafer removal and cleanup
  When you remove a broken wafer or clean the affected area, wear
  protective gloves and goggles and use tweezers. If you perform
  such works with bare hands, your hands or fingers may be cut or
  stuck.
  Before proceeding with the works, turn OFF the machine power and
  make sure that all axes are brought to a stop.

⚠ CAUTION
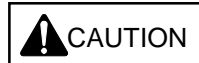
- Convenience power outlet within the machine
  The convenience power outlet within the machine (an extra power
  outlet provided inside the machine) should be used for DISCO-
  designated ancillary equipment only.
  If any equipment other than the specified ancillary equipment is
  connected to the convenience power outlet within the machine, the
  power supply to the machine may become inadequate or the
  machine may malfunction to incur an accident.

⚠CAUTION
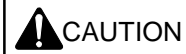
- If the operation panel is wet with water
  The operation panel is waterproofed. However, if the machine is
  operated while the operation panel is considerably wet with water,
  electric leakage may occur to invoke erratic machine movements,
  thereby causing an accident.
  If the operation panel is wet, immediately wipe it dry with a dry
  cloth.

CAUTION

- Turning the power back ON
  When turning ON the machine power, be sure that at least one
  minute has elapsed since the last power OFF. If the power is turned
  ON/OFF successively, the hard disk or other machine components
  may fail.

- Spindle seizure
  If air supply is shut off during spindle rotation, the spindle seizes up.
  Be sure to stop spindle rotation before shutting off the air supply.

- Spindle idling before machine shut off
  The spindle section is designed so that the spindle shaft is lifted by
  means of air. If the spindle is stopped without being allowed to idle
  or stopped with air supply immediately turned OFF, grinding dust
  may adhere to the spindle section, causing the spindle to gall.
  Before stopping spindle rotation for machine shutoff, allow it to idle
  for at least 10 minutes with the wheel coolant system turned ON.
  Then, stop the spindle and place the machine in the stand-by
  condition for 10 minutes with the wheel coolant system turned OFF
  but the air blow system turned ON.

- Wheel installation/removal
  The wheel installation/removal work itself could cause the spindle to
  gall. Make sure that air is kept supplied to the spindle while the
  wheel is installed or removed. Also be careful not to exert any force
  to the spindle in its axial direction.

NOTICE

- Coping with abnormal machine movements
  If the machine acts abnormally, its investigation, adjustment, and repair must be carried out by qualified maintenance personnel.

- Cautioning against power/air/water supply ON/OFF by irrelevant persons during machine operation or maintenance
  While operating or servicing the machine, be sure that the power, air, or water supply system is not turned ON/OFF by other persons. This precaution must be strictly observed particularly when the machine shares the same facilities with other equipment.

- Spindle free-run
  To prevent the spindle from entering into the free-running state (in which the rotation cannot be braked), make sure to stop spindle rotation before turning OFF the machine power.

- Related equipment power OFF
  Before troubleshooting or repairing the machine with its power turned OFF, turn OFF the power of the electrically connected equipment as well.

- Tools/materials storage
  Make sure that no tools or materials are inadvertently left inside the machine.

- Installation space
  When installing the machine, be sure to secure an adequate maintenance space. Ensure that nothing is placed in the maintenance area.

3. Inherently Hazardous Areas and Ways to Avoid Hazards

Summary of this section

This section illustrates the inherently hazardous sections of the machine and describes the ways to avoid such potential hazards by hazard type.

Section No.	Title
3-1	Locations and Preventive Measures of Operation-related Potential Hazards
3-2	Locations and Preventive Measures of Maintenance-related Potential Hazards

3-1. Locations and Preventive Measures of Operation-related Potential Hazards

Summary of this section

This section describes the locations where operation-related mechanical hazards may be latent and the measures to prevent them by hazard type.

Hazardous sections where your hands or fingers may be caught or cut off

Hazardous sections where your hands or fingers may be caught or cut off are shown in the following figure. Measures to avoid such hazards are also described.

Hazardous sections where your hands or fingers may be caught or cut off

The machine has the cassette covers that move up and down.
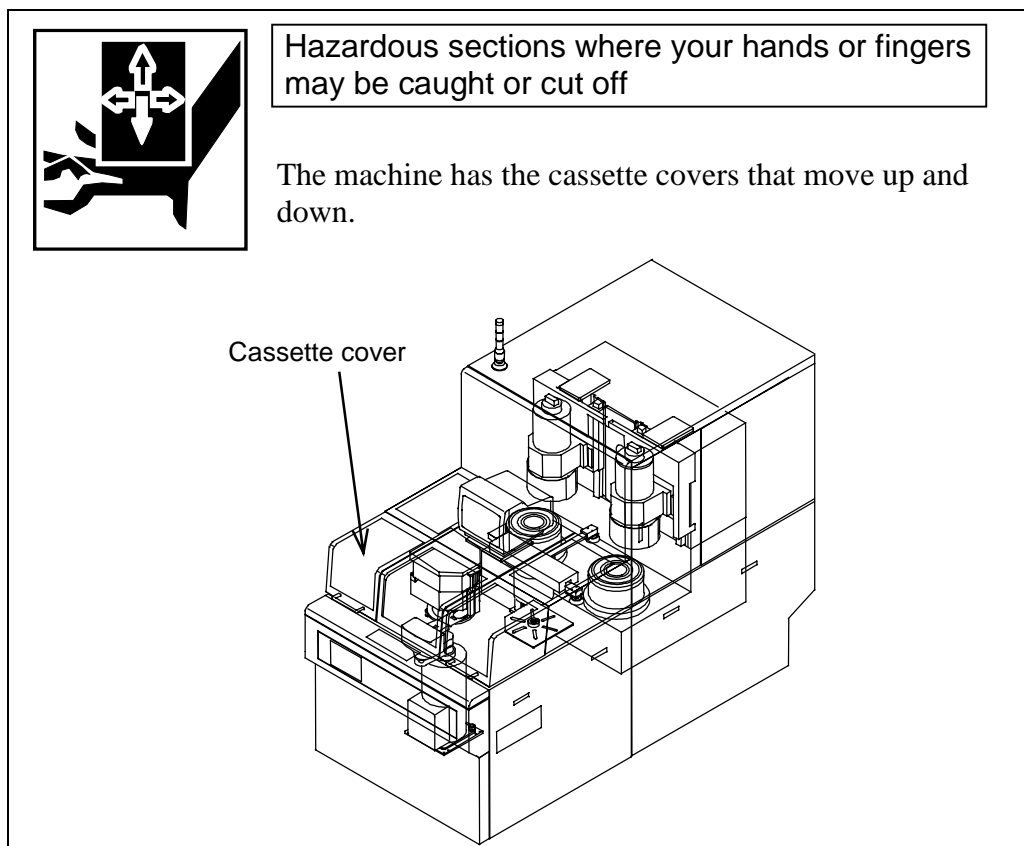
Cassette cover

Inherently hazardous area	Cassette covers
Cause of hazard	If you place your hands or fingers under the cover when the cassette cover opens/closes, they may be caught or cut off by the cover.
Avoidance method	When you open the cassette cover, make sure that the opened cover is completely stopped.

3-2. Locations and Preventive Measures of Maintenance-related Potential Hazards

Summary of this section

This section describes the locations where maintenance-related mechanical hazards may be latent and the measures to prevent them by hazard type.

Hazardous locations inside the machine outer covers

There are the locations inside the machine outer covers where catching, cutoff, capture, or electric shock hazards may be latent as shown in the figure below.

Hazardous locations inside the machine outer covers

Machine outer cover removal reveals hazardous sections of the machine where parts of your body or clothing may be captured, cut off, and caught or you may receive an electric shock.

[1]: Catching/cutoff hazard locations

[2]: Capture hazard locations

[3]: Electric shock hazard locations

Cut-off hazard locations in the machine are shown in the following figure. Measures to avoid such hazards are also described.

Cut-off hazard locations in the machine

The machine has the spindle axes (wheel section) which rotate in high speed.

Z2 spindle axis (wheel section)

Z2-axis side cover

Z1 spindle axis (wheel section)

Z1-axis side cover

Inherently hazardous area	Spindle axis (wheel section)
Cause of hazard	If your hands or fingers are placed in the spindle section when the spindle is rotating or moving up and down, they may be cut off.
Avoidance method	It takes up to 15 seconds for a rotating spindle (7000 min^{-1}(rpm)) to come to a standstill. When you open the grinding section side cover, wait for at least 15 seconds after stopping spindle rotation. Also make sure that spindle rotation is completely stopped when you open the wheel cover.

Catching and cut-off hazard locations in the machine are shown in the following figure. Measures to avoid such hazards are also described.

Catching/cut-off hazard locations in the machine

The machine has drives in such sections as the Z1-axis, Z2-axis, T-arm, T-shutter, robot arm, washing unit, and spinner cover sections.
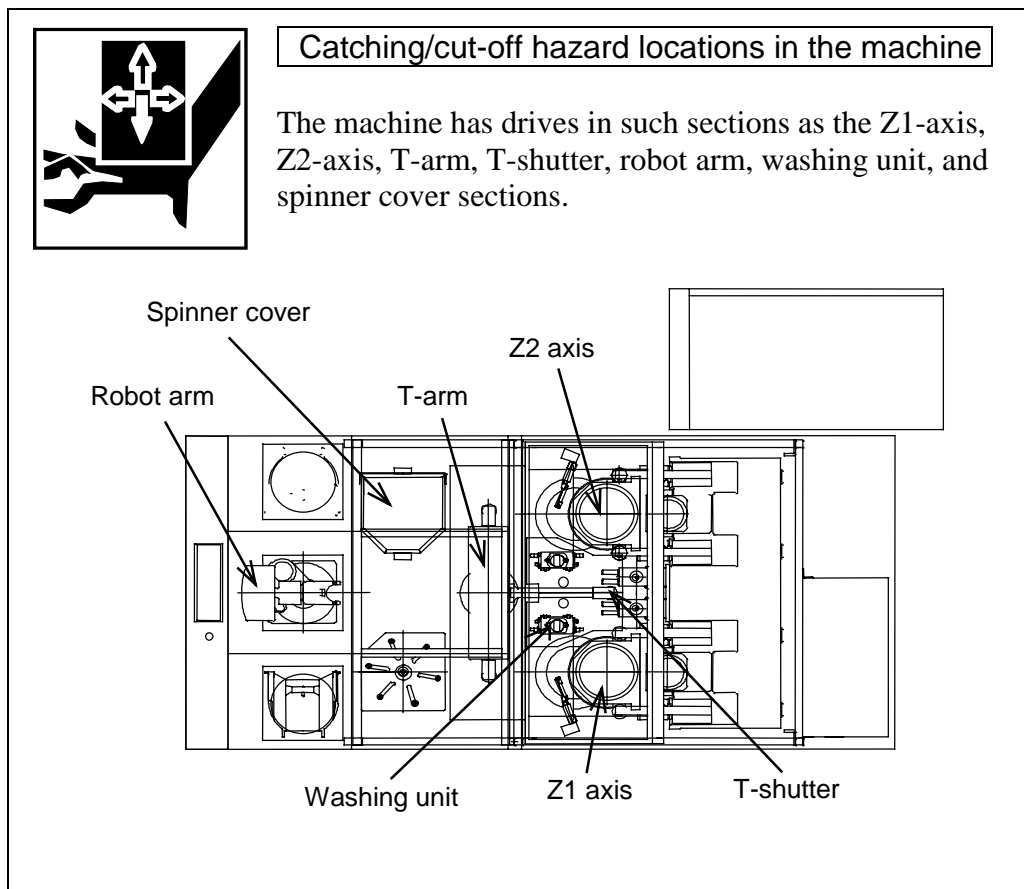
Inherently hazardous area	- Z1-axis / Z2-axis
	- T-arm rotating area
	- T-arm extension/contraction area
	- T-shutter
	- Robot arm
	- Spinner cover vertical motion area
	- Washing unit drive area
Cause of hazard	If your hands or fingers are positioned in a motor-driven or air-cylinder operated section in action, they may be caught or cut off.
Avoidance method	Machine maintenance works must be performed by qualified maintenance personnel.
	Before performing a maintenance work, make sure that the motor driven or air-cylinder operated sections are brought to a complete stop.

Capture hazard locations in the machine are shown in the following figure. Measures to avoid such hazards are also described.

Capture hazard locations in the machine

The machine has rotary drives in such sections as the chuck table drive belt, position table gear, spinner nozzle turning gear, and spindle rotation measurement dog.

Spindle rotation measurement dog

Spinner nozzle turning gear

Chuck table drive belt

Position table gear
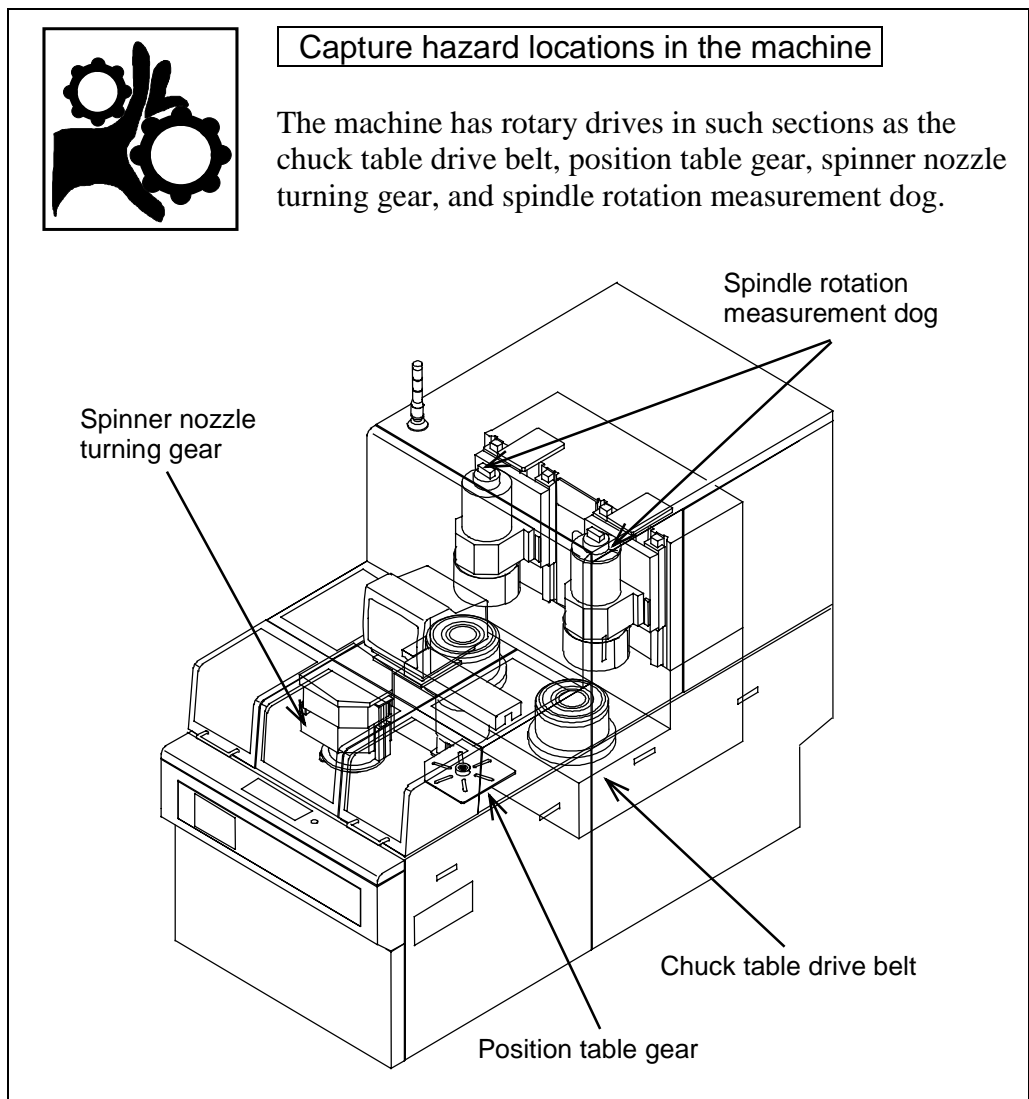
Inherently hazardous area	- Chuck table drive belt - Position table gear - Spinner nozzle turning gear - Spindle rotation measurement dog
Cause of hazard	If your hands or fingers are placed in a rotary section in action, they or your clothing may be captured. As a result, you may get severely injured.
Avoidance method	Machine maintenance works must be performed by qualified maintenance personnel. Before performing a maintenance work, make sure that the drive sections are brought to a complete stop.

Electric shock hazard locations in the machine are shown in the following figure. Measures to avoid such hazards are also described.

Hazardous sections where you may receive an electric shock

This machine has the breaker box, control unit, uninterruptible power supply unit (optional accessory), ionizer, and 100V table tap which potentially pose electric shock hazard.

Breaker box

Ionizer

100V table tap

Uninterruptible power supply unit [Optional accessory]
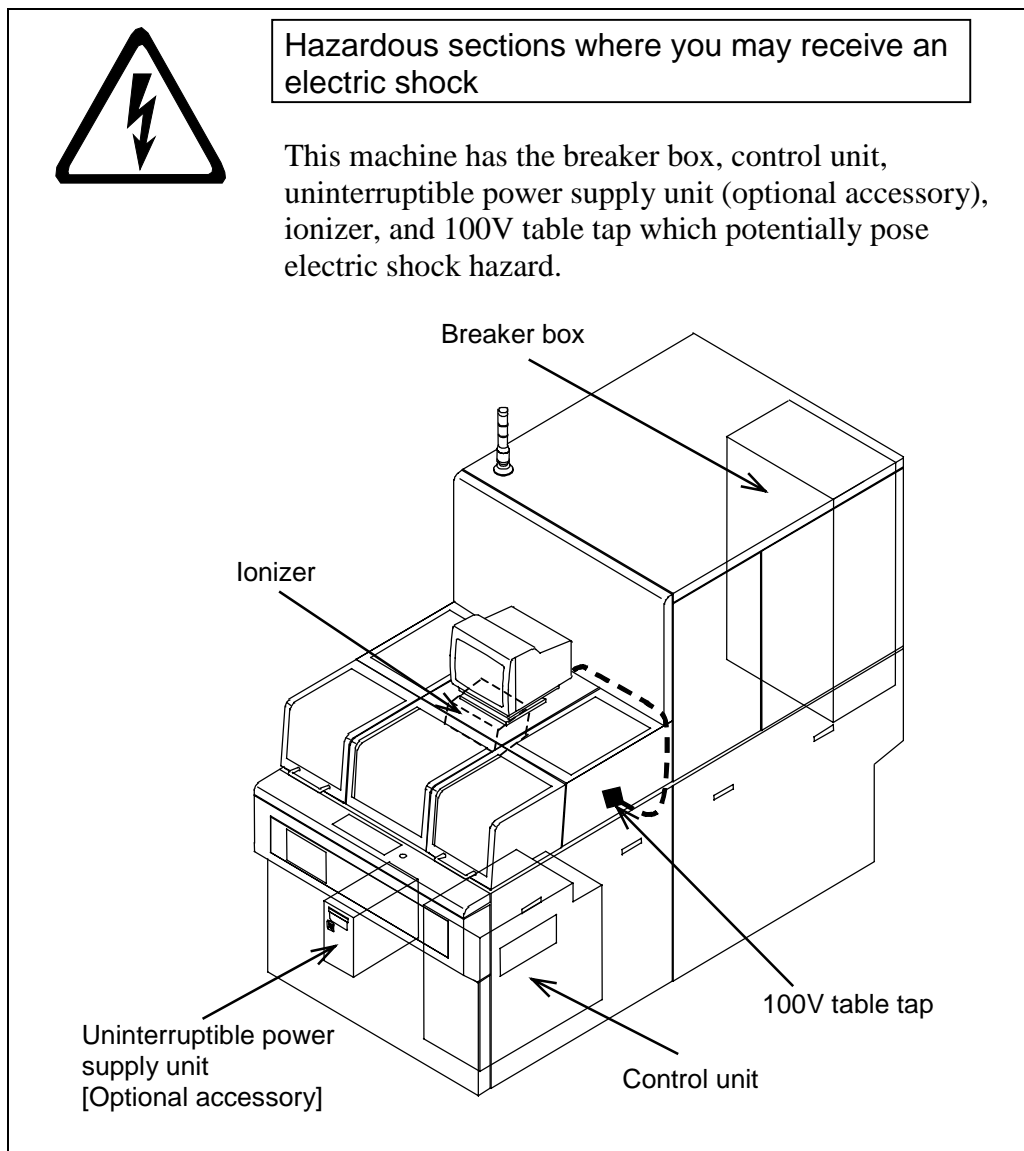
Control unit

Inherently hazardous area	- Breaker box - Control unit - Uninterruptible power supply unit [optional accessory] - Ionizer - 100V table tap
Cause of hazard	If you come into contact with an energized section, you may receive an electric shock that could be fatal.
Avoidance method	Before performing maintenance on any of the above units, turn OFF the facility-side power and lock it out with a padlock or the like instrument.

4. Emergency OFF Switch (EMO Switch)

Function of EMO switch

The EMO switch is a device to shut OFF machine power and avoid hazardous consequences when the machine becomes abnormal or faulty during its operation.

⚠ WARNING

- It takes up to 15 seconds for a rotating spindle to come to a stop. To open the grinding section side cover after the EMO switch is pressed, wait for at least 15 seconds. If your hands or fingers come into contact with a rotating spindle, they may be cut off.

- The machine power is automatically turned OFF upon emergency off switch activation. However, the power is still supplied to the main breaker primary side and the EMO circuit. Do not position your hands in an energized section, or you may receive an electric shock that could result in severe injury or death.

- The EMO switches provided on each side (1 each) and on the rear side (1) of the machine are positioned relatively high to reach. Use adequately wide (flat) steps as needed during maintenance so that the EMO switches are easily accessible all the time.

NOTICE

Once a spindle enters the free-running state (in which the rotation cannot be braked) due to power failure or error occurrence, it takes about 30 minutes for the spindle to come to a complete stop. Make sure that air supply is not stopped until the spindle completely stops rotating.

To activate EMO switch	Press the EMO switch button.
To reset EMO switch	Rotate the EMO switch button clockwise (in the direction of the arrows). The switch then pops up to clear the emergency OFF condition.
What will happen after EMO switch is pressed	The following process follows EMO switch activation. It takes about 15 seconds for a rotating spindle to come to a complete stop.

EMO switch is pressed.

Spindle stop action → Spindles stop rotating. (15 sec.)

Wheel coolant OFF → Z1/Z2 axis retraction (0.2 mm up) → Machine power OFF (2 sec.)

EMO switch locations

The locations of the EMO switches are indicated here.

EMO switch

EMO switch
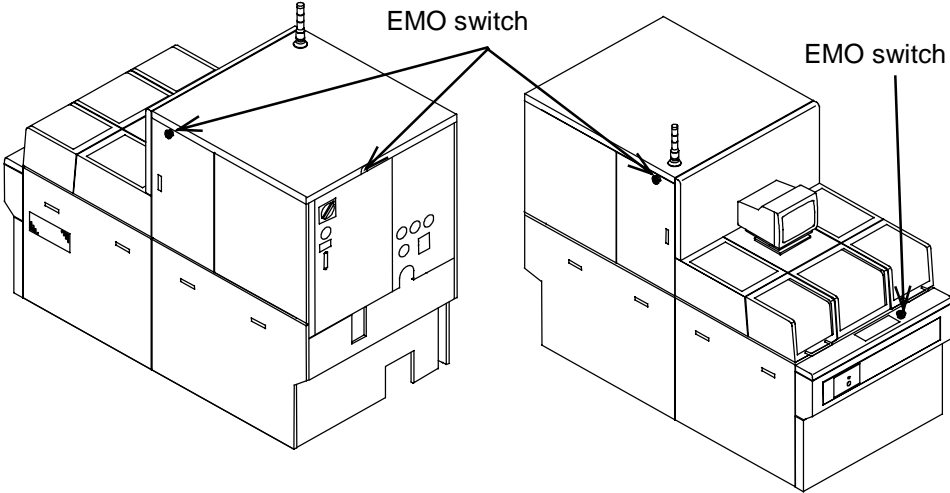
Energized lines during emergency power OFF

```
CB01 ─── NF0 ──────────────┬───── RY01 ──►

F101 ┬─ SL01               └───── RY02 ──►
F102 │
     └─ LCRY

┌───────────────────────────┘

CB02 ── TB03 ·············┐
     │                    UPS1
     └─ TB04 ············· (option)

   F103 ── T001 ── F105 ──┬── EMO      ┬─ KS01
   F104                   │  circuit   │
                          │            ├─ EMS1
   RY03 ──►               │  RY01      │
                          │  RY02      ├─ EMS2
                          │  RY03      │
                          │  RY04      ├─ EMS3
                          │  RY05      │
                          │  TRY1      └─ EMS4
                          │  TRY2
                          │  HM1
```

━━━━ Energized (200V line)

──── Energized (24 V line)

───► Not energized
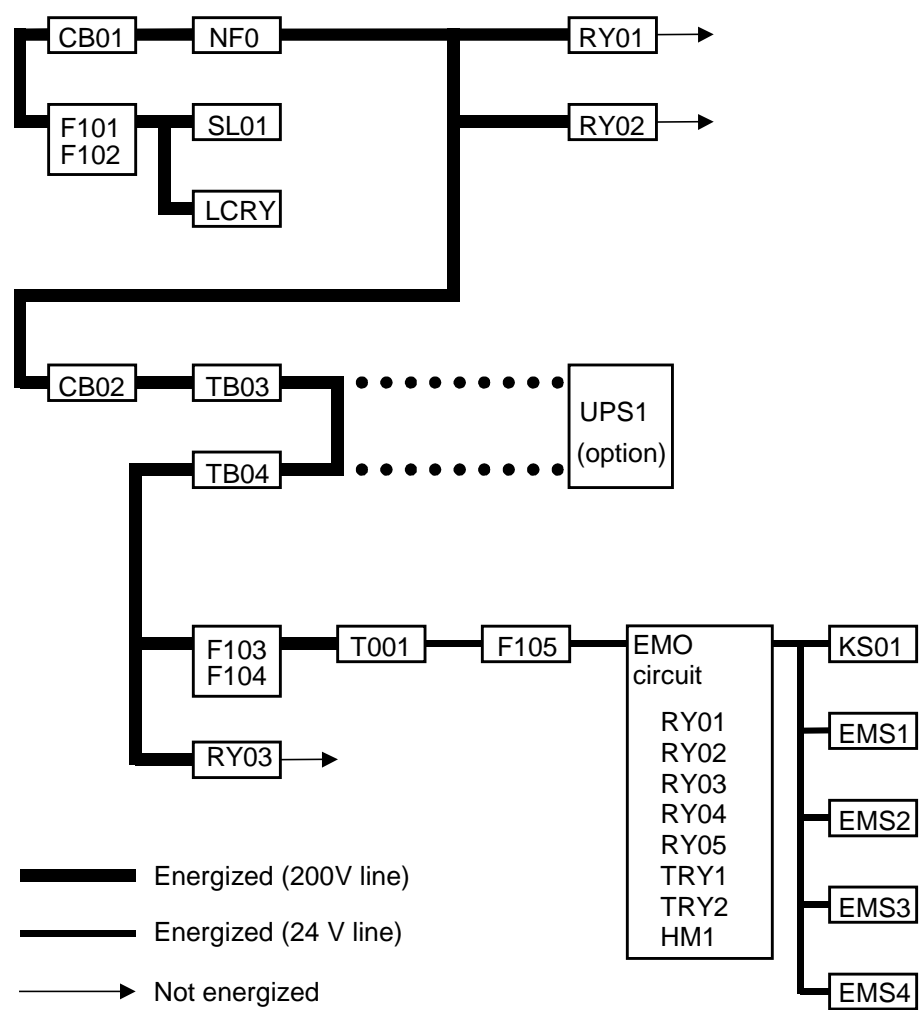
5. Power Circuit Breaker

About power circuit breaker

When a current beyond the rated capacity flows through the machine during its operation, the power circuit breaker automatically shuts OFF the power supply to the machine.

Specifications and ratings of power circuit breaker

Specifications and electrical ratings of the power circuit breaker of the machine are described here.

[Standard type]

[SEMI type]

Breaker lever

Breaker lever
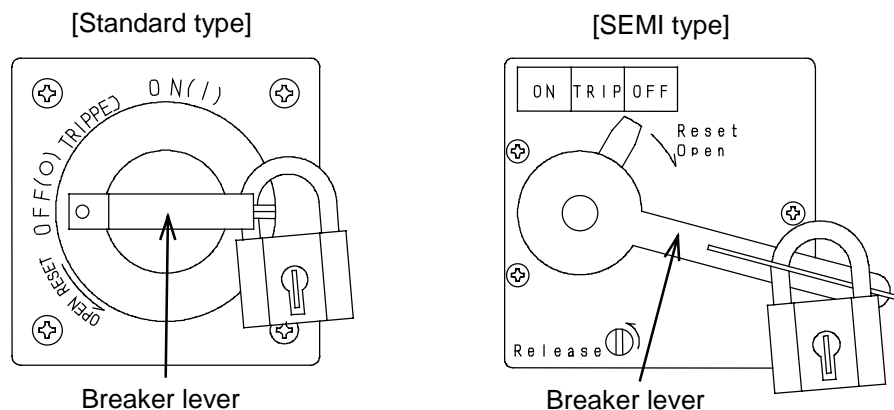
ON	Turns ON the machine power.
TRIPPED	If a larger-than-the-rated current is loaded, the breaker lever automatically moves to this position to turn OFF the machine power. (To turn the power back ON, move the lever to "OFF" position once and then move it to "ON" position.)
OFF	Turns OFF the machine power. To turn the power back ON, wait at least one minute and then move the lever to "ON" position.
OPEN/RESET	To open the breaker box, move the lever to this position and then pull it toward you.

[Electrical ratings of the breaker]

	Standard type	SEMI type
AC supply system	3-phase, 3-wire	3-phase, 3-wire
Number of poles	3	3
Rated current	60 A	60 A
Interrupting capacity	10 kA (at 230 VAC) (IEC947-2)	22 kA (at 240 VAC) (UL489)

Power circuit breaker lever lockout

Before you perform a maintenance work with the machine power turned OFF, lock out the power circuit breaker lever with a padlock or the like to prevent the machine from being inadvertently activated by other persons.

[Standard type]　　　　　　　　　　　　[SEMI type]

Breaker lever　　　　　　　　　　　　Breaker lever
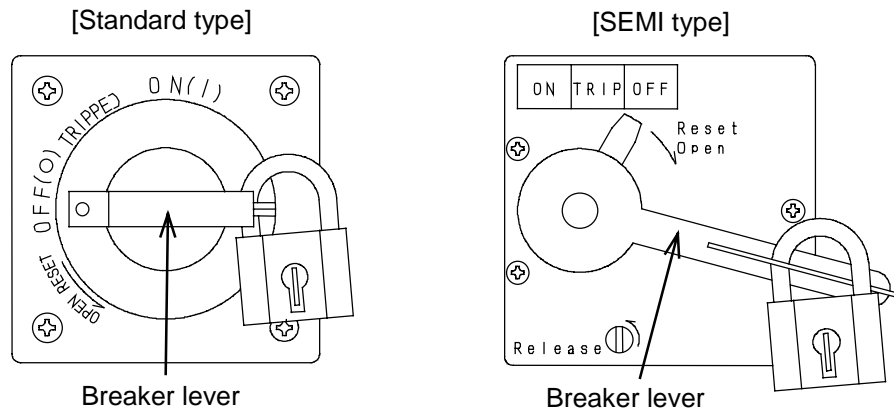
Power circuit breaker location

The location of the power circuit breaker is shown in the figure below.

Power circuit breaker
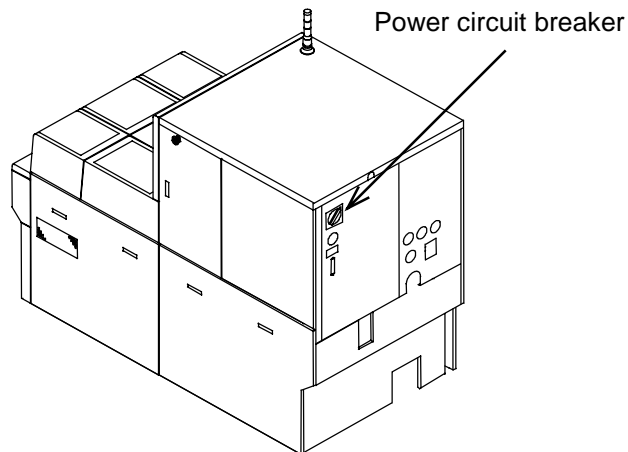
6. Interlock Mechanism

About interlock mechanism

The interlock mechanisms of the machine are the devices that detect impending hazards to avoid their consequences.
This section describes the locations of the interlocks in the machine as well as the contents of the hazards they detect.

⚠️ WARNING

- It takes up to 15 seconds for a rotating spindle to come to a standstill. Never position your hands or fingers near its rotary section while the spindle is still rotating. Before performing a maintenance or inspection work, make sure that spindle rotation is completely stopped.

- If any water leak is detected, keep away from the wet portions of the machine or floor, shut off the machine power and facility power supplies, and lock them out with padlocks or the like. If you come into contact with the machine body or the floor wet with water, you may receive an electric shock that could result in serious injury or death. Even if the machine is turned OFF, it remains energized until the facility-side power supply is shut OFF.

NOTICE

It takes up to 15 seconds for a rotating spindle (7000 min^{-1} (rpm)) to come to a standstill. Air supply must not be shut off until spindle rotation is completely stopped.

This machine incorporates the following switches and sensors that function as safety interlock mechanisms.

Z-axis
side-cover switch

Cassette
cover sensor

Z-axis
inner-cover switch

Chuck table
leakage-water
tank switch

Water case overflow
switch
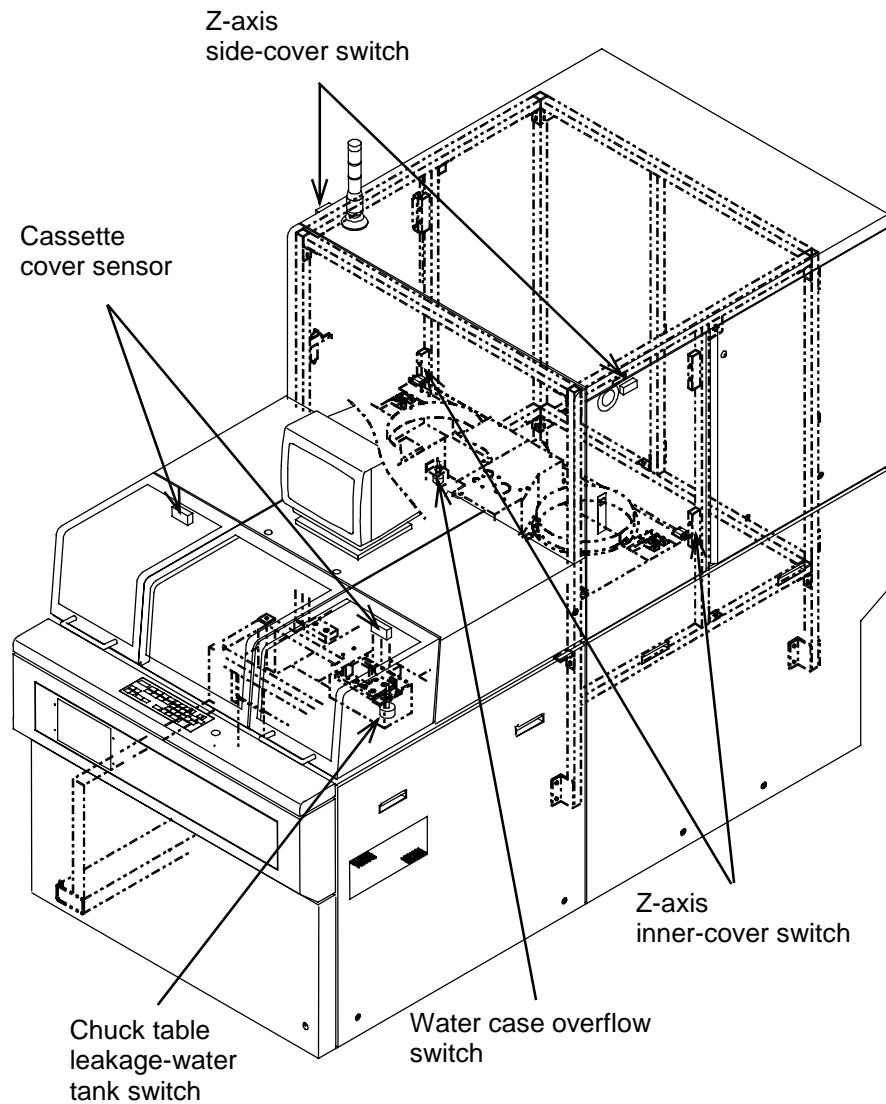
Contents of hazards detected by interlock devices

Hazards detected by the interlock devices of this machine are classified as follows. Actions taken by the machine upon hazard detection (during initialization, warming up and full auto operation) are also described.

Hazard detector	Hazard category	Hazardous section	Hazard level	Actions taken upon hazard detection
(1) Z-axis inner-cover switch	Cutoff hazard Catching hazard	- Spindle rotation section - Z1-axis drive - Z2-axis drive - T-shutter drive	[2]	- The Z1- and Z2-axes move upward to retreat. - The spindle rotation and wheel coolant supply systems come to an immediate stop. * It takes about 15 seconds for a spindle rotating at a speed of 7000 min^{-1} (rpm) to come to a standstill.
(2) Z-axis side-cover switch	Cutoff hazard Catching hazard	- Spindle rotation section - Z1-axis drive - Z2-axis drive - T-shutter drive	[2]	- The Z1- and Z2-axes move upward to retreat. - The spindle rotation and wheel coolant supply systems come to an immediate stop. * It takes about 15 seconds for a spindle rotating at a speed of 7000 min^{-1} (rpm) to come to a standstill.
(3) Cassette cover sensor	Catching hazard	- Robot drive	[2]	- The robot operation comes to an immediate stop.
(4) Water case overflow switch	Electric shock hazard due to water leakage	- Machine main body - Floor	[2]	- The Z1- and Z2-axes move upward to retreat. - The spindle rotation and wheel coolant supply systems come to an immediate stop. - Machine power is shut OFF.
(5) Chuck table leakage-water tank switch	Electric shock hazard due to water leakage	- Machine main body - Floor	[2]	- The Z1- and Z2-axes move upward to retreat. - The spindle rotation and wheel coolant supply systems come to an immediate stop. - Machine power is shut OFF.

The definitions of the detected hazard levels are as follows.
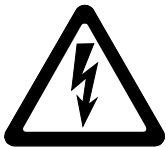
Hazard level	Hazard condition
[1]	A grave hazard to the human body exists (an impending hazardous situation which, if not avoided, will result in death or severe injury).
[2]	A hazard to the human body exists (a potentially hazardous situation which, if not avoided, may result in death or severe injury).
[3]	A hazard to the human body exists (a potentially hazardous situation which, if not avoided, may result in minor or moderate injury).

7. Safety Labels

About safety labels

The safety labels carrying hazard descriptions are attached to the locations in the machine where potential hazards exist and they are defined as follows.

Label	Hazard Level	Meaning of Label
Rotary Blade Label ⚠WARNING	⚠WARNING	There is a danger that your hands or fingers may be cut off by the rotating blade. Observe the following precautions for at least 15 seconds after stopping spindle rotation. - Do not position your hands or fingers near the wheel. - Keep the safety cover closed.
Capture Label ⚠CAUTION	⚠CAUTION	There is a danger that your hands, fingers or clothing may be captured and, as a result, wounded or cut off. Do not position your hands or fingers in any drive section.
Driving Section Label ⚠CAUTION	⚠CAUTION	There is a danger that your hands or fingers may get caught in a drive section. Do not position your hands or fingers in any drive section.
Electrical Shock Hazard Label	⚠WARNING	A risk of receiving an electric shock exists. Be alerted.
General Label	⚠WARNING	Warnings (including danger/caution) in general

Locations of labels for warning against rotary blade

Label position
(Both Z1- and Z2-axis sides)
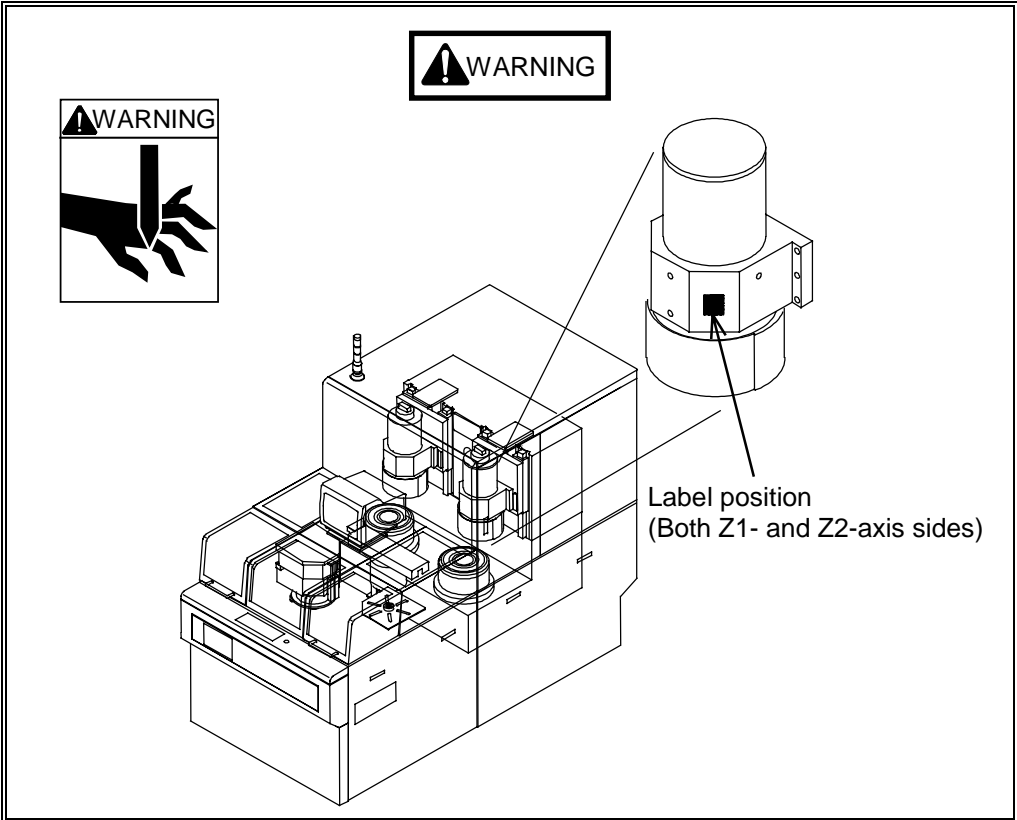
Locations of labels for cautioning against drive section

■ : Label position
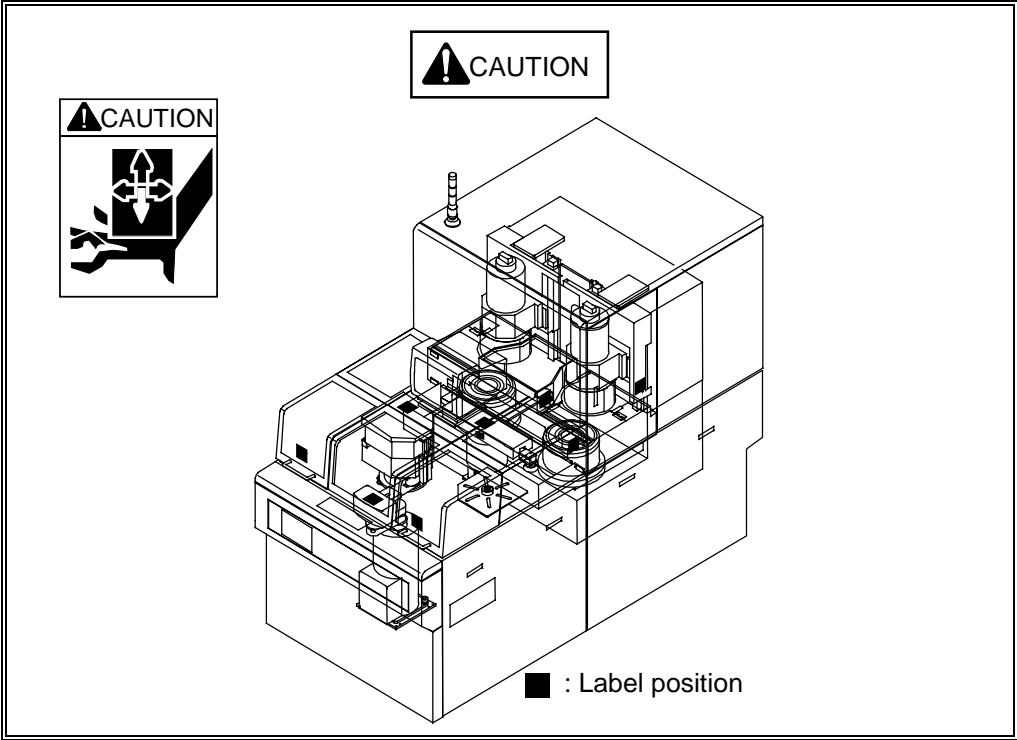
Locations of labels for cautioning against capture
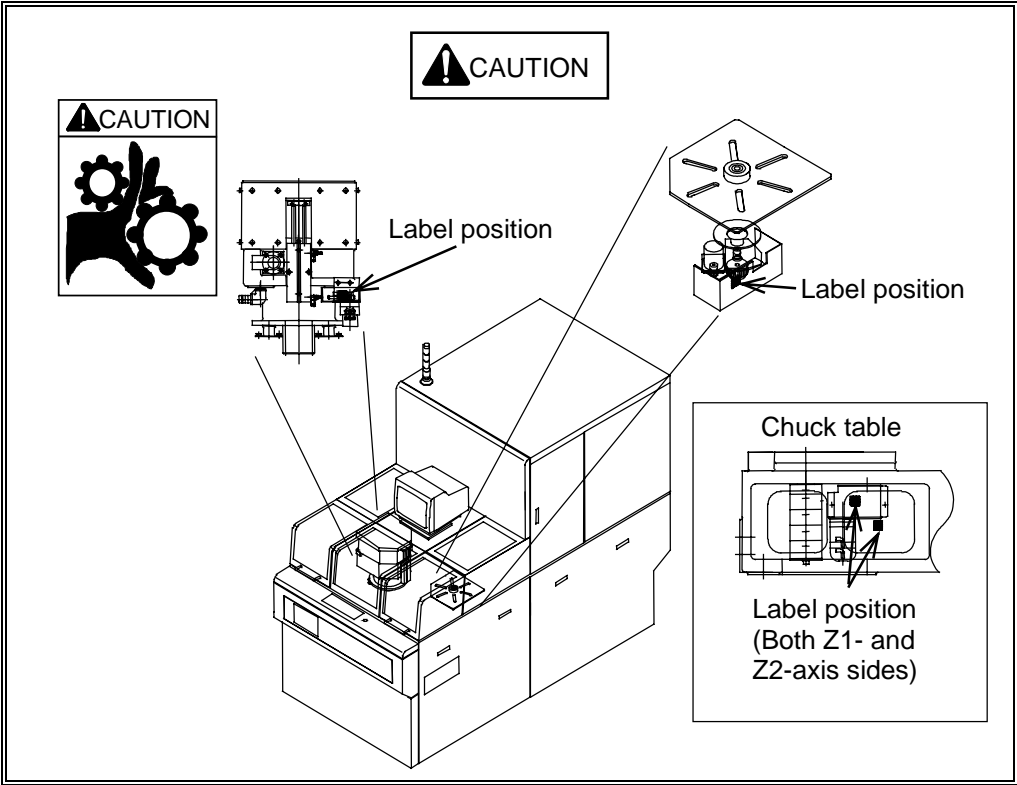
Locations of labels for warning against electric shock

Locations of general warning labels
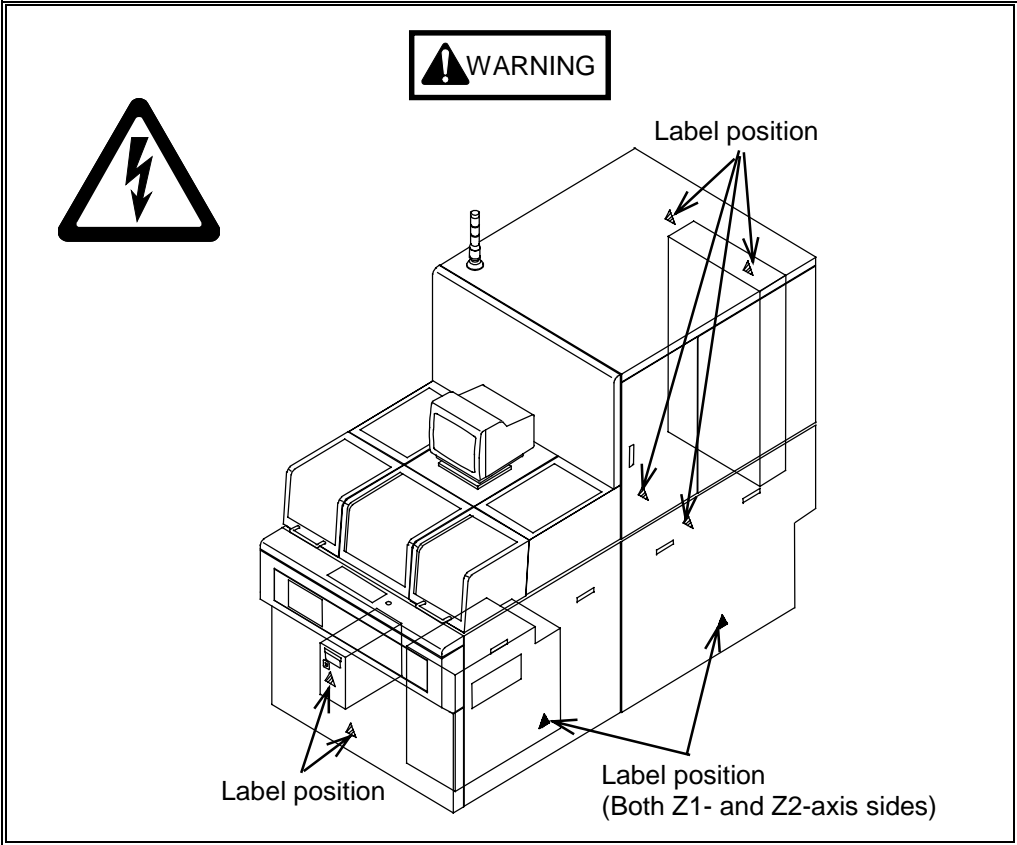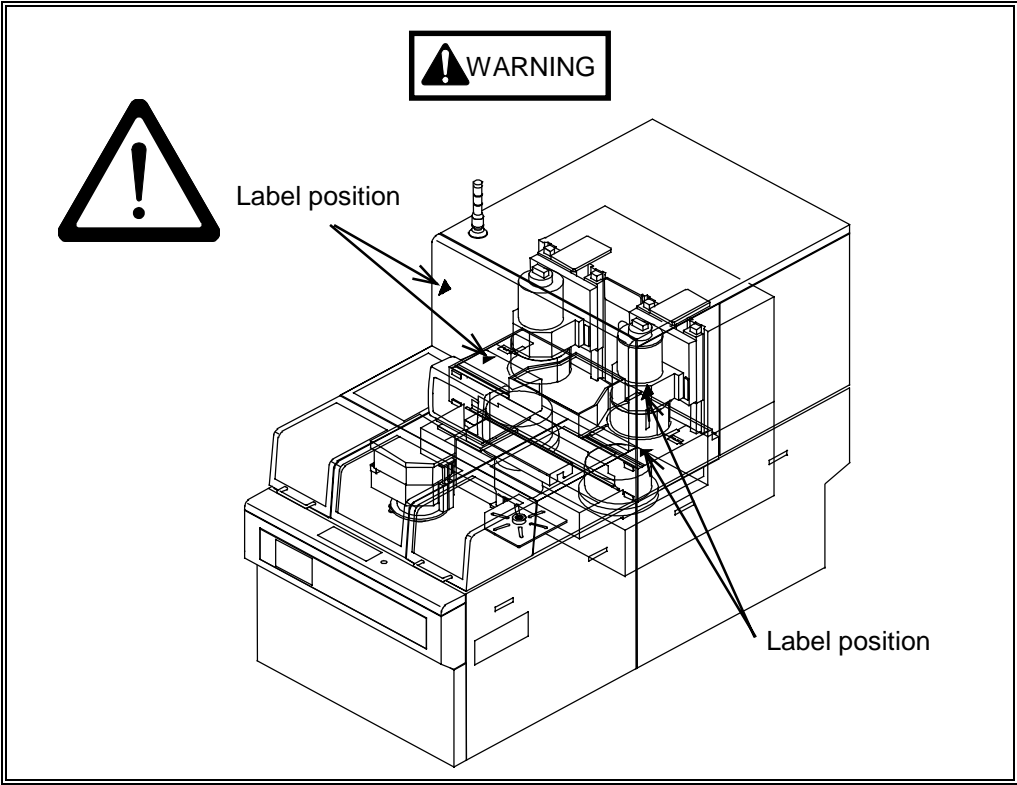
B. WHOM TO CONTACT IN AN EMERGENCY

Contents of This Chapter

This chapter shows addresses of DISCO offices to contact in an emergency. Immediately get in touch with the following nearest DISCO or DISCO Service Office if a situation arises where an accident has occurred or might occur that involves injury or death during the operation of DISCO equipment.

Section No.	Regions	Locations
1	JAPAN	Tokyo
		Osaka
		Kyusyu
		Sendai
		Suwa
		Nagoya
2	ASIA	Singapore
		Thailand
		Malaysia
		Philippines
		Korea
		Taiwan
		Hong Kong
		India
		China
3	U.S.A.	U.S.A.
		Canada
4	EUROPE	Germany
		France
		United Kingdom
		Israel

1. JAPAN OFFICE ADDRESS

JAPAN

DISCO CORPORATION

Japan Head Office	14-3, Higashi Kojiya 2-chome Ota-ku, Tokyo 144-8650 Phone 81-3-3743-0111 FAX 81-3-3743-5810
Overseas Sales / PS Company	Phone 81-3-3743-5813
Osaka Branch Office	3-12, Nishi Nakajima 6-chome Yodogawa-ku, Osaka 532-0011 Phone 81-6-6302-4501 FAX 81-6-6302-0258
Kyushu Branch Office	16-14, Kamisuizenji 2-chome Kumamoto-shi 862-0951 Phone 81-96-385-3411 FAX 81-96-384-1410
Sendai Regional Office	2nd. Floor, Sendai Bldg. Ekimae-kan 1-17, Itsutsubashi 1-chome Aoba-ku, Sendai-shi, Miyagi 980-0022 Phone 81-22-262-3345 FAX 81-22-262-3346
Suwa Regional Office	3rd. Floor, Center Bldg. 12, Okita-machi, 3-chome Suwa-shi, Nagano 392-0013 Phone 81-266-52-0814 FAX 81-266-52-0815
Nagoya Regional Office	1st. Floor, Kitamura No.4 Bldg. 80, Akegaoka, Meito-ku Nagoya-shi, Aichi 465-0033 Phone 81-52-776-6350 FAX 81-52-776-6380

2. ASIA OFFICE ADDRESS

SINGAPORE

DISCO HI-TEC (SINGAPORE) PTE., LTD.

Blk 2 Kaki Bukit Ave 1
#03-06/08 Kaki Bukit Industrial Estate
Singapore 417938
Singapore
Phone 65-7473737
FAX   65-7450266

THAILAND

DISCO HI-TEC (THAILAND) CO., LTD.

16th Floor, Lao Peng Nguan Tower 1
333 Viphavadi-Rangsit Road
Lard Yao, Cnatuchak
Bangkok 10900, Thailand
Phone 66-2-6188441
FAX   66-2-6188440

MALAYSIA

DISCO HI-TEC (MALAYSIA) SDN. BHD.

21A Tingkat 1
Jalan USJ 10/1D UEP
47620 Subang Jaya
Selangor, Darul Ehsan, Malaysia
Phone   60-3-563-72606
FAX   60-3-563-72439

Penang Regional Office

1-02-01 Persiaran Bukit Jambul Satu
Kompleks Sri Relau
11900 Penang, Malaysia
Phone   60-4-644-5502
FAX   60-4-645-2285

PHILIPPINES

AUROTECH SYSTEMS (PHIL'S), INC.

121 Buencamino Street
Alabang, Muntinglupa
Philippines
Phone   63-2-809-0155
FAX   63-2-807-7419

KOREA

D.I. CORPORATION

Disco Sales & Service
Department

D.I Building
58-6, Nonhyun-Dong
Kangnam-ku, Seoul, Korea
Phone   82-2-546-5501
FAX   82-2-3446-8087

TAIWAN

HAPPY POLE, LTD.

8th Floor, 8-1, No.41
Section 2, Roosevelt Road
Taipei, Taiwan R. O. C.
Phone   886-22-3960651
             886-22-3960652
             886-22-3966717
FAX   886-22-3943943

HONG KONG (CHINA)

NEW TRONICS CO., LTD.

Flat F, 11th Floor, Valiant Ind. Bldg.
2-12 Au Pui Wan Street, Fotan
Shatin, N.T., Hong Kong
Phone   852-26871431
FAX   852-26874283

INDIA

H. FILLUNGER & CO., PVT. LTD.

Post Box No.2526
11/4, Pusa Road
New Delhi 110 005
India
Phone   91-11-5787428
             91-11-5726052
FAX   91-11-5762961

CHINA

DISCO TECHNOLOGY (SHANGHAI) CO., LTD.

4th Floor, Block A, FaZhan Mansion
No. 51 RiJing Road
WaiGaoQiao Free Trade Zone
Shanghai, P. R. China 200131
Phone   86-21-58662516
FAX   86-21-58662517

3. U.S.A. OFFICE ADDRESS

U.S.A.

DISCO HI-TEC AMERICA, INC.	
USA Head Office	3270 Scott Blvd. Santa Clara, CA 95054-3011 U. S. A. Phone 1-408-987-3776 FAX 1-408-987-3785
Eastern Regional Sales & Service Office	360 Harvey Road, Building B, Unit 202 Manchester, NH 03103 U. S. A. Phone 1-603-656-9019 FAX 1-603-656-9018
Southeastern Regional Sales & Service Office	4460 Brookfield Corporate Drive, Suite B Chantilly, VA 20151 U. S. A. Phone 1-703-815-2727 FAX 1-703-815-3573
Central Regional Sales & Service Office	4392 Sunbelt Drive Addison, TX 75001 U. S. A. Phone 1-972-267-9500 FAX 1-972-267-5612
Southwestern Regional Sales & Service Office	4411 South 40th Street, Suite D-5 Phoenix, AZ 85040-2950 U. S. A. Phone 1-602-431-1412 FAX 1-602-431-1437
Northwest Regional Sales & Service Office	7931 SW Cirrus Drive Beaverton, OR 97008-5971 U. S. A. Phone 1-503-644-0323 FAX 1-503-643-8108

LYONS & ASSOCIATES

832 Bellevue Avenue
Hulmeville, PA 19047
U. S. A.
Phone   1-215-750-6346
FAX   1-215-752-3216
Territory in charge: PA, DE, MD, VA, WV

MATRIX ASSOCIATES

303 Sweetwater Blvd. So.
Longwood, FL 32779
U. S. A.
Phone   1-407-862-1120
FAX   1-407-862-1123
Mobile phone 1-407-421-2341
Territory in charge: FL, GA, AL

LYONS & ASSOCIATES

620 Swamp Road
Doylestown, PA 18901
U. S. A.
Phone   1-215-345-7915
FAX   1-215-345-8089
Territory in charge: NY, NJ

LYONS & ASSOCIATES

c/o Resources for Electronics
24577 Green Valley Parkway
Elkhart, IN 46517
U. S. A.
Phone   1-219-875-1133
FAX   1-219-875-6873
Territory in charge: WI, IL, IN (Area Code 219 only)
                MI (Area Codes 517, 616 only)

LYONS & ASSOCIATES

c/o Resources for Electronics
7800 John Elwood Drive
Centerville, OH 45459
U. S. A.
Phone   1-937-434-4941
FAX   1-937-434-9445
Territory in charge: OH, KY,
                IN (Except Area Code 219)
                MI (Except Area Codes 517, 616)

NET MERCURY

13438 Floyed Circle
Dallas, TX 75243
U. S. A.
Phone   1-972-783-1501
FAX   1-972-783-1574
Territory in charge: North half of TX, OK

NET MERCURY

2204 Forbes Drive, Suite 101
Austin, TX 78754
U. S. A.
Phone   1-512-835-2794
FAX   1-512-832-5274
Territory in charge: South half of TX, AR, LA,
                     MO, KS

JOHN CRANE & ASSOCIATES

PMB 147
34522 No. Scottsdale Road, D-8
Scottsdale, AZ 85262
U. S. A.
Phone   1-480-488-9898
FAX   1-480-488-9848
Territory in charge: Mexico (Central & East)

SEMITORR MIDWEST

19175 Market Avenue
Belle Plain, MN 56011
U. S. A.
Phone   1-612-873-2873
FAX   1-612-873-2327
Territory in charge: MN, IA, NE, ND, SD

UKE ENTERPRISES

631 East Chapman Avenue
Orange, CA 92866
U. S. A.
Phone   1-714-633-0463
FAX   1-714-639-4359
Territory in charge: Southern CA (South of
                     San Luis Obispo), Mexico (West)

UKE ENTERPRISES

4200 Beacon Place
Byron, CA 94514
U. S. A.
Phone   1-925-240-5483
FAX   1-925-513-3442
Mobile phone 1-408-209-9681
Territory in charge: Northern CA

SALES & SERVICE

17853 Santiago Blvd.
Bldg. 107, Suite 333
Villa Park, CA 92861
U. S. A.
Phone   1-714-532-6500
FAX   1-714-532-6131
Territory in charge: ID

CANADA

HEPAIRE PRODUCTS CORP.

P. O. Box 11026
Station "H"
Nepean, Ontario
Canada K2H7T8
Phone   1-613-831-3234
FAX   1-613-831-3235
Territory in charge: Eastern Canada

4. EUROPE OFFICE ADDRESS

GERMANY

DISCO HI-TEC EUROPE GmbH

Liebigstrasse 8
D-85551 Kirchheim b. Muenchen
Germany
Phone   49-89-90903-0
FAX   49-89-90903-199

FRANCE

DISCO HI-TEC FRANCE SARL

Provence Office   Espace Beauvalle-Bat. C
6, rue Mahatma Gandhi
F-13090 Aix-en-Provence
France
Phone   33-442910020
FAX   33-442910029

UNITED KINGDOM

DISCO HI-TEC UK LTD.

151 London Road
East Grinstead/West Sussex RH19 1ET
United Kingdom
Phone   44-1342-313165
FAX   44-1342-313177

ISRAEL

NEW TECHNOLOGY R.K. LTD.

3 Ben Gurion Street
P.O. Box 2227
Kfar-Azar 55000
Israel
Phone   972-3-6356650
FAX   972-3-6357750

C. GENERAL DESCRIPTION OF SCREENS AND DATA INPUT PROCEDURES

Contents of this chapter

This chapter describes the tree structure of the operation screens, types and setup procedures of the passwords, and the layout and functions of the keys on the operation panel and on the manual keyboard for DFG841.

Section No.	Title	Contents
1	Operation Screen Structure	- Screen menu tree of the machine
2	Password	- Explanation of the password - Procedures to set up the password
3	Operation Panel	- Keys on the operation panel - Functions of the keys
4	Manual Keyboard	- Composition of the manual keyboard

1. Operation Screen Structure

Screen menu tree of the machine

[The screens [1] through [9] can have password protection. Password entry is required to call up a screen with password protection.
See section 2, [Password] of this chapter for details.

(A)

F4

[1] PARAMETER SET

F2 — EDIT PARAMETER (GRIND)

F3 — EDIT PARAMETER (HEIGHT GAUGE)

F4 — EDIT PARAMETER (TRANSFER)

F5 — EDIT PARAMETER (CASSETTE)

F6 — EDIT PARAMETER (CLEANING)

F7 — EDIT PARAMETER (TURNTABLE)

F8 — EDIT PARAMETER (OTHER)

F5

[2] MACHINE MAINTENANCE

F2 — UNIT OPERATION

F3 — EDIT DATE/TIME

F4 — SIGNAL MONITOR

F5 — OUTPUT SETTING

F6 — EDIT PASS WORD

F7 — PRIVENTIVE MAINTAINANCE

F2 — Z1

F3 — Z2

F4 — SPINNER

F5 — POSITION TABLE

F6 — T-ARM

F7 — ROBOT

F6 [X] — MAKER MAINTENANCE

(B)

The screens [1] through [9] can have password protection. Password entry is required to call up a screen with password protection.
See section 2, [Password] of this chapter for details.
The password [X] to enter the MAKER MAINTENANCE screen, TURNTABLE DETAILS SETTING screen, and Variable condition screen is not open to the customers.

Screen menu tree of the machine (Continued)

(B)

```
├─ F7 ── EXTRA ── F2 ── EXTRA GRINDING ── F2 [9] ── MANUAL GRINDING
│
│                        ┌─────────────────────────────────────────────┐
├─ OP-1                  │ The screens [1] through [9] can have password │
│   │                    │ protection. Password entry is required to call up │
│   └─ OTHER ── F2 ── MACHINE MODE DISPLAY │ a screen with password protection. │
│              │         │ See section 2, [Password] of this chapter for │
│              ├─ F3 ── PURGE WATER │ details. │
│              │         └─────────────────────────────────────────────┘
│              ├─ F4 ── MACHINE POWER OFF      F2 ── GRIND DATA LIST
│              │
│              ├─ F5 [1] ── FILE MAINTENANCE ── F3 ── FD content display
│              │
│              └─ F6 [1] ── GRIND RECORD       F5 ── dress list
│
├─ OP-2 ── WAFERS RECOVERY                     F6 ── self list
│
├─ WARM UP ── WARM UP ── [1] (Edit data)
│
└─ STATUS ── STATUS ── F8 ── EVENT HISTORY
```

C-4

2. Password

Summary of this section

This section describes the types of the passwords used for the machine and the procedures to set them up.

Section No.	Title	Contents
2-1	Types of Passwords	- Types of the passwords used for the machine - Explanation of each password
2-2	Password Check/Set up Procedures	- Password checking and setting procedures

2-1. Types of Passwords

About password

The following screens can have password (a number of up to 5 digits) protection. Once a password is set up for a screen, the screen cannot be called up by persons to whom the password number is not known.

- EDIT PARAMETER Screen
- FILE MAINTENANCE Screen
- GRIND RECORD Screen
- WARM UP screen (for editing)
- MACHINE MAINTENANCE Screen
- HEIGHT GAUGE TEST Screen
- GRIND DATA screen
- GRIND MAINTENANCE Screen
- Edit Program (GRIND MODE) Screen
- EDIT ID/Comment Screen (for calling up from the GRIND DATA screen)
- Manual chuck cleaning sequence screen

* The MAKER MAINTENANCE screen is protected by the password which is not open to the customers.

Password types

There are the following nine password types available for this machine.

Refer to Section 2-2, [Password Check/Set up Procedures] in this chapter for the procedures to check and set up the password numbers.

	Password type	Applicable screen
[1]	PARAMETER	- EDIT PARAMETER screen - FILE MAINTENANCE screen - GRIND RECORD screen - WARM UP screen (for editing)
[2]	MAINTENANCE	- MACHINE MAINTENANCE screen
[3]	GAUGE	- HEIGHT GAUGE TEST screen
[4]	GRINDING	- GRIND DATA
[5]	GRIND MAINTENANCE	- GRIND MAINTENANCE screen
[6]	EDIT PROGRAM	- Edit Program (GRIND MODE) screen
[7]	ID REMARK	- EDIT ID/Comment screen
[8]	Manual clearning	- Manual chuck cleaning sequence screen
[9]	MANUAL GRIND	- MANUAL GRINDING screen

2-2. Password Check/Set up Procedures

Procedures to check/set up the password

Checking or setting up the password (number) is made on the PASS WORD screen.

Step No.	Do This
1	Press the <F5> key on the top menu screen. - The MACHINE MAINTENANCE screen appears. - If the screen is password-protected, enter the password (MAINTENANCE) and then press the <ENTER> key.
2	Press the <F6> key. - The PASS WORD screen appears. - The current password setup status is displayed. If there is a password type to which the password number has not been set up, its password number column is left blank. | Page[MT12]	PASS WORD	YYYY/MM/DD HH:MM:SS | Password \<PARAMETER\> ##### Password \<MAINTENANCE\> ##### Password \<GAUGE\> ##### Password \<GRINDING\> ##### Password \<GRIND MAINTENANCE\> ##### Password \<EDIT PROGRAM\> ##### Password \<ID REMARK\> ##### Password \<Manual clearning\> ##### Password \<MANUAL GRIND\> ##### F01 Previous scrn. F02 F03 F04 F05 F06 F07 F08
3	Select the password you want to change its set up number using the < > or < > key.
4	Press the <ENTER> key. - The PASS WORD (edition) screen appears. | Page [MT12]	PASS WORD	 [< Within 5 >] Ver.********* # # # # ^^ F01 : Edit Completed F02 : Back Space F03 : Clear Enter F04 : F05 : F06 : F07 : F08 :
5	Press the <F3> key. - The current password number is erased.

Step No.	Do This
6	Enter the new password number (a number of up to 5 digits) using the numeral keys.
7	Press the <F1> key.
8	To change another password, repeat the steps 3 through 7.
9	When changing of the password(s) completes, press the <F1> key. - The system returns to the MACHINE MAINTENANCE screen.

Contents of the PASS WORD screen

The password types available for the machine are shown on the PASS WORD screen.

```
Page[MT12]                    PASS WORD           YYYY/MM/DD HH:MM:SS


    Password <PARAMETER>              [  [1]  ]
    Password <MAINTENANCE>            [  [2]  ]
    Password <GAUGE>                  [  [3]  ]

    Password <GRINDING>               [  [4]  ]
    Password <GRIND MAINTENANCE>      [  [5]  ]
    Password <EDIT PROGRAM>           [  [6]  ]
    Password <ID REMARK>              [  [7]  ]
    Password <Manual clearning>       [  [8]  ]

    Password <MANUAL GRIND>           [  [9]  ]


 F01   Previous scrn.   F02              F03              F04
 F05                    F06              F07              F08
```

	Password type	Applicable screen
[1]	PARAMETER	- EDIT PARAMETER screen - FILE MAINTENANCE screen - GRIND RECORD screen - WARM UP screen (for editing)
[2]	MAINTENANCE	- MACHINE MAINTENANCE screen
[3]	GAUGE	- HEIGHT GAUGE TEST screen
[4]	GRINDING	- GRIND DATA
[5]	GRIND MAINTENANCE	- GRIND MAINTENANCE screen
[6]	EDIT PROGRAM	- Edit Program (GRIND MODE) screen
[7]	ID REMARK	- EDIT ID/Comment screen
[8]	Manual clearning	- Manual chuck cleaning sequence screen
[9]	MANUAL GRIND	- MANUAL GRINDING screen

3. Operation Panel

Summary of this section

This section describes the arrangement and functions of the keys on the operation panel.

Section No.	Title	Contents
3-1	Arrangement of Keys on Operation Panel	- Arrangement of the keys on the operation panel - Grouping of the keys by function
3-2	Functions of Keys on Operation Panel	- Description of the keys by functions

3-1. Arrangement of Keys on Operation Panel

Arrangement of the keys

The keys on the operation panel are arranged as follows.

Keys to call up the special screens · Function keys · Numeric keys · Arrow keys

Operation start/stop keys · Alarm clearance key · Data set up/change/selection keys
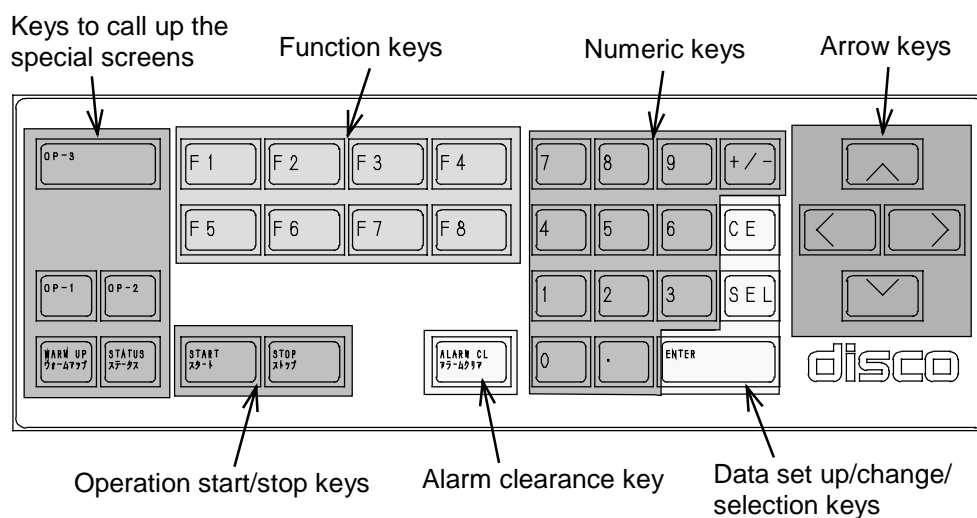
Grouping of the keys by function
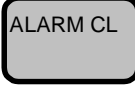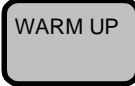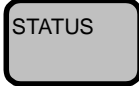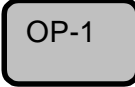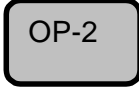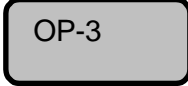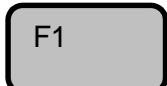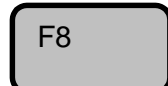
The keys on the operation panel are grouped by function as follows:

Function	Key to be used	
Start/stop of operations	[START], [STOP]	
Alarm clearance	[ALARM CL]	
Calling up of the special screens	[WARM UP], [STATUS], [OP-1], [OP-2], [OP-3]	
Data setting/change/ selection	Numeric keys	[0] to [9], [.], [+/-]
	Arrow keys	[ ], [ ], [ ], [ ]
	Data setting/ change/selection keys	[ENTER], [CE], [SEL]
	Function keys	[F1] to [F8]

3-2. Functions of Keys on Operation Panel

Summary of this section

This section describes about the keys on the operation panel by function.

Section No.	Title	Contents
3-2-1	Keys to Start/Stop Operations and Clear Alarm Condition	START STOP ALARM CL
3-2-2	Keys to Call up Special Screens	WARM UP STATUS OP-1 OP-2 OP-3
3-2-3	Keys to Set up/Change/Select/Call up Data	- Numeric keys 0 9 to , +/- - Arrow keys ⌃ ⌄ ‹ › - Data set up/change/selection keys ENTER CE SEL - Function keys F1 F8 to

3-2-1. Keys to Start/Stop Operations and Clear Alarm Condition
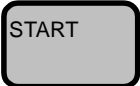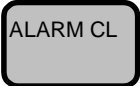
Summary of this section

The keys to start/stop various operations and clear alarm condition are described here.

Functions of the keys

Key	Function
START	Initiates automatic grinding (full auto) and other machine operations.
STOP	Halts automatic grinding (full auto) and other machine operations.
ALARM CL	If this key is pressed when an error occurs, the alarm indication is cleared and the buzzer sound stops.

3-2-2. Keys to Call up Special Screens
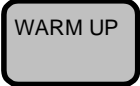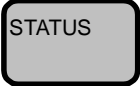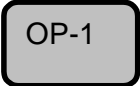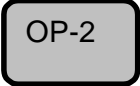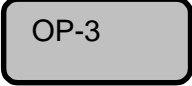
Summary of this section

The keys to call up the special screens are described here.

Functions of the keys

Key	Function
WARM UP	If this key is pressed on the top menu screen, the WARM UP screen for performing warming up operation appears.
STATUS	If this key is pressed on the top menu screen or during full auto operation, the STATUS screen appears.
OP-1 OP-2 OP-3	Keys to call up the special screens to perform special functions.
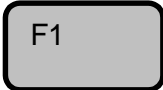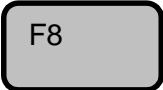
3-2-3. Keys to Set up/Change/Select/Call up Data

Summary of this section

The keys to set up or change the machine data and to call up the specific functions or screens are described here.

Functions of the keys

Key	Function
F1 to F8	Function keys to select specific functions. The available function keys followed by their function descriptions are indicated at the bottom of each screen.
0 to 9	Used to enter numerals.
	Used to enter decimals.
+/-	Effects numerical data sign changeover between + (plus) and - (minus).
(cursor arrow keys)	Used to move the cursor.
SEL	Used to change the settings of the grinding data and parameters.
ENTER	Finalizes the selected data setting. Also used to execute operations.
CE	Erases the data of an item over which the cursor is positioned. Also used to cancel operations.

4. Manual Keyboard

About manual keyboard

The manual keyboard is used to perform unit operation for the various machine units. When used, the keyboard is connected to its connector in the machine main body.
See section 2, [Unit Operation] in Chapter E of the Maintenance Manual for details of the unit operation.

Configuration of the manual keyboard

The manual keyboard is configured as shown in the figure below.

Operable functions of each key vary depending on the unit to operate. See section 2-2, [Unit Operation Screens] in Chapter E of the Maintenance Manual for details.

Operating unit indication LED

Operation key

Operating unit indication LED	Z1 AXIS	Comes on when the unit operation of either of the following units is available: - Z1-axis - Chuck table washing unit
	Z2 AXIS	Comes on when the unit operation of either of the following units is available: - Z2-axis - Wafer washing unit
	SPINNER	Comes on when the unit operation of the spinner table is available.
	P-TABLE	Comes on when the unit operation of the position table is available.
	T-ARM	Comes on when the unit operation of the T-arm is available.
	ROBOT	Comes on when the unit operation of the robot is available.
Operation keys	A, B, C, D	Keys to select applicable operations. When pressed for selection, the LED on the upper left corner of the selected key comes on. To cancel the selection, press the same key again to extinguish its LED.
	T1, T2, T3, T4	
	STEP, HIGH	
	, , ,	Keys to execute (or stop) operations.
	ON/OFF	

D. DATA MAINTENANCE

Contents of this chapter

This chapter describes about the screens and the procedures used for setting up, editing, or duplicating the grinding, dressing, and self-grinding program data. The screen for editing the warm up data to perform warm up operation is also explained.

Section No.	Title	Contents
1	Top Menu Screen	- Contents of the top menu screen
2	Set up and Edition of Warm up Data	- Descriptions on the screen used for setting up and editing the warm up data
3	Set up and Edition of Grinding Program Data	- Procedures to set up and edit the grinding program - Descriptions on the screens used for setting up and editing the grinding program
4	Set up and Edition of Dressing Program Data	- Procedures to set up and edit the dressing program - Descriptions on the screens used for setting up and editing the dressing program
5	Set up and Edition of Self-grinding Program Data	- Procedures to set up and edit the self-grinding program - Descriptions on the screens used for setting up and editing the self-grinding program

The procedures as described below are used in common to set up or edit data items on the various screens of the machine.

- If any value outside the acceptable input range is entered, the message "Invalid Data!" appears on the screen. In such a case, press the <CE> key and then enter the correct value.

- The write-protected programs cannot be edited. If an attempt is made to change data of such programs, the message "Program is protected!!" appears. Refer to Section 3-6, [Parameters in EDIT PARAMETER (OTHER)] Screen in Chapter E for details.

Step No.	Do This
1	Using the cursor keys, move the cursor to the data item you want to make change. - When there are many setup items on the screen, the item you want to make change may not appear on the screen. In such a case, move the cursor to the upper end or lower end of the screen. Then the screen is automatically scrolled.
2	Using the <SEL> key or numeric keys, change the data. (Use numeric keys to enter numerals.) - To call up the WARM UP screen for editing the warm up data, entry of the password (PARAMETER) is required.
3	Press the <ENTER> key. - The changed data is shown in purple (excluding the setup data on the WARM UP screen).
4	Repeat the steps 1 through 3 to change other data if any. (For the WARM UP screen, the steps from here onward are not necessary.)
5	Press the <F5> key. - The message "Is it OK to save the program?" appears. <Cancellation of data change> If you attempt to move, after changing any setup data, to another screen without pressing the <F5> key, the message "Do you want to return to the previous screen?" appears. If you press the <ENTER> key here, you can cancel the change.
6	Press the <ENTER> key. - The changed data is saved.

1. Top Menu Screen

Top Menu screen

The top menu screen (MENU screen) appears when you turn on the machine power. Contents of the MENU screen are described as follows.

[Screen]

```
Page [A02]                      MENU              YYYY/MM/DD HH:MM:SS
                                                       Ver.*********
            F1 : MACHINE INITIALIZE
            F2 : GRINDING
            F3 : GRIND MAINTENANCE
            F4 : PARAMETER SET
            F5 : MACHINE MAINTENANCE
            F7 : EXTRA
   WARM UP TIME  ├────[1]──┼──────┤ ( [2] /[3] min)
                 0        50      100%

 F01 : Initialize      F02 : Grinding      F03 : Grind Maint.    F04 : Parameter Set
 F05 : Machine Maint.  F06 : Maker Maint.  F07 : Extra           F08 :
 G: [F1] - [F2] Please choose. ([F3] - [F6]   Password Required)
```
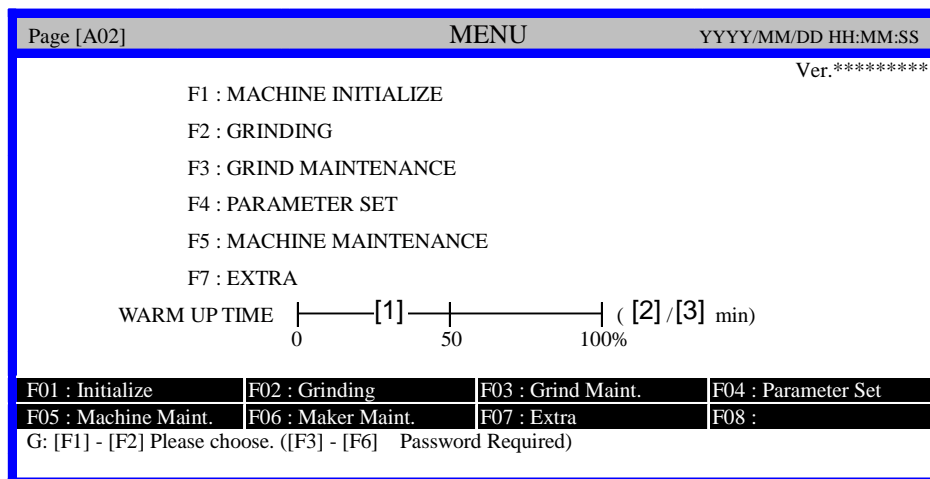
[Setting Item]

Item No.	Descriptions
[1]	Progress of the warm up process is shown in bar graph on a percentage basis.
[2]	The elapsed time (min.) from the start of the warm up process is shown.
[3]	The warm up time (setup time) set up in the WARM UP screen is shown. The time can be edited in the WARM UP screen.

[Function Key]

Press	To
F1	Call up the INITIALIZE screen.
F2	Call up the GRIND DATA screen.
F3	Call up the GRIND MAINTENANCE screen.
F4	Call up the EDIT PARAMETER screen.
F5	Call up the MACHINE MAINTENANCE screen.
F6	Call up the MAKER MAINTENANCE Screen (the screen used for maintenance by DISCO). This screen cannot be selected by the user.
F7	Call up the EXTRA screen
F8	Not used.

2. Set up and Edition of Warm up Data

Summary of this section

The warm up data is used to perform warm up operation. This section describes about the screen used for setting up or editing the warm up data. The special warm up operations (warm up with periodical chuck table washing / warm up with periodical flow of spinner cleaning water, oilstone water, and chuck table auxiliary nozzle water) are also explained.

Section No.	Title	Contents
2-1	WARM UP Screen	- Contents of the WARM UP screen
2-2	Special Warm up Operations	- Procedures to perform special warm up operations

2-1. WARM UP screen

WARM UP screen

The WARM UP screen is used to edit the warm up data. Initiation and termination of warm up operation are also performed from the WARM UP screen.
To call up the WARM UP screen, press the <WARM UP> key on the top menu screen.

Entry of the password (PARAMETER) is required to call up the WARM UP screen for editing warm up data. When warm up operation is underway, however, data edition cannot be made.

[Screen]

```
Page [E02]                        WARM UP                YYYY/MM/DD HH:MM:SS
                    ACTUAL STATUS                   SET : (Mode)      (Value)

 >> Z1 Axis Spindle R.P.M.   >  [1]  <        [2] (rpm)    <  [3]  >    [4] (rpm)
              Coolant   >  [5]  <                          <  [6]  >
            Chuck R.P.M.   >  [7]  <        [8] (rpm)      <  [9]  >   [10] (rpm)
            Chuck Blow   >  [11]  <                        <  [12]  >

 >> Z2 Axis Spindle R.P.M.   >  [1]  <        [2] (rpm)    <  [3]  >    [4] (rpm)
              Coolant   >  [5]  <                          <  [6]  >
            Chuck R.P.M.   >  [7]  <        [8] (rpm)      <  [9]  >   [10] (rpm)
            Chuck Blow   >  [11]  <                        <  [12]  >

 >> Warm Up Time                          [13] (min)                 [14] (min)
 <> After Auto, Coolant C/T Rot/Blow on according to parameter above : <  [15]  >
 F01 : Previous scrn.  F02 : Syc. C/T washer  F03 : Syc. interval-P  F04 : Start
 F05 :                 F06 :                  F07 : Pause/Restart     F08 : Stop
```

[Setting Item]

Item No.	Descriptions	
[1]	Z1/Z2 spindle status is shown.	
	Rotate	The spindle is rotating
	Stop	The spindle is stopped
[2]	Present Z1/Z2 spindle rotative speed (min^{-1} (rpm)) is shown. The indicated value is correct when the speed exceeds 300 (min^{-1} (rpm)).	
[3]	Z1/Z2 spindle movement during warm up is selected (<SEL> key is used for selection).	
	Rotate	The spindle rotates during warm up.
	Stop	The spindle stops during warm up.
[4]	Z1/Z2 spindle rotative speed during warm up is set up. - Acceptable input range: 1000 to 7000 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm)) - Standard setting: Same speed as used during grinding operation	
[5]	Z1/Z2 wheel coolant status is shown.	
	Blow	The wheel coolant water is flowing.
	Stop	The wheel coolant water is stopped.

[Setting Item]

Item No.	Descriptions	
[6]	Z1/Z2 wheel coolant water ON/OFF during warm up is selected (<SEL> key is used for selection).	
	Active	Wheel coolant water is ON during warm up.
	Stop	Wheel coolant water is OFF during warm up.
[7]	Z1/Z2 chuck table status during warm up is shown.	
	Rotate	The chuck table is rotated during warm up.
	Stop	The chuck table is stopped during warm up.
[8]	Present chuck table rotative speed is shown.	
[9]	Z1/Z2 chuck table movement during warm up is selected (<SEL> key is used for selection).	
	Rotate	The chuck table rotates during warm up.
	Stop	The chuck table stops during warm up.
[10]	Z1/Z2 chuck table rotative speed (min^{-1} (rpm)) during warm up is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm)) - Standard setting: 60 (min^{-1} (rpm))	
[11]	Z1/Z2 chuck table water flow/air blow status is shown.	
	Blow	The chuck table water flow/air blow system is ON.
	Stop	The chuck table water flow/air blow system is OFF.
[12]	Z1/Z2 chuck tables water flow/air blow ON/OFF during warm up is selected (<SEL> key is used for selection).	
	Active	The chuck table water flow/air blow system is turned ON during warm up.
	Stop	The chuck table water flow/air blow system is turned OFF during warm up.
[13]	Elapsed time (min.) from the start of the warm up process is shown.	
[14]	Warm up time (min) is set up. Before starting full auto operation, the machine should be warmed up for at least 30 minutes to achieve its continued accuracy. - Acceptable input range: 0 to 999 (min) - Increments: 1 (min)	
[15]	Machine idling ON/OFF after finishing full auto operation is selected. Normally, "Set" is selected.	
	Set	After termination of full auto operation, the machine is idled according to the settings in this screen. When full auto operation is forcibly terminated, however, this function does not work.
	Pass	The machine is not idled.

[Function Key]

Press	To
F1	Return to the top menu screen.
F2	Start "warm up operation accompanied by periodical chuck table washing by oilstone". - Refer to section 2-2, [Special Warm up Operations] in this chapter for details.
F3	Start "warm up operation accompanied by periodical flow of spinner cleaning water/oilstone water/chuck table auxiliary nozzle water". - Refer to section 2-2, [Special Warm up Operations] in this chapter for details.
F4	Start normal warm up operation.
F5	Not used.
F6	Not used.
F7	Halt warm up operation. Pressing this key once again resumes the operation.
F8	Stop warm up operation.

2-2. Special Warm up Operations

About special warm up operations

Two special warm up operation methods are available for the machine and they are initiated by the F2 (Syc. C/T washer) and F3 (Syc. interval-P) keys respectively.

The three different warm up operation methods including the normal method are summarized as follows.

Warm up initiation key	Warm up operation process
F4 (Start)	<Normal warm up> Normal warm up operation according to the data settings in the WARM UP screen is performed.
F2 (Syc.C/T washer)	<Warm up with periodical chuck table washing> In addition to the normal warm up process, periodical chuck table washing is performed. Warming up starts with the Z-axes escaped to their upper end positions. Chuck table washing (by oilstone) is performed at specified intervals. The interval time is set up in "Interval Time in Warm up" parameter in "Chucktable Cleaning Special Mode" parameter group on the EDIT PARAMETER (CLEAN) screen. Refer to Section 3-5, [Parameters in EDIT PARAMETER (CLEAN) Screen] in Chapter E for details. If you press the <F2> key, the message "Escape up each Z axis?" appears. Press the <ENTER> key to proceed. The warm up operation cannot be started unless the Z-axes are escaped to their upper end positions.
F3 (Syc.interval-P)	<Warm up with periodical flow of spinner cleaning water/oilstone water/chuck table auxiliary nozzle water> In addition to the normal warm up process, flow of spinner cleaning water/oilstone water/chuck table auxiliary nozzle water is turned ON/OFF regularly (ON: 10 sec. / OFF: 50 sec.). The ON/OFF cycle here is almost the same as that in actual full auto operation. Since water reaches to the area not covered in the normal warm up operation, this method is effective in preventing bacterial contamination.

3. Set up and Edition of Grinding Program Data

Summary of this section

Grinding programs are used to perform automatic grinding operation (full auto operation). This machine can register up to 60 grinding programs (No. 1 through 60).
This section describes the procedures and the screens used to set up or edit grinding program data.

Section No.	Title	Contents
3-1	Creation/Edition of Grinding Program	- Procedure to newly create a grinding program - Procedure to check/change the contents of a grinding program
3-2	Duplication of Grinding Program	- Procedure to duplicate a grinding program
3-3	GRIND DATA Screen	- Contents on the GRIND DATA screen.
3-4	Edit Program Screen	- Contents of the Edit Program screen.
3-5	Automatic Program Set, Edit Screen	- Contents of the Automatic Program Set, Edit screen.
3-6	SPECIAL FUNCTION Screen	- Contents of the SPECIAL FUNCTION Screen
3-7	GRIND DATA LIST Screen	- Contents of the GRIND DATA LIST screen.
3-8	EDIT ID/Comment Screen	- Contents of the EDIT ID/Comment screen.
3-9	Grinding Sequence	- Z-axis operation sequence during grinding
3-10	Cassette ID Entry	- Cassette ID function - Contents of the CST. ID EDIT screen
3-11	Finished Wafer Thickness Data Correction by Wafer	- Procedures to correct finished wafer thickness data by wafer
3-12	Grinding Control Method Setting Screen	- Contents of the grinding control method setting screen

NOTICE

When you set up grinding program data, carefully predict the resultant machine movements and make sure that the changed parameters are in the appropriate set up ranges. Improperly set up parameters may cause machine/wafer breakage or adversely affect the machine's grinding accuracy.

3-1. Creation/Edition of Grinding Program

Composition of grinding program

Setup items of the grinding program split across the following 4 screens according to their contents.
To make a grinding program, therefore, it is necessary to set up the items on these screens.

- GRIND DATA screen (Refer to section 3-3 in this chapter.)
- Edit Program screen (Refer to section 3-4 in this chapter.)
- Automatic Program Set, Edit screen (Refer to section 3-5 in this chapter.)
- SPECIAL FUNCTION Screen (Refer to section 3-6 in this chapter.)

Procedures to newly create a grinding program

The procedures to newly create a grinding program are described here. Refer to Sections 3-3 through 3-8 in this chapter for details of the associated screens.

Step No.	Do This
1	Press the <F2> key on the top menu screen. - The GRND DATA screen appears. - If the screen is password-protected, enter the password (GRINDING) and then press the <ENTER> key.
2	Press the <F6> key. - The GRIND DATA LIST screen appears.
3	Using the cursor keys, select the program number (1 - 60) for the grinding program you are going to create. - Refer to Section 3-7, [GRIND DATA LIST Screen] in this chapter for details of the GRIND DATA LIST screen.
4	Press the <ENTER> key. - The GRIND DATA screen appears.
5	Set up data items of the GRIND DATA screen. - Refer to Section 3-3, [GRIND DATA Screen] in this chapter for details of the GRIND DATA screen.
6	After confirming all data are correctly set up, press the <F5> key to save the setup data.
7	Press the <F2> key. - The Edit Program screen appears. - If the screen is password-protected, enter the password (EDIT PROGRAM) and then press the <ENTER> key.
8	Set up data items of the Edit Program screen. - Refer to section 3-4, [Edit Program Screen] in this chapter for details of the Edit Program screen.
9	After confirming all data are correctly set up, press the <F5> key to save the setup data.

Step No.	Do This
10	Press the <F2> key. - The Automatic Program Set, Edit screen appears.
11	Set up data items of the Automatic Program Set, Edit screen. - Refer to Section 3-5, [Automatic Program Set, Edit Screen] in this chapter for details of the Automatic Program Set, Edit screen.
12	After confirming all data are correctly set up, press the <F5> key to save the setup data. - When saving of the setup data completes, the system automatically returns to the Edit Program screen.
13	Press the <F3> key. - The SPECIAL FUNCTION screen appears.
14	Set up data items on the SPECIAL FUNCTION screen. - Refer to Section 3-6, [SPECIAL FUNCTION Screen] in this chapter for details of the SPECIAL FUNCTION screen.
15	Press the <F1> key twice. - The system returns to the GRIND DATA screen. The grinding program creation process now completes.

Procedures to check the contents of an existing grinding program

The procedures to check the contents of an existing grinding program are described here. Refer to sections 3-3 through 3-8 for details of the associated screens.

Step No.	Do This
1	Press the <F2> key on the top menu screen. - The GRIND DATA screen appears. - If the screen is password-protected, input the password (GRINDING) and then press the <ENTER> key.
2	Press the <F6> key. - The GRIND DATA LIST screen appears.
3	Using the cursor keys, select the grinding program (No. 1 - 60) you want to check. - Refer to Section 3-7, [GRIND DATA LIST Screen] in this chapter for details of the GRIND DATA LIST screen.
4	Press the <ENTER> key. - The GRIND DATA screen appears. - Data of the set up items on the GRIND DATA screen, Edit Program screen, and Automatic Program Set, Edit screen automatically change to those of the selected program respectively.
5	Call up each screen to check the data of the setup items. - Refer to [Procedures to newly create a grinding program] in this section for details.

Procedures to change the contents of a grinding program

The procedure to change the contents of a grinding program is described here.

Step No.	Do This
1	Press the <F2> key on the top menu screen. - The GRIND DATA screen appears. - If the screen is password-protected, enter the password (GRINDING) and then press the <ENTER> key.
2	Press the <F6> key. - The GRIND DATA LIST screen appears.
3	Using the cursor keys, select the grinding program (No. 1 - 60) you want to make change in its contents. - Refer to Section 3-7, [GRIND DATA LIST Screen] in this chapter for details of the GRIND DATA LIST screen.
4	Press the <ENTER> key. - The GRIND DATA screen appears.
5	Make data change of the setup item(s) on the respective screens referring to [Procedures to newly create a grinding program] in this chapter.

3-2. Duplication of Grinding Program

Cautions in duplicating a grinding program

When a grinding program is duplicated, data of its destination program number is overwritten and erased. If you want to keep the data of the destination program number, save the data into floppy disk before performing data duplication.

- Refer to Section 2, [Data Management by Floppy Disk] in Chapter F for the procedures to save data into floppy disk.

Procedures to duplicate a grinding program

The procedures to duplicate an existing grinding program under another program number are described here.
The example below duplicates the contents of the program No. 2 under the program No 5. To cancel duplication, press the <CE> key.

Step No.	Do This
1	Press the <F6> key on the GRIND DATA screen or the Edit Program screen. - The GRIND DATA LIST screen appears.
2	Press the <F3> key. - The following message appears on the center of the screen. Input the number you want to copy from. (Cancel : [CE]) From : No. _ [ ]
3	Enter the program number of the program you want to copy ([2] in this case) into "From: No." column.
4	Press the <ENTER> key. Input the number you want to copy from. (Cancel : [CE]) From : No. 2 => To : No. _ [ ]
5	Enter the destination program number ([5] in this case) into "To: No." column.
6	Press the <ENTER> key. Input the number you want to copy from. (Cancel : [CE]) From : No. 2 => To : No. 5 [key : Press please. (Correct No. [SEL] Copy to [ENTER])

Procedures to duplicate a grinding program (Continued)

Step No.	Do This
7	After verifying that "From: No." and "To: No." are correct, press the <ENTER> key. - The duplication process starts with the message "Now copying." displayed. - When duplication of the program completes, the "Now copying." message disappears.

3-3. GRIND DATA Screen

GRIND DATA screen

On the GRIND DATA screen, such data as original wafer thickness and finished wafer thickness are set up.

To call up the GRIND DATA screen, press the <F2> key on the top menu screen. If the screen is password-protected, entry of the password (GRINDING) is necessary.

```
┌─────────────────────────────────────────────────────────┐
│                         NOTICE                          │
│                                                         │
│  When you set up a "Z1(Z2) Original Thickness" value,   │
│  ensure that it includes the thickness of the           │
│  protective material (tape, resist, etc.)               │
│  If there is thickness variation among wafers to be     │
│  ground, make sure to enter the maximum thickness       │
│  value of those. If "Z1(Z2) Original Thickness" is set  │
│  to a value smaller than the actual value,              │
│  wafer/wheel breakage or machine failure may be caused. │
└─────────────────────────────────────────────────────────┘
```

[Screen]

```
Page [G01]                  GRIND DATA          YYYY/MM/DD HH:MM:SS
                      Program No.   [1]
                      ID   ==   [2]
                      Rmrk==   [3]
                      Wafer      Diameter        [4]   inch
                      Original Thickness         [5]   μm
                                  off amount  (   [6] )
            Z2            Finished Thickness      [7]   μm      Z1
GR mode sel   < [8] >   start  < [9] >      GR mode sel  < [8] >   start  < [9] >
   Z2- GRIND : [   [10] ]   SPINDLE : [   [13] ]   Z1- GRIND : [   [10] ]   SPINDLE : [   [13] ]
      GAUSE : [   [11] ]   C-WATER : [   [14] ]      GAUSE : [   [11] ]   C-WATER : [   [14] ]
      CST-C/D : [   [12] ]   C-LEVEL : [   [15] ]      CST-C/D : [   [12] ]   C-LEVEL : [   [15] ]

F01 : TOP MENU        F02 : Edit Program      F03 : Input cst. ID      F04 : Process status
F05 : Save            F06 : Program List      F07 : Chg Thick. list    F08 : Test H-Gauge
G : [SEL]     key: Change data
G : [START] key: Start FULL AUTO operation.
```

[Setting Item]

Item No.	Descriptions
[1]	Selected program number is shown. To select another program number, call up the GRIND DATA LIST screen by pressing the <F6> key. - Refer to Section 3-7, [GRIND DATA LIST Screen] in this chapter for details of the GRIND DATA LIST screen.

[Setting Item]

Item No.	Descriptions
[2]	Program ID (up to 8 characters) is shown. If you move the cursor to this data item and press the ENTER key, the EDIT ID/Comment screen for editing the ID appears. - Refer to section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[3]	Comment on the program (up to 35 characters) is shown. If you move the cursor to this data item and press the ENTER key, the EDIT ID/Comment screen for editing the comment appears. - Refer to Section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[4]	Grinding wafer size (4", 5", 6", 8", X") is selected. The <SEL> key is used to switch between the settings. - The size for the X" is set up on the EDIT PARAMETER (CASSETTE) screen. (Refer to Section 3-4, [Parameters in EDIT PARAMETER (CASSETTE) Screen] in Chapter E.)
[5]	Original (loaded) wafer thickness (including the protective tape thickness) is set up. - Acceptable input range: 0 to 2500 (μm) - Increments: 1(μm)
[6]	Grinding depth ("Original Thickness" - "Finished Thickness") is shown.
[7]	Finished wafer thickness is set up. - Acceptable input range: -1000 to 2500 (μm) - Increments: 1 (μm)
[8]	The set up data of "Grinding mode select" parameter in "Grinding special select" parameter group on the EDIT PARAMETER (GRIND) screen appears here. Refer to Section 3-1, [Parameters in EDIT PARAMETER (GRIND) Screen] in Chapter E for details of the "Grinding mode select" parameter.
[9]	The set up data of "Start" parameter in "Grinding special select" parameter group on the EDIT PARAMETER (GRIND) screen appears here. Refer to Section 3-1, [Parameters in EDIT PARAMETER (GRIND) Screen] in Chapter E for details of the "Start" parameter

[Setting Item]

Item No.	Descriptions	
[10]	Whether Z1-axis (Z2-axis) grinding is performed or not (set up in the Edit Program screen) is shown. - If "Z1 GRIND" is set to <Pass> and "Z2 GRIND" is set to <Use>, it is possible that a wafer that does not meet the Z2-axis grinding conditions is processed for Z2-axis grinding. In such a case, wafer breakage or wheel breakage may result.	
	Use	Z1-axis (Z2-axis) grinding is performed.
	Pass	Z1-axis (Z2-axis) grinding is not performed.
[11]	Z1/Z2 height gauge setting (set up in the "Edit Program" screen) is shown.	
	Set	Wafer thickness control using the height gauge is enabled.
	Pass	Wafer thickness control using the height gauge is disabled.
[12]	Cassette presence (Cassette A/B) is shown.	
	Set	Cassette is set.
	None	Cassette is not set.
[13]	Z1/Z2 spindle status is shown.	
	Rotate	The spindle is rotating.
	Stop	The spindle is stopped.
[14]	Z1/Z2 wheel coolant status is shown.	
	Blow	Wheel coolant is flowing.
	Stop	Wheel coolant is stopped.
[15]	Z1/Z2 wheel coolant flow rate is shown.	
	normal	Flow rate of wheel coolant water is normal.
	LOW	Flow rate of wheel coolant water is too low.

[Function Key]

Press	To
F1	Return to the top menu screen.
F2	Call up the Edit Program screen.
F3	Call up the CST. ID EDIT screen.
F4	Call up the PROCESS STATUS screen.
F5	Save the changed data. Whenever any setup data is changed, make sure to press this key before moving to another screen.
F6	Call up the GRIND DATA LIST screen.
F7	Call up the GRIND DATA (Each Wafer finish Thickness adjust Edit) screen.
F8	Call up the HEIGHT GAUGE TEST screen.

3-4. Edit Program Screen

Edit Program screen

On the Edit Program screen, such data as Z-axis feed rate, air cut amount, and chuck table rotative speed are set up.
The standard values for the setup items vary depending on the used wheel or grinding conditions. Refer to Section 1, [Grinding Program Setup Samples] in chapter G for examples of grinding program setup.

To call up the Edit Program screen, press the <F2> key on the GRIND DATA screen. If the screen is password-protected, entry of the password (EDIT PROGRAM) is necessary.

NOTICE

- The Edit Program screen includes the items that are also set up on the Automatic Program Set, Edit screen (see the table below).

  For these items, the set up data that is lastly saved by the [F05: Save] key (of either the Edit Program Screen or the Automatic Program, Set, Edit Screen) becomes effective.

  Data change/saving made for an item on the Edit Program screen, however, is not automatically reflected in the same item on the Automatic Program Set, Edit screen.

Edit Program screen	Automatic Program Set, Edit screen
Z1 (Z2)Aircut	Z1 (Z2) Aircut
Z1 (Z2) P1 Thick.	Z1 (Z2) P1^^P2 Off Amount
Z1 (Z2) P2 Thick.	Z1 (Z2) P2^^P3 Off Amount
Z1 (Z2)Escape Thic	Z1 (Z2) Escape Amount

- If "Aircut" parameter is set to a value smaller than the standard setup value, wafer/wheel breakage or machine failure as a result of wafer thickness error, wheel position setup error, or other discrepancies may occur. Make sure to enter a value equaling to or larger than the standard setup value.

- If "Z1 GRIND" is set to <Pass> and "Z2 GRIND" is set to <Use>, it is possible that a wafer that does not meet the Z2-axis grinding conditions is processed for Z2-axis grinding. In such a case, wafer breakage or wheel breakage may result.

[Screen]

Page [G03]	GRIND MODE	YYYY/MM/DD HH:MM:SS

Edit Program
Program No. = [1]   ID = [2]
Rmrk= [3]
Wafer Diameter   [4]   inch
Original Thickness   [5]   μm
Finished Thickness   [6]   μm

Z1-axis side setting items →

Z1 Grinding   < [7] >   Height Gauge   < [8] >   Spindle (rpm)   [9]
Origin Thick.(μm)   [10]   Aircut   (μm)   [11]
P1 Thick.   (μm)   [12]   P2 Thick.   (μm)   [15]   P3 Thick.   (μm)   [18]
Feed Rate (μm/s)   [13]   Feed Rate   (μm/s)   [16]   Feed Rate   (μm/s)   [19]
Chuck Table(rpm)   [14]   Chuck Table (rpm)   [17]   Chuck Table (rpm)   [20]
                             Escape Thic (μm)   [23]
Spark Out   (rev)   [21]   Feed Rate   (μm/s)   [24]
Chuck Table(rpm)   [22]   Chuck Table (rpm)   [25]   Process Time (s)   [26]

Z2-axis side setting items →

Z2 Grinding   < [7] >   Height Gauge   < [8] >   Spindle (rpm)   [9]
Origin Thick.(μm)   [10]   Aircut   (μm)   [11]
P1 Thick.   (μm)   [12]   P2 Thick.   (μm)   [15]   P3 Thick.   (μm)   [18]
Feed Rate (μm/s)   [13]   Feed Rate   (μm/s)   [16]   Feed Rate   (μm/s)   [19]
Chuck Table(rpm)   [14]   Chuck Table (rpm)   [17]   Chuck Table (rpm)   [20]
                             Escape Thic (μm)   [23]
Spark Out   (rev)   [21]   Feed Rate   (μm/s)   [24]
Chuck Table(rpm)   [22]   Chuck Table (rpm)   [25]   Process Time (s)   [26]

F01 : Previous scrn.	F02 : Auto Set	F03 : Special func.	F04 :
F05 : Save	F06 : Program List	F07 :	F08 :

[Setting Item]

Item No.	Descriptions	
[1]	Program No. is shown.	
[2]	Program ID is shown.	
[3]	Comment on the program is shown.	
[4]	Grinding wafer size is shown.	
[5]	Original (loaded) wafer thickness is shown.	
[6]	Finished wafer thickness is shown.	
[7]	Whether Z1-axis (Z2-axis) grinding is performed or not is set up. The <SEL> key is used for selection. Standard setting: Use - If "Z1 GRIND" is set to <Pass> and "Z2 GRIND" is set to <Use>, it is possible that a wafer that does not meet the Z2-axis grinding conditions is processed for Z2-axis grinding. In such a case, wafer breakage or wheel breakage may result.	
	Use	Z1-axis (Z2-axis) grinding is performed.
	Pass	Z1-axis (Z2-axis) grinding is not performed. The spindle stays at its upper end position even if full auto operation is started.

[Setting Item]

Item No.	Descriptions	
[8]	Enabling/disabling of finished wafer thickness control using the height gauge is set up. The <SEL> key is used for selection. Standard setting: Set	
	Set	Finished wafer thickness control using the height gauge is enabled. At the beginning of full-auto operation, the height gauge measures the zero-point of the chuck table (chuck surface) to check for its accuracy. If the measured value is outside the permissible range (-100 $\pm$ 40 μm), an error is issued.
	Pass	Finished wafer thickness control using the height gauge is disabled. In this case, wafer thickness is controlled by the moving distance of the Z-axis. The finished thickness of wafers becomes larger as the wheel tooth wears in this method.

[9]	Spindle rotative speed is set up.
	- Acceptable input range: 1000 to 7000 (min^{-1} (rpm))
	- Increments: 1 (min^{-1} (rpm))
	  Standard setting: Z1 4800 (min^{-1}(rpm))
	                   Z2 5500 (min^{-1}(rpm))	

[10]	Z1-axis side	"Original Thickness" set up in the GRIND DATA screen is shown.
	Z2-axis side	Z1 finished-wafer-thickness value is automatically entered. It is possible to change this data. However, it should not be changed under the normal circumstances.
[11]	Air cut amount (refer to Section 3-9, [Grinding Sequence] in this chapter) to compensate for variation in thickness values of the loaded wafers is set up. "Z1/Z2 Aircut (μm)" setting on the Automatic Program Set, Edit screen takes precedence over this parameter if it is set up. - Acceptable input range: 0 to 1000 (μm) - Increments: 1 (μm) - Standard setting: Z1 50 μm Z2 10 μm	
[12]	Wafer thickness at P1 position (refer to section 3-9, [Grinding Sequence] in this chapter) is shown. This data is automatically calculated from the associated data settings on the Automatic Program Set, Edit screen. It is possible to change this data. However, under the normal circumstances, it should not be changed.	

[Setting Item]

Item No.	Descriptions
[13]	Z-axis feed rate in P1 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[14]	Chuck table rotative speed in P1 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[15]	Wafer thickness at P2 position (refer to section 3-9, [Grinding Sequence] in this chapter) is shown. This data is automatically calculated from the associated data settings in the Automatic Program Set, Edit screen. It is possible to change this data. However, under the normal circumstances, it should not be changed.
[16]	Z-axis feed rate in P2 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[17]	Chuck table rotative speed in P2 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[18]	Wafer thickness at P3 position (refer to section 3-9, [Grinding Sequence] in this chapter) is shown. This data is automatically calculated from the associated data settings in the Automatic Program Set, Edit screen. It is possible to change this data. However, under the normal circumstances, it should not be changed.
[19]	Z-axis feed rate in P3 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[20]	Chuck table rotative speed in P3 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[21]	Number of chuck table revolutions made in the spark out process (refer to section 3-9, [Grinding Sequence] in this chapter) is set up. If it is set to "0", spark out operation is not performed. - Acceptable input range: 0 to 999 (revolutions) - Increments: 1 (revolution)
[22]	Chuck table rotative speed in the spark out process is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))

[Setting Item]

Item No.	Descriptions
[23]	Escape cut amount (refer to section 3-9, [Grinding Sequence] in this chapter) is set up. When it is set to "0", escape cut operation is not performed. "Escape Amount (μm)" on the Automatic Program Set, Edit screen takes precedence over this parameter if it is set up. - Acceptable input range: 0.0 to 100.0 (μm) - Increments: 0.1 (μm)
[24]	Z-axis feed rate in escape cut operation is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[25]	Chuck table rotative speed in escape cut operation is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[26]	Expected grinding time (sec.) per wafer calculated from the set up values of the associated data items is shown.

[Function Key]

Press	To
F1	Return to the GRIND DATA screen.
F2	Call up the Automatic Program Set, Edit screen.
F3	Call up the SPECIAL FUNCTION Screen.
F4	Not used.
F5	Save the changed data. Whenever any setup data is changed, make sure to press this key before moving to another screen.
F6	Call up the GRIND DATA LIST screen.
F7	Not used.
F8	Not used.

3-5. Automatic Program Set, Edit Screen

Automatic Program Set, Edit screen

The Automatic Program Set, Edit screen is mainly used to set up/edit the grinding amount related data.
The standard values for the setup items vary depending on the used wheel or grinding conditions. Refer to Section 1, [Grinding Program Setup Samples] in chapter G for examples of grinding program setup.

To call up the Automatic Program Set, Edit screen, press the <F2> key on the Edit Program screen.

NOTICE

- The Automatic Program Set, Edit screen includes the items that are also set up on the Edit Program screen (see the table below).
  For these items, the set up data that is lastly saved by the [F05: Save] key (of either the Edit Program Screen or the Automatic Program, Set, Edit Screen) becomes effective.
  Data change/saving made for an item on the Edit Program screen, however, is not automatically reflected on the same item on the Automatic Program Set, Edit screen.

Edit Program screen	Automatic Program Set, Edit screen
Z1 (Z2)Aircut	Z1 (Z2) Aircut
Z1 (Z2) P1 Thick.	Z1 (Z2) P1^^P2 Off Amount
Z1 (Z2) P2 Thick.	Z1 (Z2) P2^^P3 Off Amount
Z1 (Z2)Escape Thic	Z1 (Z2) Escape Amount

- If "(Z1)/(Z2) Aircut" parameter is set to a value smaller than the standard setup value, wafer/wheel breakage or machine failure as a result of wafer thickness error, wheel position setup error, or other discrepancies may occur. Make sure to enter a value equaling to or larger than the standard value.

- The standard setting value for the "Off Amount Guarant." parameter is 15μm. If this parameter is set to a value smaller than 15 μm, partial grinding or decreased ground-surface strength may result.

[Screen]

Page [G04]	GRIND MODE	YYYY/MM/DD HH:MM:SS

Automatic Program Set, Edit
Program   No.= [1]   ID   = [2]
                    Rmrk= [3]
Wafer   Diameter   [4]   inch
Original Thickness   [5]   μm
Finished Thickness   [6]   μm

Z1   Aircut   (μm)   [7]   Escape Amount   (μm)   [10]
P1^^P2 Off Amount (μm)   [8]   Height Adjust   (μm)   [11]
P2^^P3 Off Amount (μm)   [9]   Off Amount Guarant. (μm)   [12]

Z2   Aircut   (μm)   [7]   Escape Amount   (μm)   [10]
P1^^P2 Off Amount (μm)   [8]   Height Adjust   (μm)   [11]
P2^^P3 Off Amount (μm)   [9]   Off Amount Guarant. (μm)   [12]
Z2 Total Amount   (μm)   [13]

F01 : Previous scrn.	F02 :	F03 :	F04 :
F05 : Save	F06 :	F07 :	F08 :

Z1-axis side setting items

Z2-axis side setting items

[Setting Item]

Item No.	Descriptions
[1]	Program No. is shown.
[2]	Program ID is shown.
[3]	Comment on the program is shown.
[4]	Grinding wafer size is shown.
[5]	Original (loaded) wafer thickness is shown.
[6]	Finished wafer thickness is shown.
[7]	Air cut amount is set up. Make sure to enter a value equaling to or larger than the following standard setting values. Otherwise, wafer/wheel breakage or machine failure may result. - Acceptable input range: 0 to 1000 (μm) - Increments: 1 (μm) - Standard setting: Z1 50 (μm) Z2 10 (μm)
[8]	Grinding amount between P1 position and P2 position is set up. (Refer to Section 3-9 in this chapter.) - Acceptable input range: 0.0 to 200.0 (μm) - Increments: 0.1 (μm)
[9]	Grinding amount between P2 position and P3 position is set up. (Refer to Section 3-9 in this chapter.) - Acceptable input range: 0.0 to 200.0 (μm) - Increments: 0.1 (μm)

[Setting Item]

Item No.	Descriptions
[10]	Escape cut amount is set up. (Refer to Section 3-9 in this chapter.) If it is set to "0", escape cut operation is not performed. - Acceptable input range: 0 to 100 (μm) - Increments: 1 (μm)
[11]	Height adjustment value (correction amount) to compensate for variation of the actual finished wafer thickness from the target finished wafer thickness is set up. $$\text{Height Adjust} = \frac{\text{target finished}}{\text{thickness}} - \frac{\text{actual finished}}{\text{thickness}}$$ - Refer to "Procedures to measure actual finished wafer thickness values" in this section for the procedures to measure the actual finished thickness value of ground wafers. - The height adjustment value set up here for a grinding program is effective only when the program is used for grinding. - Acceptable input range: -100.0 to 100.0 (μm) - Increments: 0.1 (μm)
[12]	Minimum grinding amount is set up. If thickness of a loaded wafer measured by the height gauge is out of the acceptable value range as indicated below, an error is issued. $$\text{Loaded wafer thickness} > \frac{\text{Finished}}{\text{Thickness}} - \frac{\text{Off Amount Guarant.}}{\text{(this parameter)}}$$ The standard setting value for "Off Amount Guarant." (this parameter) is 15μm. If this parameter is set to a value smaller than 15 μm, partial grinding or decreased ground-surface strength may result. - Acceptable input range: 0 to100 (μm) - Increments: 1 (μm) - Standard setting: 15 (μm)
[13]	Z2 grinding amount is set up. - Acceptable input range: 0.0 to 200.0 (μm) - Increments: 0.1 (μm) - Standard setting: 20.0 (μm)
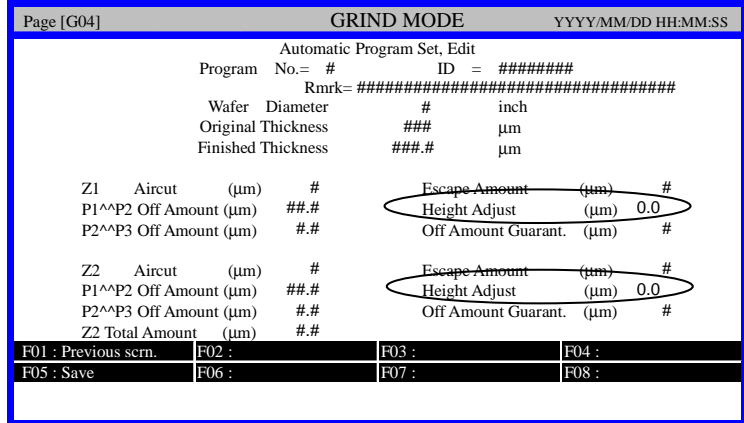
[Function Key]

Press	To
F1	Return to the Edit Program screen.
F2	Not used.
F3	Not used.
F4	Not used.
F5	Save the changed data. Whenever any setup data is changed, make sure to press this key before moving to another screen.
F6	Not used.
F7	Not used.
F8	Not used.

For calculation of a "height adjust" value, it is necessary to obtain the actual Z1/Z2 finished wafer thickness values. The procedures to measure the finished wafer thickness values are described here.

Step No.	Do This
1	Call up the Automatic Program Set, Edit screen.
2	Set Z1/Z2 "Height Adjust" parameters to <0.0> respectively.
3	Press the <F5> key.
	- The message "Is it OK to save the program?" appears.
4	Press the <ENTER> key.
	- The changed data is saved and the Edit Program screen appears.
5	Make the following settings on the Edit Program screen.
	Z1 Grinding: <Use> (Z1) Height Gauge: <Set>
	Z2 Grinding: <Pass> (Z2) Height Gauge: <Pass>
6	Press the <F5> key to save the changed data.
7	Perform full auto operation to grind wafers.
	- Use wafers without protective materials such as tape to obtain accurate measurement values.
	- Since Z2-axis grinding is disabled, Z1-axis grinding alone is performed.
8	Measure the thickness of the ground wafers.
	- The values obtained here are the actual Z1 finished wafer thickness values.
9	Make the following settings on the Edit Program screen.
	Z1 Grinding: <Pass> (Z1) Height Gauge: <Pass>
	Z2 Grinding: <Use> (Z2) Height Gauge: <Set>
10	Following the same steps taken for obtaining the actual Z1 finished wafer thickness values, measure the actual Z2 finished wafer thickness values.

Screen for Step 2:

```
Page [G04]                    GRIND MODE          YYYY/MM/DD HH:MM:SS

                       Automatic Program Set, Edit
              Program   No.=  #              ID  =  ########
                       Rmrk= ###############################
              Wafer   Diameter           #        inch
              Original Thickness         ###      μm
              Finished Thickness         ###.#    μm

        Z1     Aircut      (μm)     #      Escape Amount      (μm)     #
        P1^^P2 Off Amount (μm)    ##.#     Height Adjust      (μm)   0.0
        P2^^P3 Off Amount (μm)     #.#     Off Amount Guarant. (μm)     #

        Z2     Aircut      (μm)     #      Escape Amount      (μm)     #
        P1^^P2 Off Amount (μm)    ##.#     Height Adjust      (μm)   0.0
        P2^^P3 Off Amount (μm)     #.#     Off Amount Guarant. (μm)     #
        Z2 Total Amount   (μm)     #.#
F01 : Previous scrn.   F02 :              F03 :              F04 :
F05 : Save             F06 :              F07 :              F08 :
```

3-6. SPECIAL FUNCTION Screen

SPECIAL FUNCTION Screen

The SPECIAL FUNCTION screen is mainly used to set up/edit the robot arm related data such as cassette processing order or wafer transport method.

To call up the SPECIAL FUNCTION screen, press the <F3> key on the Edit Program screen.

[Screen]

```
Page [G12]                        SPECIAL FUNCTION           YYYY/HH/DD HH:MM:SS

>>Robot Parameter Setting
    Cassette flow select                    <  [1]  >
    Cassette Operating Mode                 <  [2]  >
    Robot Pick : Flip over movement         <  [3]  >
    Grind mode                              <  [4]  >
    Flip over : BSG. last unload            <  [5]  >
    Z1 special grinding                     <  [6]  >
    Z1 count offset                         <  [7]  >
    Z2 special grinding                     <  [8]  >
    Z2 count offset                         <  [9]  >




 F01 : Previous scrn.   F02 :            F03 :            F04 :
 F05 :                  F06 :            F07 :            F08 :
```

[Setting Item]

Item No.	Descriptions	
[1]	Method of wafer flow (from "loading" to "unloading") is set up using the <SEL> key. - Standard setting: <SAME>	
	SAME	Wafers after grinding are returned back to the same cassette as they came.
	OPEN	Wafers after grinding are stored into the other side cassette (Wafers loaded from cassette A are unloaded into cassette B, and wafers loaded from cassette B are unloaded into cassette A).
[2]	Cassette processing order is set up using the <SEL> key. - Standard setting: <A→B Cycle>	
	A→B Cycle	When a cassettes is placed both on the cassette A and B stages at the start of full auto operation, wafer processing starts from Cassette A.
	B→A Cycle	When a cassette is placed both on the cassette A and B stages at the start of full auto operation, wafer processing starts from Cassette B.

[Setting Item]

Item No.	Descriptions	
[3]	Reversal/non-reversal of wafers after loading or before unloading is set up. - Standard setting: \<Both times\>	
	Both times	- When loaded from the cassette, wafers are reversed and then transported to the position table. - Ground wafers are reversed again before they are unloaded into the cassette (after washing at spinner).
	Loading	- When loaded from the cassette, wafers are reversed and then transported to the position table. - Ground wafers are not reversed before unloaded into the cassette.
	Unload-ing	- Ground wafers are reversed before unloaded into the cassette (after washing at spinner). - Wafers are not reversed when they are loaded from the cassette.
	Deactivate	- Wafer reversal by the robot arm is not performed.
[4]	[User-specified spec.] Whether one surface of the wafer is ground or both surfaces of the wafer are ground is set up. Normally, it should be set to "1 surface".	
[5]	[User-specified spec.] This parameter is used when both-surface grinding is performed. Normally, it should be set to "Pass".	
[6], [8]	[User-specified spec.] This parameter is used when "5 μm grinding" (grinding amount is only 5 μm) is performed. Normally, it should be set to "Pass". Contact your nearest DISCO Office or DISCO service office if you want to use this function.	
	Set	"Loaded wafer too thin" error is not detected.
	Pass	"Loaded wafer too thin" error is detected.
[7], [9]	[User-specified spec.] This parameter is used when "5 μm grinding" (grinding amount is only 5 μm) is performed. Normally, it should be set to "0.0". Contact your nearest DISCO Office or DISCO service office if you want to use this function.	

[Function Key]

Press	To
F1	Return to the Edit Program screen.
F2	(Not used)
F3	(Not used)
F4	(Not used)
F5	(Not used)
F6	(Not used)
F7	(Not used)
F8	(Not used)

3-7. GRIND DATA LIST Screen

GRIND DATA LIST screen

You can see a list of the grinding programs stored in the machine on the GRIND DATA LIST screen. Selection and duplication of the programs are also made on the screen.

To call up the GRIND DATA LIST screen, press the <F6> key on the GRIND DATA screen or Edit Program screen.

[Screen]

```
Page [G02]                    GRIND DATA LIST          YYYY/MM/DD HH:MM:SS
 No.     ID                Remark            Grind Data        Ver.*********

 [1]     [2]                  [3]              [4]   [5]   [6]      [7]

 4     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 5     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 6     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 7     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 8     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 9     ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 10    ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 11    ########   #############################   # inch  ###  <>###   YYYY/MM/DD
 12    ########   #############################   # inch  ###  <>###   YYYY/MM/DD


 F01 : Previous scrn.    F02 :            F03 : Copy         F04 :
 F05 :                   F06 :            F07 :              F08 :
 G : [ENTER] key : Go into Edit Mode
```

Grinding programs are indicated in the following colors and ID indication forms according to their attributes (write protect, execution lock, etc.)

Color	ID indication form	Attribute
White	ID name (No bracket)	The program is free from attribute binding.
Yellow	< ID name >	The program is write-protected (set to [wr protect]).
Purple	= ID name =	The program is execution-locked (set to [exec. lock]).
Red	< ID name =	The program is write-protected and execution locked (set to [wr/ex lock]).

Attributes for the programs are set up in the "Grinding Data Protect Setting" parameter on the EDIT PARAMETER (OTHER) screen. Refer to Section 3-6, [Parameters in EDIT PARAMETER (OTHER) Screen] in Chapter E for details.

[Setting Item]

Item No.	Descriptions
[1]	Program number is shown. Up to 60 grinding programs (No. 1 - 60) can be registered.
[2]	Program ID is shown.
[3]	Comment on the program is shown.
[4]	Wafer size registered in the program is shown.
[5]	Original wafer thickness registered in the program is shown.
[6]	Finished wafer thickness registered in the program is shown.
[7]	Date the program is saved is shown.

[Function Key]

Press	To
F1	Return to the previous screen.
F2	Not used.
F3	Duplicate a grinding program. - Refer to Section 3-2, [Duplication of Grinding Program] in this chapter for the procedures to duplicate a grinding program.
F4	Not used.
F5	Not used.
F6	Not used.
F7	Not used.
F8	Not used.

3-8. EDIT ID/Comment Screen

EDIT ID/Comment Screen

Program ID and the comment on the program are set up on the EDIT ID/Comment screen.

To call up the EDIT ID/Comment screen, move the cursor to "ID" or "Rmrk" on the GRIND DATA screen and press the <ENTER> key.

[Screen]

```
Page [MT02]                    EDIT ID/Comment           YYYY/MM/DD HH:MM:SS
                            [< Within # w>]                    Ver.*********

                     [1]_____

                 A    B    C    D    E    F    G    H
                 I    J    K    L    M    N    O    P
                 Q    R    S    T    U    V    W    X
                 Y    Z    #    sp   %    &    _    -


F01 : Edit Completed   F02 : Back Space    F03 : Clear Enter    F04 :
F05 :                  F06 :               F07 :                F08 :
G : Choose a letter by cursor
G : Use numeral key to input numeral.
```

[Setting Item]

Item No.	Descriptions
[1]	ID or comment for the program is set up. For edition, select a character you wish to enter using the cursor keys and press the <ENTER> key. Use numeric keys to enter numerals.

[Function Key]

Press	To
F1	Return to the previous screen after setting up ID or comment data.
F2	Erase a character on the left of the cursor
F3	Erase all characters.
F4	Not used.
F5	Not used.
F6	Not used.
F7	Not used.
F8	Not used.

3-9. Grinding Sequence

Grinding sequence

This section describes about the grinding sequence of this machine.

To set up the grinding program data and parameters, it is important to know the grinding sequence and the terms used in describing the sequence.

Operation sequence from the start of Z-axis descent to completion of grinding
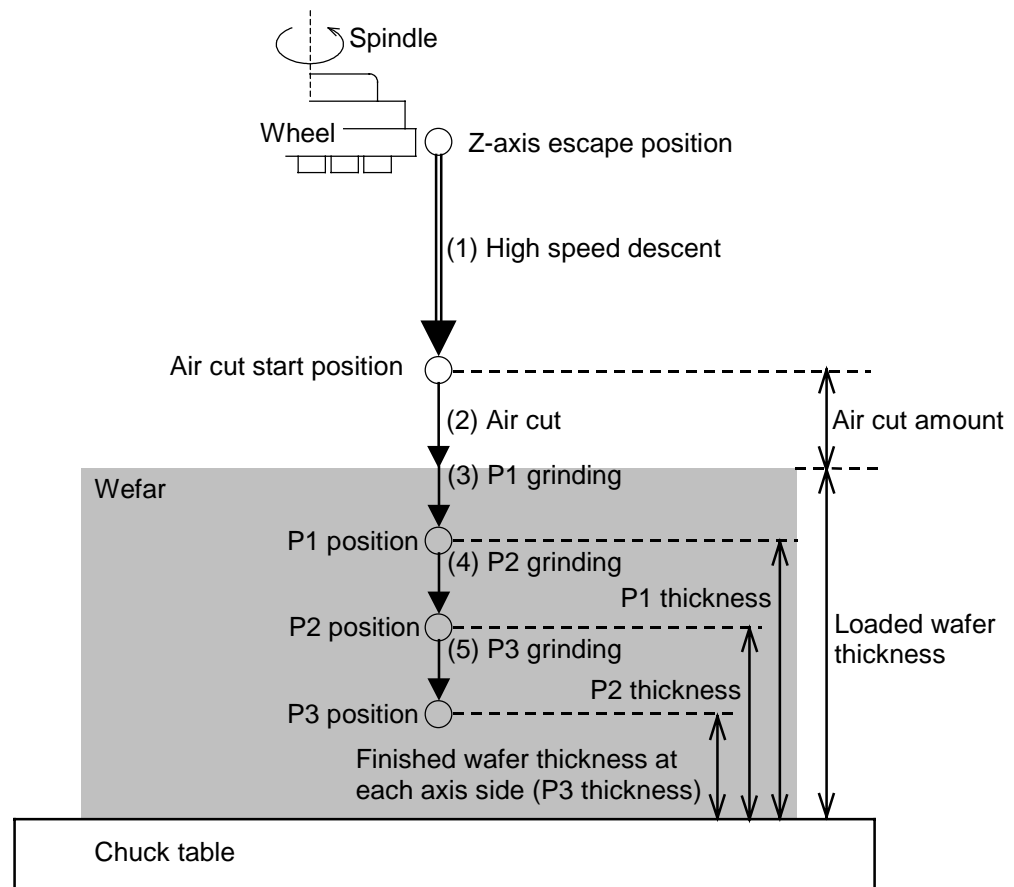
	Sequence	Action
(1)	High speed descent	Z-axis moves down in high speed from the escape position to the air cut start position.
(2)	Air cut	Loaded wafers vary in thickness and that could cause the wafers to break if the Z-axis keeps descending in high speed to the set up loaded-wafer-thickness position. To avoid this, the Z-axis descent speed changes from high to low (P1 Feed Rate) from a point of "Loaded wafer thickness + Air Cut".
(3)	P1 grinding	Z-axis moves down to P1 position in the speed of "P1 Feed Rate".
(4)	P2 grinding	Z-axis moves down to P2 position in the speed of "P2 Feed Rate".
(5)	P3 grinding	Z-axis moves down to P3 position in the speed of "P3 Feed Rate".

Operation sequence from completion of grinding to Z-axis escape
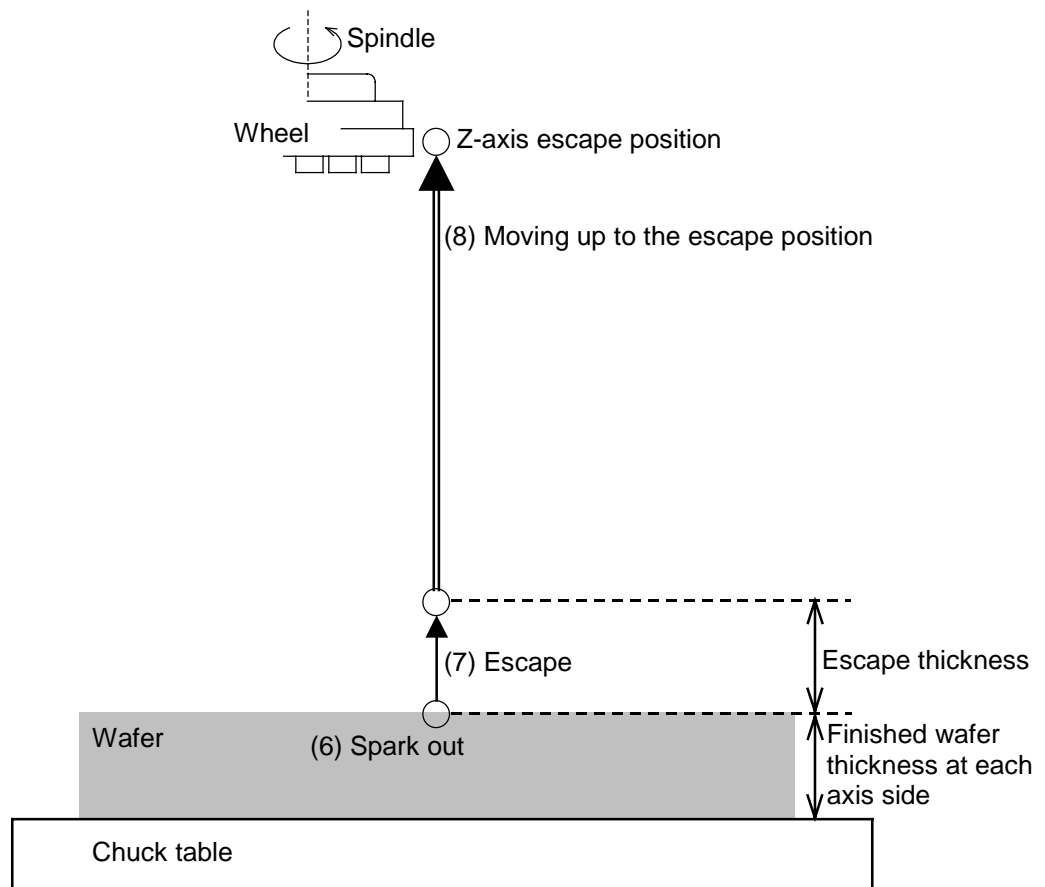
	Sequence	Action
(6)	Spark out	With the Z-axis position unchanged, the chuck table rotates for the specified number of times to improve the flatness of the ground wafer surface.
(7)	Escape	When the spark out process finishes, the Z-axis moves up in low speed to a point specified in the "Escape Cut (µm)" parameter to avoid making any marks on the ground surface when the wheel tooth leaves the wafer surface.
(8)	Moving up to the escape position	The Z-axis moves up in high speed to the escape position.

3-10. Cassette ID Entry

Use/disuse of cassette ID function

This function is incorporated into the machine prior to its shipment upon customer's choice.

Contact your nearest DISCO office or DISCO service office if you want to change the use/disuse of this function.

Cassette ID function

By setting up ID for each cassette, you can manage wafer grinding data by cassette.

* "ID" shown on the GRIND DATA screen and "Cassette ID" are completely different. "ID" on the GRIND DATA screen is set up for each grinding program and "Cassette ID" is set up for each cassette.

Cassette ID entry (CST. ID EDIT) screen

The "CST. ID EDIT" screen is used to set up a cassette ID. When the machine is set to use the cassette ID function, you must make cassette ID entry on this screen before starting full auto operation.

[Screen]

Page [G04]	CST. ID EDIT	YYYY/MM/DD HH:MM:SS
	CASETTE ID : [1]	
	PREVIOUS ID :	
F01 : Previous scrn.	F02 :	F03 :	F04 :
F05 :	F06 :	F07 :	F08 :

[Setting item]

Item No.	Descriptions
[1]	Cassette ID name

3-11. Finished Wafer Thickness Data Correction by Wafer

Finished wafer thickness data correction (by wafer) function

By using this function (user-specified spec.), you can correct finished thickness data of each wafer on the "GRIND DATA (Each Wafer finish Thickness adjust Edit)" screen before starting full auto operation.

GRIND DATA (Each Wafer finish Thickness adjust Edit)" screen

The screen used to minutely change the finished thickness data of each wafer is described here.

[Screen]

```
Page [G04]                    GRIND DATA            YYYY/MM/DD HH:MM:SS
                      Each Wafer finish Thickness adjust Edit
                         Program No. = [1]        ID = [2]
                                Rmrk = [3]
                  Wafer      Diameter          [4]   inch
                  Orignal    Thickness         [5]   μm
                  Finished   Thickness         [6]   μm
   ------------------ [=====B-cassette=====]------------------[=====A- cassette =====] --------------------
   1)    [7]   9)    [7]  17)   [7]  25)    [7]  1)   [7]   9)    [7]  17)   [7]  25)    [7]
   2)    [7]  10)    [7]  18)   [7]  26>    [7]  2)   [7]  10)    [7]  18)   [7]  26>    [7]
   3)    [7]  11)    [7]  19)   [7]  27>    [7]  3)   [7]  11)    [7]  19)   [7]  27>    [7]
   4)    [7]  12)    [7]  20)   [7]  28>    [7]  4)   [7]  12)    [7]  20)   [7]  28>    [7]
   5)    [7]  13)    [7]  21)   [7]  29>    [7]  5)   [7]  13)    [7]  21)   [7]  29>    [7]
   6)    [7]  14)    [7]  22)   [7]  30>    [7]  6)   [7]  14)    [7]  22)   [7]  30>    [7]
   7)    [7]  15)    [7]  23)   [7]             7)   [7]  15)    [7]  23)   [7]
   8)    [7]  16)    [7]  24)   [7]             8)   [7]  16)    [7]  24)   [7]
   F01 : Previous scrn.    F02 :              F03 : B-cst clr data    F04 : A-cst clr data
   F05 :                   F06 :              F07 :                   F08 :
```

[Setting item]

Item No.	Descriptions
[1]	Selected program No. is shown.
[2]	Program ID is shown.
[3]	Comment on the program is shown.
[4]	Set up grinding wafer size is shown.
[5]	Set up original (loaded) wafer thickness is shown.
[6]	Set up finished wafer thickness is shown.
[7]	Correction value of finished wafer thickness data for each wafer is set up. The actual finished wafer thickness value will be [6] + [7]. Acceptable input range: -20.0 to 20.0 μm Standard setting 0.0 μm

3-12. Grinding Control Method Setting Screen

Grinding control method setting screen

This screen is used to set up various grinding control methods.

To call up the "grinding control method setting" screen, press the <OP-2> key on the GRIND DATA screen.

[Screen]

```
Page [G01]                     GRIND DATA              YYYY/HH/DD HH:MM:SS


                        <Start>   **** A    *** [1]
                                  **** C    *** [1]

                   Z1 : GR mode sel  <  [2]  >      start      < [3] >
                   Z2 : GR mode sel  <  [2]  >      start      < [3] >

                   C/T mode Max-Min DIF comparison value      [ [4] ]



   F01 : Previous scrn.    F02 :              F03 :              F04 :
   F05 :                   F06 :              F07 :              F08 :
```

[Setting Item]

Item No.	Descriptions
[1]	This setup item is not used. Even if data is set up for the item, it does not affect any machine movement. "0" should normally be entered.
[2]	The same data as in "Grinding mode select" parameter in "Grinding special select" parameter group on the EDIT PARAMETER (GRIND) screen appears here. Refer to Section 3-1, [Parameters in EDIT PARAMETER (GRIND) Screen] in Chapter E for details of the "Grinding mode select" parameter. If the set up data here is changed, the change is also reflected on the "Grinding mode select" parameter data.
[3]	The same data as in "start" parameter in "Grinding special select" parameter group on the EDIT PARAMETER (GRIND) screen appears here. Refer to Section 3-1, [Parameters in EDIT PARAMETER (GRIND) Screen] in Chapter E for details of the "start" parameter If the setup data here is changed, the change is also reflected on the "start" parameter data (on the EDIT PARAMETER (GRIND) screen).

[Setting Item]

Item No.	Descriptions
[4]	This function is effective when "[2] GR mode sel" is set to <Chuck> or during the "Chuck" period of <Ch→Su> or <Su→Ch>. When the difference between the maximum thickness value and the minimum thickness value of a loaded wafer exceeds the value set up here, an error is issued. The error-causing wafer is nor ground. This function prevents wafers with warping or grooving from being processed for grinding to cause a decrease in machine's throughput. - If "0" is entered, this function does not work. - Unit: μm

4. Set up and Edition of Dressing Program Data

Summary of this section

Dressing programs are used for dressing wheels. This machine can register up to 6 dressing programs (No. 1 through 6).

This section describes the procedures and the screens used for setting up, editing and duplicating dressing program data.

Section No.	Title	Contents
4-1	Creation/Edition of Dressing Program	- Procedures to newly create a dressing program - Procedures to check/change the contents of a dressing program
4-2	Duplication of Dressing Program	- Procedures to duplicate a dressing program
4-3	Dress Data Edit Screen	- Contents of the dress data edit screen
4-4	Dress Program List Screen	- Contents of the dress program list screen

4-1. Creation/Edition of Dressing Program

Procedures to newly create a dressing program

The procedures to newly create a dressing program are described here. Refer to sections 4-3 and 4-4 in this chapter for details of the associated screens.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and press the <ENTER> key.
2	Press the <F2> key. - The dress data edit screen appears.
3	Press the <F6> key. - The dress program list screen appears.
4	Using the cursor keys, select the program number (1 - 6) for the dressing program you are going to create. - Refer to section 4-4, [Dress Program List Screen] in this chapter for details of the dress program list screen.
5	Press the <ENTER> key. - The dress data edit screen appears.
6	Edit the data items on the dress data edit screen. - Refer to Section 4-3, [Dress Data Edit Screen] in this chapter for details of the dress data edit screen.
7	After confirming all data are correctly set up, press the <F5> key to save the changes. - Editing of a dressing program is now completed.

Procedures to check the contents of a dressing program

The procedures to check the contents of a dressing program are described here. Refer to sections 4-3 and 4-4 in this chapter for details of the associated screens.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and press the <ENTER> key.
2	Press the <F2> key. - The dress data edit screen appears.

Procedures to check the contents of a dressing program (Continued)

Step No.	Do This
3	Press the <F6> key. - The dress program list screen appears.
4	Using the cursor keys, select the dressing program (No. 1 - 6) you want to check. - Refer to Section 4-4, [Dress Program List Screen] in this chapter for details of the dress program list screen.
5	Press the <ENTER> key. - The dress data edit screen appears. - Data of the set up items on the dress data edit screen automatically change to those of the selected program.
6	Check the data of the set up items on the screen. - Refer to Section 4-3, [Dress Data Edit Screen] for details.

Procedures to change the contents of a dressing program

The procedures to make change in the contents of a dressing program are described here.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and press the <ENTER> key.
2	Press the <F2> key. - The dress data edit screen appears.
3	Press the <F6> key. - The dress program list screen appears.
4	Using the cursor keys, select the dressing program (No. 1 - 6) you want to make change in its contents. - Refer to Section 4-4, [Dress Program List Screen] in this chapter for details of the dress program list screen.
5	Press the <ENTER> key. - The dress data edit screen appears.
6	Make change in the setup data on the screen referring to [Procedures to newly create a dressing program] in this section.

4-2. Duplication of Dressing Program

Cautions in duplicating a dressing program

When a dressing program is duplicated, data of its destination program number is overwritten and erased. If you want to keep the data of the destination program number, save the data into floppy disk before performing data duplication.

- Refer to Section 2, [Data Management by Floppy Disk] in chapter F for the procedures to save data into floppy disk.

Procedures to duplicate a dressing program

The procedures to duplicate an existing dressing program under another program number are described here.
The example below copies the contents of the program No. 2 under the program No 5. To cancel duplication, press the <CE> key.

Step No.	Do This
1	Press the <F6> key on the dress data edit screen. - The dress program list screen appears.
2	Press the <F3> key. - The following message appears on the center of the screen Input the number you want to copy from.　(Cancel : [CE]) 　　　From : No. _ [　　　　　　　　　　　　　　　　　　　　　　　]
3	Enter the program number of the program you want to copy (2 in this case) into "From: No." column. Input the number you want to copy from.　(Cancel : [CE]) 　　　From : No. 2　　　=>　To : No. _ [　　　　　　　　　　　　　　　　　　　　　　　]
4	Enter the destination program number (5 in this case) into "To: No." column. Input the number you want to copy from.　(Cancel : [CE]) 　　　From : No. 2　　　=>　To : No. 5 [key : Press please. (Correct No. [SEL]　Copy to [ENTER]　)
5	After verifying that "From: No." and "To: No." are correct, press the <ENTER> key. - The duplication process starts with the message "Now copying." displayed. - When duplication of the program completes, the "Now copying." message disappears.

4-3. Dress Data Edit Screen

Dressing data used for dressing wheels are set up on the dress data edit screen. The standard values for the set up items vary depending on the used wheel or dressing conditions. Refer to Section 2, [Dressing Program Setup Samples] in Chapter G for examples of dressing program setup.

To call up the dress data edit screen, first press the <F3> key on the top menu screen to call up the GRIND MAINTENANCE screen, and then press the <F2> key on the GRIND MAINTENANCE screen. The dress data edit screen then appears.

NOTICE

- If "Aircut" parameter is set to a value smaller than the standard setup value (100 μm), dresser board/wheel breakage or machine failure as a result of varied dresser board thickness, wheel position setup error or other discrepancies may occur. Make sure to enter a value equaling to or larger than the standard setup value.

- When entering "Thickness of Dresser" value, ensure that it represents the maximum thickness measured at several points of the dresser board used. If you enter a value smaller than the actual value, dresser board/grinding wheel breakage or machine failure may be caused.

[Screen]

```
Page [B01]                          DRESS            YYYY/MM/DD HH:MM:SS


                              ID    == [2]
              Program No. == [1]    Rmrk == [3]

               Dressed Axis              [4]    Axis
               Thickness of Dresser      [5]    μm
               Spindle R.P.M.            [6]    rpm   [  [7]   rpm]
               Aircut                    [8]    μm
               Dressing Amount           [9]    μm
               Feed Rate                 [10]   μm/s
               Chuck Table R.P.M.        [11]   rpm
               Process Time              [12]   Sec.


 F01 : Previous scrn.    F02 :              F03 :              F04 :
 F05 : Save              F06 : Program List F07 :              F08 :
```

[Setting Item]

Item No.	Descriptions
[1]	Selected program number is shown. - To select another program number, call up the dress program list screen by pressing the <F6> key. - Refer to Section 4-4, [Dress Program List Screen] for details of the dress program list screen.
[2]	Program ID (up to 8 characters) is shown. If you move the cursor to this data item and press the <ENTER> key, the "EDIT ID/Comment" screen for editing the ID appears. - Refer to Section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[3]	Comment on the program (up to 35 characters) is shown. If you move the cursor to this data item and press the ENTER key, the "EDIT ID/Comment" screen for editing the comment appears. - Refer to section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[4]	The axis (Z1-axis or Z2-axis) for performing dressing is selected by the <SEL> key.
[5]	Maximum thickness value of the dresser board measured at several points is entered. - Acceptable input range: 0 to 2500 (μm) - Increments: 1 (μm)
[6]	Spindle rotative speed during dressing is set up. - Acceptable input range: 1000 to 7000 (min^{-1}(rpm)) - Increments: 1 (min^{-1}(rpm))
[7]	Present spindle rotative speed (min^{-1}(rpm)) is shown.
[8]	Air cut amount in dressing is set up. If this parameter is set to a value smaller than the standard setting value (100 μm), dresser board/wheel breakage or machine failure may occur. Make sure to enter a value equaling to or larger than the standard setup value. - Acceptable input range: 0 to 100 (μm) - Increments: 1 (μm) - Standard setting: 100 (μm)
[9]	Dressing amount is set up. - Acceptable input range: 0 to 2500 (μm) - Increments: 1 (μm)
[10]	Z-axis feed rate for dressing is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)

[Setting Item]

Item No.	Descriptions
[11]	Chuck table rotative speed for dressing is set up. - Acceptable input range: -300 to 300 (min^{-1}(rpm)) - Increments: 1 (min^{-1}(rpm))
[12]	Expected dressing time (sec.) calculated from the set up values of the associated data items is shown.

[Function Key]

Press	To
F1	Return to the GRIND MAINTENANCE screen.
F2	Not used.
F3	Not used.
F4	Not used.
F5	Save the changed data. Whenever any setup data is changed, make sure to press this key before moving to the GRIND MAINTENANCE screen.
F6	Call up the dress program list screen.
F7	Not used.
F8	Not used.

4-4. Dress Program List Screen

You can see a list of the dressing programs stored in the machine on the dress program list screen. Selection and duplication of the programs are also made on the screen.

To call up the dress program list screen, press the <F6> key on the dress data edit screen.

[Screen]

```
Page [B02]                       DRESS              YYYY/MM/DD HH:MM:SS
  No.     ID              Remark                        Ver.*********

  [1]     [2]                    [3]                  [4]         [5]

  4    ########   ############################   Job Axis :  #   YYYY/MM/DD
  5    ########   ############################   Job Axis :  #   YYYY/MM/DD
  6    ########   ############################   Job Axis :  #   YYYY/MM/DD




  F01 : Previous scrn.    F02 :            F03 : Copy       F04 :
  F05 :                   F06 :            F07 :            F08 :
  G : [ENTER] key: Go into Edit Mode
```

Dressing programs are indicated in the following colors and ID indication forms according to their attributes (write protect, execution lock, etc.)

Color	ID indication form	Attribute
White	ID name (No bracket)	The program is free from attribute binding.
Yellow	< ID name >	The program is write-protected (set to [wr protect]).
Purple	= ID name =	The program is execution-locked (set to [exec. lock]).
Red	< ID name =	The program is write-protected and execution locked (set to [wr/ex lock]).

Attributes for the programs are set up in the "Dressing Data Protect Setting" parameter on the EDIT PARAMETER (OTHER) screen. Refer to Section 3-6, [Parameters in EDIT PARAMETER (OTHER) Screen] in Chapter E for details.

[Setting Item]

Item No.	Descriptions
[1]	Program number is shown. Up to 6 dressing programs (No. 1 through 6) can be registered.
[2]	Program ID is shown. The program ID can be set up on the dress data edit screen.
[3]	Comment on the program is shown. The comment on the program can be set up on the dress data edit screen.
[4]	The axis (Z1 or Z2) registered in the program for performing dressing is shown.
[5]	Date the program is saved is shown.

[Function Key]

Press	To
F1	Return to the dress data edit screen.
F2	Not used.
F3	Duplicate a dressing program. Refer to Section 4-2, [Duplication of Dressing Program] in this chapter for the procedures to duplicate a dressing program.
F4	Not used.
F5	Not used.
F6	Not used.
F7	Not used.
F8	Not used.

5. Set up and Edition of Self-grinding Program Data

Summary of this section

Self-grinding programs are used for performing self-grinding operation. This machine can register up to 6 self-grinding programs (No. 1 through 6).
This section describes the procedures and the screens used for setting up, editing and duplicating self-grinding program data.

Section No.	Title	Contents
5-1	Creation/Edition of Self-grinding Program	- Procedures to newly create a self-grinding program - Procedures to check/change the contents of a self-grinding program
5-2	Duplication of Self-grinding Program	- Procedures to duplicate a self-grinding program
5-3	Self Grind Data Edit Screen	- Contents of the self grind data edit screen
5-4	Self Grind Program List Screen	- Contents of the self grind program list screen

5-1. Creation/Edition of Self-grinding Program

Procedures to newly create a self-grinding program

The procedures to newly create a self-grinding program are described here. Refer to sections 5-3 and 5-4 in this chapter for details of the associated screens.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and then press the <ENTER> key.
2	Press the <F3> key. - The self grind data edit screen appears.
3	Press the <F6> key. - The self grind program list screen appears.
4	Using the cursor keys, select the program number (1 - 6) for the self-grinding program you are going to create. - Refer to Section 5-4, [Self Grind Program List Screen] in this chapter for details of the self grind program list screen.
5	Press the <ENTER> key. - The self grind data edit screen appears.
6	Edit the data items of the self grind data edit screen. - Refer to Section 5-3, [Self Grind Data Edit Screen] in this chapter for details of the self grind data edit screen.
7	After confirming all data are correctly set up, press the <F5> key to save the changes. - Editing of a self-grinding program is now completed.

Procedures to check the contents of a self-grinding program

The procedures to check the contents of a self-grinding program are described here. Refer to sections 5-3 and 5-4 in this chapter for details of the associated screens.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and then press the <ENTER> key.
2	Press the <F3> key. - The self grind data edit screen appears.
3	Press the <F6> key. - The self grind program list screen appears.
4	Using the cursor keys, select the self-grinding program (No. 1 - 6) you want to check. - Refer to Section 5-4, [Self Grind Program List Screen] in this chapter for details of the self grind program list screen.
5	Press the <ENTER> key. - The self grind data edit screen appears. - Data of the set up items on the self grind data edit screen automatically change to those of the selected program.
6	Check the data of the set up items on the screen. - Refer to Section 5-3, [Self Grind Data Edit Screen] for details.

Procedures to change the contents of a self-grinding program

The procedures to make change in the contents of a self-grinding program are described here.

Step No.	Do This
1	Press the <F3> key on the top menu screen. - The GRIND MAINTENANCE screen appears. - If the screen is password-protected, enter the password (GRIND MAINTENANCE) and then press the <ENTER> key.
2	Press the <F3> key. - The self grind data edit screen appears.
3	Press the <F6> key. - The self grind program list screen appears.
4	Using the cursor keys, select the self-grinding program (No. 1 - 6) you want to make change in its contents. - Refer to Section 5-4, [Self Grind Program List Screen] in this chapter for details of the self grind program list" screen.
5	Press the <ENTER> key. - The self grind data edit screen appears.
6	Make change in the setup data on the screen referring to [Procedures to newly create a self-grinding program] in this section.

5-2. Duplication of Self-grinding Program

Cautions in duplicating a self-grinding program

When a self-grinding program is duplicated, data of its destination program number is overwritten and erased. If you want to keep the data of the destination program number, save the data into floppy disk before performing data duplication.

- Refer to Section 2, [Data Management by Floppy Disk] in chapter F for the procedures to save data into floppy disk.

Procedures to duplicate a self-grinding program

The procedures to duplicate an existing self-grinding program under another program number are described here.
The example below copies the contents of the program No. 2 under the program No 5. To cancel duplication, press the <CE> key.

Step No.	Do This
1	Press the <F6> key on the self grind data edit screen. - The self grind program list screen appears.
2	Press the <F3> key. - The following message appears on the center of the screen Input the number you want to copy from. (Cancel : [CE]) From : No. _ [ ]
3	Enter the program number of the program you want to copy (2 in this case) into "From: No." column. Input the number you want to copy from. (Cancel : [CE]) From : No. 2 => To : No. _ [ ]
4	Enter the destination program number (5 in this case) into "To: No." column. Input the number you want to copy from. (Cancel : [CE]) From : No. 2 => To : No. 5 [key : Press please. (Correct No. [SEL] Copy to [ENTER])
5	After verifying that "From: No." and "To: No." are correct, press the <ENTER> key. - The duplication process starts with the message "Now copying." displayed. - When duplication of the program completes, the "Now copying." message disappears.

5-3. Self Grind Data Edit Screen

Self grind data edit screen

Self-grinding data used for performing self-grinding operation are set up on the self grind data edit screen.
The standard values for the set up items vary depending on the used wheel or self-grinding conditions. Refer to Section 3, [Self-grinding Program Setup Samples] in chapter G for examples of self-grinding program setup.

To call up the self grind data edit screen, first press the <F3> key on the top menu screen to call up the GRIND MAINTENANCE screen, and press the <F3> key on the GRIND MAINTENANCE screen. The self grind data edit screen then appears.

NOTICE

If "Aircut" parameter is set to a value smaller than the standard setup value (100 μm), chuck table/wheel breakage or machine failure as a result of wheel position setup error or other discrepancies may occur. Make sure to enter a value equaling to or larger than the standard setup value.

[Screen]

```
Page [S01]                    SELF GRIND              YYYY/MM/DD HH:MM:SS


                                      ID    == [2]
                  Program No. == [1]     Rmrk == [3]
              Self Grind Axis   [4] Axis    Spindle R.P.M.        [5]  rpm  [  [6]  rpm]
                                           Self Grinding Amount    [7]  μm
          Aircut (μm)        [8]   P1->P2Thick. (μm)   [9]   P2->P3Thick. (μm)    [10]

     P1 Grind (μm)       [11]   P2 Grind (μm)        [14]   P3 Grind (μm)        [17]
     Feed Rate (μm/s)    [12]   Feed Rate (μm/s)     [15]   Feed Rate (μm/s)     [18]
     Chuck Table (rpm)   [13]   Chuck Table (rpm)    [16]   Chuck Table (rpm)    [19]
                                Escape Thic (μm)     [22]
     Spark Out (rev)     [20]   Feed Rate (μm/s)     [23]
     Chuck Table (rpm)   [21]   Chuck Table (rpm)    [24]   Process Time (s)  [   [25]   ]
     Total Amount of Self-Grind   [26] μm /  [27]   Times
 F01 : Previous scrn.    F02 :              F03 :              F04 :
 F05 : Save              F06 : Program List F07 :              F08 :

```

D-58

[Setting Item]

Item No.	Descriptions
[1]	Selected program number is shown. - To select another program number, call up the self grind program list screen by pressing the <F6> key. - Refer to Section 5-4, [Self Grind Program List Screen] for details of the self grind program list screen.
[2]	Program ID (up to 8 characters) is shown. If you move the cursor to this data item and press the <ENTER> key, the "EDIT ID/Comment" screen for editing the ID appears. - Refer to Section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[3]	Comment on the program (up to 35 characters) is shown. If you move the cursor to this data item and press the ENTER key, the "EDIT ID/Comment" screen for editing the comment appears. - Refer to Section 3-8, [EDIT ID/Comment Screen] in this chapter for details of the EDIT ID/Comment screen.
[4]	The axis (Z1-axis or Z2-axis) for performing self-grinding is selected by the <SEL> key.
[5]	Spindle rotative speed during self-grinding is set up. - Acceptable input range: 1000 to 7000 (min^{-1}(rpm)) - Increments: 1 (min^{-1}(rpm))
[6]	Present spindle rotative speed (min^{-1} (rpm)) is shown.
[7]	Self-grinding amount is set up. - Acceptable input range: 0 to 2500 (μm) - Increments: 1 (μm)
[8]	Air cut amount for self-grinding is set up. If this parameter is set to a value smaller than the standard setting value (100 μm), chuck table/wheel breakage or machine failure may occur. Make sure to enter a value equaling to or larger than the standard setup value. - Acceptable input range: 0 to 1000 (μm) - Increments: 1 (μm) - Standard setting: 100 (μm)
[9]	Self-grinding amount between the P1 position and P2 position is set up. - Acceptable input range: 0.0 to 2000.0 (μm) - Increments: 0.1 (μm)
[10]	Self-grinding amount between the P2 position and P3 position is set up. - Acceptable input range: 0.0 to 2000.0 (μm) - Increments: 0.1 (μm)

[Setting Item]

Item No.	Descriptions
[11]	P1 position (refer to Section 3-9 of this chapter) is shown. This data is automatically calculated from the setting values of the data items [7] (Self Grinding Amount), [9] (P1 - P2 Thick), and [10] (P2 - P3 Thick). It is possible to change this data. However, it should not be changed under the normal circumstances.
[12]	Z-axis feed rate in P1 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[13]	Chuck table rotative speed in P1 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[14]	P2 position (refer to Section 3-9 of this chapter) is shown. This data is automatically calculated from the setting values of the data items [7] (Self Grinding Amount), [9] (P1 - P2 Thick), and [10] (P2 - P3 Thick). It is possible to change this data. However, it should not be changed under the normal circumstances.
[15]	Z-axis feed rate in P2 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[16]	Chuck table rotative speed in P2 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[17]	P3 position (refer to Section 3-9 of this chapter) is shown. This data is automatically calculated from the setting values of the data items [7] (Self Grinding Amount), [9] (P1 - P2 Thick), and [10] (P2 - P3 Thick). It is possible to change this data. However, it should not be changed under the normal circumstances.
[18]	Z-axis feed rate in P3 grinding is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[19]	Chuck table rotative speed in P3 grinding is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[20]	Number of chuck table revolutions in the spark out process is set up. If it is set to "0", spark out operation is not performed. - Acceptable input range: 0 to 999 (revolutions) - Increments: 1 (revolution)

[Setting Item]

Item No.	Descriptions
[21]	Chuck table rotative speed in the spark out process is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[22]	Escape cut amount is set up. If it is set to "0", escape cut operation is not performed. - Acceptable input range: 0.0 to 100.0 (μm) - Increments: 0.1 (μm)
[23]	Z-axis feed rate in escape cut operation is set up. - Acceptable input range: 0.00 to 80.00 (μm/s) - Increments: 0.01 (μm/s)
[24]	Chuck table rotative speed in escape cut operation is set up. - Acceptable input range: -300 to 300 (min^{-1} (rpm)) - Increments: 1 (min^{-1} (rpm))
[25]	Expected self-grinding time (sec.) calculated from the set up values of the associated data items is shown.
[26]	Total self-grinding amount (μm) so far accumulated in the continuous self-grinding runs (more than once) is shown. When the self-grinding operation terminates, the self-grinding amount is cleared to "0".
[27]	Total number of runs so far performed in the continuous self-grinding runs (more than once) is shown.

[Function Key]

Press	To
F1	Return to the GRIND MAINTENANCE screen.
F2	Not used.
F3	Not used.
F4	Not used.
F5	Save the changed data. Whenever any setup data is changed, make sure to press this key before moving to the GRIND MAINTENANCE screen.
F6	Call up the self grind program list screen.
F7	Not used.
F8	Not used.

5-4. Self Grind Program List Screen

Self grind program list screen

You can see a list of the self-grinding programs stored in the machine on the self grind program list screen. Selection and duplication of the programs are also made on the screen.

To call up the self grind program list screen, press the <F6> key on the self grind data edit screen.

[Screen]

```
┌─────────────────────────────────────────────────────────────────────────┐
│ Page [S02]                    SELF GRIND           YYYY/MM/DD HH:MM:SS     │
│  No.    ID              Remark                          Ver.*********      │
│                                                                           │
│   [1]      [2]                  [3]                   [4]          [5]      │
│                                                                           │
│  4    ########   ############################  Job Axis :  #   YYYY/MM/DD  │
│  5    ########   ############################  Job Axis :  #   YYYY/MM/DD  │
│  6    ########   ############################  Job Axis :  #   YYYY/MM/DD  │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│ F01 : Previous scrn.  F02 :           F03 : Copy        F04 :              │
│ F05 :                 F06 :           F07 :             F08 :              │
│ G : [ENTER] key: Go into Edit Mode                                        │
└─────────────────────────────────────────────────────────────────────────┘
```

Self-grinding programs are indicated in the following colors and ID indication forms according to their attributes (write protect, execution lock, etc.)

Color	ID indication form	Attribute
White	ID name (No bracket)	The program is free from attribute binding.
Yellow	< ID name >	The program is write-protected (set to [wr protect]).
Purple	= ID name =	The program is execution-locked (set to [exec. lock]).
Red	< ID name =	The program is write-protected and execution locked (set to [wr/ex lock]).

Attributes for the programs are set up in the "Self-Grinding Data Protect Setting" parameter on the EDIT PARAMETER (OTHER) screen. Refer to Section 3-6, [Parameters in EDIT PARAMETER (OTHER) Screen] in Chapter E for details.

[Setting Item]

Item No.	Descriptions
[1]	Program number is shown. Up to 6 self-grinding programs (No. 1 through 6) can be registered.
[2]	Program ID is shown.
[3]	Comment on the program is shown.
[4]	The axis (Z1 or Z2) registered in the program for performing self-grinding is shown.
[5]	Date the program is saved is shown.

[Function Key]

Press	To
F1	Return to the self grind data edit screen.
F2	Not used.
F3	Duplicate a self-grinding program. Refer to section 5-2, [Duplication of Self-grinding Program] in this chapter for the procedures to duplicate a self-grinding program.
F4	Not used.
F5	Not used.
F6	Not used.
F7	Not used.
F8	Not used.

E. PARAMETERS

Contents of this chapter

This chapter describes in detail the parameters of this machine and the procedures to edit them.

Section No.	Title	Contents
1	Parameter List	- List of the machine parameters together with their acceptable set up ranges and standard setting values
2	Parameter Edition	- Procedures to change the setup data of the parameters
3	Detailed Descriptions on Each Parameter	- Detailed descriptions of each parameter

About parameters

Parameters are the set up data to control operations and movements of the grinding wheels, cassettes and other machine components. The parameters of this machine can be edited on the EDIT PARAMETER screen.

NOTICE

The parameters of this machine are provided with their predefined standard settings. When you change parameter data, carefully predict the resultant machine movements and make sure that the changed parameters are in the appropriate set up ranges. Improperly set up parameters may cause machine/wafer breakage or adversely affect the machine's grinding accuracy.

The EDIT PARAMETER screen is sub-divided into the following six screens grouped by the related units.
- EDIT PARAMETER (GRIND) screen
- EDIT PARAMETER (HEIGHT GAUGE) screen
- EDIT PARAMETER (TRANSFER) screen
- EDIT PARAMETER (CASSETTE) screen
- EDIT PARAMETER (CLEAN) screen
- EDIT PARAMETER (OTHER) screen

1. Parameter List

Acceptable setup ranges and standard settings of parameters

This section lists up the parameters in the EDIT PARAMETER screen together with their acceptable setup ranges and standard settings.

Parameters in EDIT PARAMETER (GRIND) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Wheel Parameter Setting>			
Z1 (Z2) Minimum Tooth	1 (μm)	0 to 10000	1000
Z1 (Z2) Usable Tooth	Can not be changed.		
Z1 (Z2) Setup Allowance	1 (μm)	0 to 500	50
Z1 (Z2) Excessive Wear	1 (μm)	0 to 50	20
<Wheel Height Setup>			
Z1 (Z2) Block Gauge Height	1 (μm)	0 to 100000	4980
Z1 (Z2) Set Up Method	—	Manual / Auto	Manual
<Spindle Parameter Setting>			
Z1 (Z2) SPD. Rotat. Pre-Alarm	1 (rpm)	-1000 to 0	0
Chuck Wash mode-3 interval wfr.	1(pcs.)	0 to 90	0
<Spindle Current Pre-Alarm (A Code) Setting>			
Z1 (Z2) 4/5/6/8 inch	0.1 (A)	0.0 to 22.0	12.0
<Spindle Current Pre-Alarm (B Code) Setting>			
Z1 (Z2) 4/5/6/8 inch	0.1 (A)	0.0 to 22.0	13.0
<Grinding special select> (Z1/Z2)			
Air cut control select	—	Set / Pass	Pass
Speed change point	1 (μm)	0 to 30	0
Grinding mode select	—	Chuck / Surf. / Ch→Su / Su→ Ch	Chuck
Surface mode wafe limit	1 (μm)	1 to 300	1
start	1(pcs.)	0 to 99	0
<Wheel Parameter Setting>			
Z1 (Z2) Limit Tooth	1 (μm)	0 to 10000	0

Parameters in EDIT PARAMETER (GRIND) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Auto process setting> (User-specified spec.)			
Auto size process	—	Usual Grind / Auto Size Gr / Usual&PW off / Asize&PW off	Usual Grind
Org wafer min. check set	—	Pass / minimum / Specify / min+specify	Pass
Measuring interval	1 (× 10 msec)	1 to 30	8
Specified detect level	0.1 (µm)	-100.0 to 100.0	0.0
Measuring point	1 (times)	1 to 30	12
<Wafer thickness check setting>			
Error class setting	—	A Class / B Class	A Class
<Z axis standby setting>			
Auto Z1 (Z2) escape position	1 (mm)	1 to 100	1
<Wafer original thickness up limit setting (Air cut)>			
Z1 (Z2) wafer org. thick. limit	1 (µm)	0 to 100	0

Parameters in EDIT PARAMETER (HEIGHT GAUGE) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Height Gauge Setting>			
Z1 (Z2) Height Offset	0.1 (µm)	-100.0 to 100.0	0.0
<Height Gauge Zero-point Mode>			
Initial Warm Up Action	1 (times)	1 to 6	1
C/T measuring interval	—	Auto / -CST- / n-wfr / Com-A / SP-A / None	Auto
Wafers interval for measurement	1 (pcs.)	0 to 999	0
<Height Gauge Initial Offset>			
Minimum Interim	1 (min.)	0 to 999	0
Z1 (Z2) Offset Wafers	1 (pcs.)	0 to 999	0
Z1 (Z2) Offset Amount	0.1 (µm)	-20.0 to 20.0	0.0
Z1 (Z2) time set inner (outer)	1 (sec.)	0 to 100	0
Z1 (Z2) error class setting	—	A Class / B Class	A Class

Parameters in EDIT PARAMETER (TRANSFER) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Cassette Parameter Setting (Manual mode)>			
Cassette Operating Mode	—	A→B Cycle / B → A Cycle	A→B Cycle
Reverse-Arm Reverse Job	—	Both times / Loading / Unloading / Deactivate	Both times
<Arm Parameter Setting>			
Vacuum Timeout (T-Arm)	0.1 (sec.)	0.0 10.0	5.0
Vacuum Timeout (Table)	0.1 (sec.)	0.0 10.0	3.0
Timer between 2 STEP	0.1 (sec.)	0.0 30.0	0.0
First distance of 2 STEP	0.1(mm)	0.0 10.0	0.0
<Option Robot Parameter Setting (840HS)>			
Robot X-axis speed select	—	10:1 / 4:1 / 2:1 / 1:1	10:1
Robot arm rotation in load	—	Pass / Z1 / Z2 / Z1&Z2	Pass
Robot arm rotation in unload	—	Pass / Z1 / Z2 / Z1&Z2	Pass

Parameters in EDIT PARAMETER (CASSETTE) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Cassette Parameter Setting>			
Wafer Number Of 4 inch CST.	1 (pcs.)	1 to 30	25
Wafer Number Of 5 inch CST.	1 (pcs.)	1 to 30	25
Wafer Number Of 6 inch CST.	1 (pcs.)	1 to 30	25
Wafer Number Of 8 inch CST.	1 (pcs.)	1 to 30	25
Wafer Number Of X inch CST.	1 (pcs.)	1 to 30	25
X inch Cassette. Inch Size	(inch)	3 / 4 / 5 / 6 /8	4
CST.A/B 45/6/X inch First Pitch	0.01 (mm)	10.00 to 45.00	14.53
CST.A/B 8 inch First Pitch	0.01 (mm)	10.00 to 45.00	25.40
CST.A/B 45/6/8/X inch Correct Unload	0.01 (mm)	-10.00 to 10.00	0.00
CST.A/B 45/6/X inch Index Pitch	0.01 (mm)	1.00 to 20.00	4.76
CST.A/B 8 inch Index Pitch	0.01 (mm)	1.00 to 20.00	6.35
CST. 45/6/8/X inch Correct X:	0.1 (mm)	-10.0 to 0.0	-5.0
CST.A/B Correct X center	0.1 (mm)	-10.0 to 10.0	0.0
CST.A/B Correct THETA STOP	0.5 (deg.)	-10.0 to 10.0	0.0
P-TABLE Correct X center	0.1 (mm)	-10.0 to 10.0	0.0
P-TABLE Correct THETA STOP	0.5 (deg.)	-10.0 to 10.0	0.0
SPINNER Correct X center	0.1 (mm)	-10.0 to 10.0	0.0
SPINNER Correct THETA STOP	0.5 (deg.)	-10.0 to 10.0	0.0
Correct Reverse Arm-Load	0.1 (mm)	-5.0 to 5.0	0.0
Correct Rev.Arm-Unload	0.1 (mm)	-5.0 to 5.0	0.0
<Option Cassette Parameter Setting> (User-specified spec.)			
CST.C/D 45/6/X inch First Pitch	0.01 (mm)	10.00 to 45.00	14.53
CST.C/D 8 inch First Pitch	0.01 (mm)	10.00 to 45.00	25.40
CST.C/D 45/6/X inch Index Pitch	0.01 (mm)	1.00 to 20.00	4.76
CST.C/D 8 inch Index Pitch	0.01 (mm)	1.00 to 20.00	6.35
CST.C/D 45/6/8/X inch Correct Unload	0.01 (mm)	-10.00 to 10.00	0.00
CST. C/D Correct X:center	0.1 (mm)	-10.0 to 0.0	-5.0
SP1 (SP2) Correct X:center	0.1 (mm)	-10.0 to 0.0	0.0
CST.C/D Correct THETA STOP	0.5 (deg.)	-10.0 to 10.0	0.0
SP1 (SP2) Correct THETA STOP	0.5 (deg.)	-10.0 to 10.0	0.0
<Cassette proc-flow Setting>			
Cassette flow select	—	= SAME = / * OPEN *	=SAME=
<UNLOAD PICK SPECIAL SET>			
UNLOAD PICK DOWN ESCAPE	0.1 (mm)	-1.0 2.0	0.0

Parameters in EDIT PARAMETER (CLEAN) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Cleaning Parameter Setting>			
Spinner Washing. Time	1 (sec.)	0 to 999	5
Spinner Drying. Time	1 (sec.)	0 to 999	15
Chuck Washing Mode	—	-STD- / MODE1 / MODE2 / MODE3	-STD-
Chuck Washing time	1 (sec.)	0 to 90	5
<Wafer Spray Timer Setting (in grind room)>			
Z1 (Z2) wafer spray time	1 (sec.)	0 to 999	0
<Spinner special job select>			
ground wafer position home	—	Pass / Z1 / Z2 / Z1&Z2	Pass
spinner Dmy-table sprey	1 (sec.)	0 to 90	0
wafer pre dry on Dmy-table	1 (sec.)	0 to 90	0
spinner Dmy-table dryer	1 (sec.)	0 to 90	0
wafer post dry on Dmy-table	1 (sec.)	0 to 90	0
Spinner pick insert height	0.1 (mm)	-10.0 to 0.0	0.0
Spinner pick pullup height	0.1 (mm)	-10.0 to 0.0	0.0
Spinner positioning device	—	Pass / Set	Pass
Spinner positioning time	1 (sec.)	0 to 90	0
<Chucktable cleaning Mode>			
ground wafer position home	—	Pass / Z1 / Z2 / Z1&Z2	Pass
Z1 (Z2) Chuck Cleaning Mode	—	-STD- / MODE1 / MODE2 / MODE3	-STD-
Z1 (Z2) Chuck Rotation Speed	1 (rpm)	-300 to 300	100
Z1 (Z2) Scrub Times	1 (rev)	0 to 300	5
Z1 (Z2) Scrub Duty	1 (%)	0 to 100	50
<Chucktable cleaning Special Mode>			
Chuck Special Washing Times	1 (sec.)	0 to 90	0
Interval Time in Warm up	1 (mm)	0 to 999	0
Cleaning C/T or PAD Select	—	none / PAD / Chuck	none
<SPRAY BEFORE FIRST LOAD WAFER>			
Spinner Washing Time	1 (sec.)	0 to 90	0
Spinner Drying Time	1 (sec.)	0 to 90	15

> **NOTICE**
>
> Turntable related parameters (called up by the [F07: Turntable] key on the EDIT PARAMETER scree) are not used in this machine.

Parameters in EDIT PARAMETER (OTHER) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Others>			
Language	—	Japanese / English	Japanese
Screen Saver Time	1 (min.)	0 to 100	10
Password (PARAMETER)	—	Within 5 digits	—
<Wafer Thickness Measure Parameter Setting> (User-specified spec.)			
Select Thickness-Measure	—	Pass / Set	Pass
Measure offset	0.1 (μm)	-99.0 to 99.0	0.0
(+) Value Limit	1 (μm)	0 to 999	0
(-) Value Limit	1 (μm)	0 to -999	0
Meathd of Hold Wafer	—	3-P / 1-P	3-P
Measure Time	1(times)	1 to 5	1
<SPECIAL E.L.P SET> (User-specified spec.)			
SPECIAL E.L.P	—	Pass / Set	Pass
Auto Correct height off-set	—	Pass / Set	Pass
<Surface Routghness Parameter Setting> (User-specified spec.)			
Select Roughness-Measure	—	Pass / Set	Pass
Correct X :	0.1 (mm)	-10.0 to 10.0	0.0
Correct THETA :	0.5 (°)	-10.0 to 10.0	0.0
Correct Z :	0.01 (mm)	-10.00 to 10.00	0.00
<Self-Grinding Data Protect Setting>			
1) to 6)	—	wr protect / exec. lock / wr/ex lock / blank	1): wr protect 2) to 6): blank

Acceptable setup ranges and standard settings of parameters (Continued)

Parameters in EDIT PARAMETER (OTHER) screen

PARAMETER	Increment (unit)	Setting range	Standard setting
<Dressing Data Protect Setting>			
1) to 6)	—	wr protect / exec. lock / wr/ex lock / blank	1): wr protect 2) to 6): blank
<Grinding Data Protect Setting>			
1) to 60)	—	wr protect / exec. lock / wr/ex lock / blank	1): wr protect 2) to 60): blank
<Auto history setting> (Not used)			
Z-axis wheel wear Record	—	Cumul. / simple	Cumul.

2. Parameter Edition

Procedures to edit parameters

The parameters are edited on the EDIT PARAMETER screen. This section describes the procedures to edit the parameters.

```
┌─────────────────────────────────────────────────────┐
│                    ┌───────────────┐                 │
│                    │   N O T I C E │                 │
│                    └───────────────┘                 │
│                                                      │
│  The parameters of this machine are provided with    │
│  their predefined standard settings. When you change │
│  parameter data, carefully predict the resultant     │
│  machine movements and make sure that the changed    │
│  parameters are in the appropriate set up ranges.    │
│  Improperly set up parameters may cause machine/wafer│
│  breakage or adversely affect the machine's grinding │
│  accuracy.                                           │
└─────────────────────────────────────────────────────┘
```

Step No.	Do This
1	Press the <F4> key on the top menu screen. - The parameter menu (EDIT PARAMETER) screen appears. - If the screen is password-protected, enter the password (PARAMETER) and then press the <ENTER> key. Page [MT06]　　　EDIT PARAMETER　　　YYYY/MM/DD HH:MM:SS Ver.********* F2 : GRIND F3 : HEIGHT GAUGE F4 : TRANSFER F5 : CASSETTE F6 : CLEANING F7 : TURNTABLE F8 : OTHER F01 : TOP MENU　F02 : Grind　F03 : Height gauge　F04 : Transfer F05 : Cassette　F06 : Cleaning　F07 : Turntable　F08 : Other
2	Call up the screen containing the parameter you want to edit by pressing one of the keys <F2> through <F8> (except <F7>).
3	Using the cursor keys, move the cursor to the parameter you want to edit. - Refer to Section 3, [Detailed Descriptions on Each Parameter] in this chapter for details of the individual parameters.
4	Using the numeric keys or <SEL> key, change setup the data of the parameter. - Use the numeric keys to change numeric data. - If any value outside the acceptable input range is entered, the message "Invalid Data!" appears on the screen. In such a case, press the <CE> key and then enter the correct value.
5	Press the <ENTER> key. - Any change in parameter setting must be followed by pressing of the <ENTER> key. If you move the cursor key without pressing the <ENTER> key, the change made is cancelled.

Procedures to edit parameters (Continued)

Step No.	Do This
6	Repeat the steps 3 through 5 to edit other parameters if any.
7	Press the \<F1\> key. - The system returns to the parameter menu (EDIT PARAMETER) screen and the changed data becomes effective.

3. Detailed Descriptions on Each Parameter

Summary of this section

This section provides detailed descriptions on the parameters in each of the EDIT PARAMETER sub-screens.

Section No.	Title	Contents (Parameter name)
3-1	Parameters in EDIT PARAMETER (GRIND) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (GRIND) screen
3-2	Parameters in EDIT PARAMETER (HEIGHT GAUGE) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (HEIGHT GAUGE) screen
3-3	Parameters in EDIT PARAMETER (TRANSFER) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (TRANSFER) screen
3-4	Parameters in EDIT PARAMETER (CASSETTE) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (CASSETTE) screen
3-5	Parameters in EDIT PARAMETER (CLEAN) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (CLEAN) screen
3-6	Parameters in EDIT PARAMETER (OTHER) Screen	- Detailed descriptions on the parameters in EDIT PARAMETER (OTHER) screen

Format used to describe the parameters

The format as shown below is used to describe the parameters in the following sections 3-1 through 3-6.

Parameter Name	Unit	Setting range	Standard setting
Descriptions on the parameter			

3-1. Parameters in EDIT PARAMETER (GRIND) Screen

EDIT PARAMETER (GRIND) screen

This section describes the parameters in EDIT PARAMETER (GRIND) screen.

[Screen]

```
Page [MT26]              EDIT PARAMETER (GRIND)       YYYY/HH/DD HH:MM:SS

>> Wheel Parameter Setting
    Z2 Minimum Tooth (μm)          1000      Z1 Minimum Tooth (μm)          1000
    Z2 Usable Tooth (μm)           4000      Z1 Usable Tooth (μm)           4000
    Z2 Setup Allowance (μm)          50      Z1 Setup Allowance (μm)          50
    Z2 Excessive Wear (μm)           20      Z1 Excessive Wear (μm)           20

>> Wheel Height Setup
    Z2 Block Gauge Height (μm)     4980      Z1 Block Gauge Height (μm)     4980
    Z2 Set Up Method          <Manual>      Z1 Set Up Method          <Manual>

>> Spindle Parameter Setting
    Z2 SPD. Rotat. Pre-Alarm (rpm)    0      Z1 SPD. Rotat. Pre-Alarm (rpm)    0
    Chuck Wash mode-3 interval wfr.   0

>> Spindle Current Pre-Alarm (A Code) Setting
    Z1 : 4 inch  [   12.0]  5 inch  [   12.0]  6 inch  [   12.0]  8 inch  [   12.0]
    Z2 : 4 inch  [   12.0]  5 inch  [   12.0]  6 inch  [   12.0]  8 inch  [   12.0]

>> Spindle Current Pre-Alarm (B Code) Setting
    Z1 : 4 inch  [   13.0]  5 inch  [   13.0]  6 inch  [   13.0]  8 inch  [   13.0]
    Z2 : 4 inch  [   13.0]  5 inch  [   13.0]  6 inch  [   13.0]  8 inch  [   13.0]

>> Grinding special select (Z1)
    Air cut control select      < Pass >     Speed change point (μm)           0
    Grinding mode select        < Chuck>     Surface mode wafer limit (μm)     1
    start        <  0>

>> Grinding special select (Z2)
    Air cut control select      < Pass >     Speed change point (μm)           0
    Grinding mode select        < Chuck>     Surface mode wafer limit (μm)     1
    start        <  0>

>> Wheel Parameter setting
    Z2 Limit Tooth (μm)               0      Z1 Limit Tooth (μm)               0

>> Auto process setting
    Auto size process           < Usual Grind >

    Org wafer min. check set    < Pass >
    Measuring interval                8      Specified detect level          0.0
    Measuring point                  12

>> Wafer thickness check setting
    Error class setting         < A Class>

>> Z axis standby setting
    Auto Z2 escape position (mm)      1      Auto Z1 escape position (mm)      1

>> Wafer original thickness up limit setting (Air cut)
    Z2 wafer org. thick. limit (μm)   0      Z1 wafer org. thick. limit (μm)   0
F01 : Parameter menu   F02 :              F03 : Height gauge    F04 : Transfer
F05 : Cassette         F06 : Cleaning     F07 : Turntable       F08 : Other
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	(Not used)
F3	Call up the EDIT PARAMETER (HEIGHT GAUGE) screen.
F4	Call up the EDIT PARAMETER (TRANSFER) screen.
F5	Call up the EDIT PARAMETER (CASSETTE) screen.
F6	Call up the EDIT PARAMETER (CLEAN) screen.
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	Call up the EDIT PARAMETER (OTHER) screen.

Parameters in "Wheel Parameter Setting" group

Parameters in "Wheel Parameter Setting" group are detailed here.

Z1 (Z2) Minimum Tooth	μm	0 to 10000	1000

The machine issues an error (Class A) when the wheel is worn out to the extent this minimum tooth length setting is reached. Full auto operation can be continued even if the error is issued.

Z1 (Z2) Usable Tooth	Can not be changed.

The remaining wheel tooth length (blade protrusion amount) set up in the wheel change sequence is shown. The setting value can not be changed on the EDIT PARAMETER screen.
This data is used to set a standard for issuing an error when the wheel is worn out with the remaining tooth length significantly reduced.

Z1 (Z2) Setup Allowance	μm	0 to 500	50

The detected wheel wear value immediately after wheel position setup may show apparent wheel wear caused by an error inherent in wheel position setup. If the detected wheel wear value at the start of full auto operation immediately after performing wheel position setup exceeds this parameter value, an error (Class A) is issued.
If the error is issued, full auto operation cannot be continued. This provision is made to minimize possible damage to wafers in case malfunctioning of the height gauge or wheel is causing the error.

Z1 (Z2) Excessive Wear	μm	0 to 50	20

If the amount of wheel wear detected at the end of each wafer grinding during full auto operation exceeds this parameter value, an error (Class A) is issued.
If the error is issued, full auto operation cannot be continued. This provision is made to minimize possible damage to wafers in case malfunctioning of the height gauge or wheel is causing the error.

Parameters in "Wheel Height Setup" group

Parameters in "Wheel Height Setup" group are detailed.

Z1 (Z2) Block Gauge Height	μm	0 to 100000	4980
Thickness of the block gauge used for wheel position setup			

Z1 (Z2) Set Up Method	—	Manual / Auto	Manual
The wheel position setup method is selected between "Manual" and "Auto" using the <SEL> key. When the machine uses the automatic setup function [optional accessory], select <Auto>.			

Parameters in "Spindle Parameter Setting" group

Parameters in "Spindle Parameter Setting" group are detailed.

Z1 (Z2) SPD Rotat. Pre-Alarm	rpm (min^{-1})	-1000 to 0	0
This function provides a warning (error display) in advance before the spindle inverter trips (stops) due to abnormal grinding (loss of wheel abrasiveness, etc.) When the spindle rotative speed falls short of this parameter value, an error is issued. This parameter value can be independently set up for the Z1 and Z2 spindles respectively.			

Chuck Wash mode-3 interval wfr.	pcs.	0 to 90	0
This parameter is effective when the "Chuck Washing Mode" parameter in the "Cleaning Parameter Setting" group on the EDIT PARAMETER (CLEAN) screen is set to <MODE 3>. Oilstone washing of the chuck table is performed each time the number of wafers set up here is ground. When oilstone washing is not performed after a wafer is ground, spray-washing of the chuck table is performed. - If this parameter is set to "0", oilstone washing is performed only once at the start of full auto operation and spray washing is performed each time grinding of a wafer finishes.			

Parameters in "Spindle Current Pre-Alarm (A Code) Setting" group

Parameters in "Spindle Current Pre-Alarm (A Code) Setting" group are detailed.

Z1 (Z2) 4/5/6/8 inch	A	0.0 to 22.0	12.0
This function provides a warning (error display) in advance before the spindle inverter trips (stops) due to abnormal grinding (loss of wheel abrasiveness, etc.) When a current exceeding this parameter value is detected at the spindle section, an error (Class A) is issued. This parameter value can be set up by wafer size for each of the Z1 and Z2 spindles.			

Parameters in "Spindle Current Pre-Alarm (B Code) Setting" group

Parameters in "Spindle Current Pre-Alarm (B Code) Setting" group are detailed.

Z1 (Z2) 4/5/6/8 inch	A	0.0 to 22.0	13.0
This function stops full auto operation before the spindle inverter trips (stops) due to abnormal grinding (loss of wheel abrasiveness, etc.) If a current exceeding this parameter value is detected at the spindle section, an error (Class B) is issued. This parameter value can be set up by wafer size for each of the Z1 and Z2 spindles. If this parameter is set to "0.0", this function does not work.			
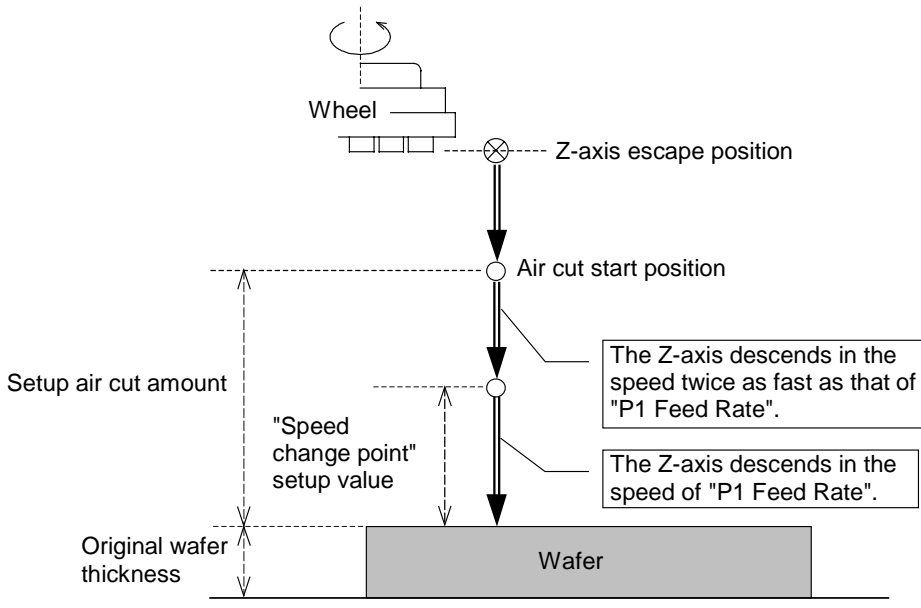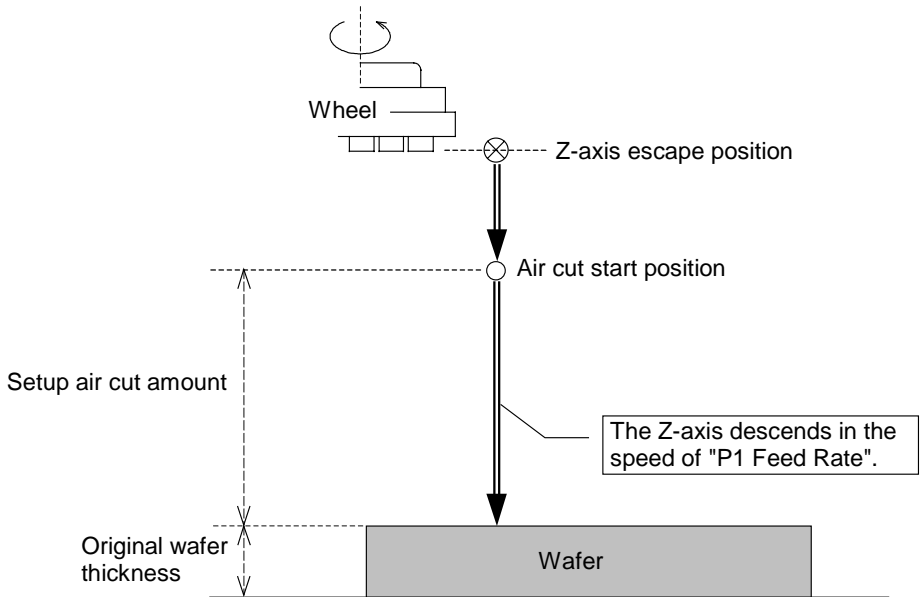
Parameters in "Grinding special select" group
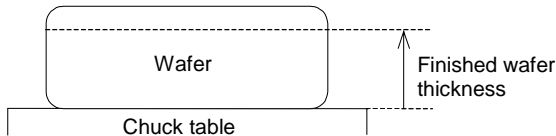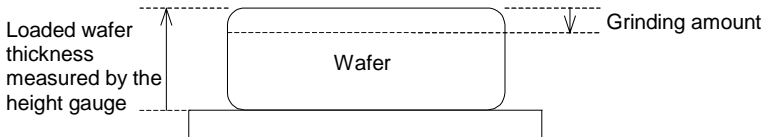
Parameters in "Grinding special select" group are detailed.

Air cut control select	—	Set / Pass	Pass
This parameter sets up the air cut method (starting position). <Set> : The air cut starting position will be "loaded wafer thickness measured by the height gauge + setup air cut amount". This method improves the machine's throughput by automatically choosing the most efficient starting position for each wafer. <Pass> : The air cut starting position is fixed as "specified original wafer thickness + setup air cut amount". In this method, grinding (air cut) can always start from the fixed position.			

Speed change point	μm	0 to 30	0

When this parameter is effective, the Z-axis speed from "air cut start" position to "original wafer thickness + this parameter value" position is twice as fast as the speed of "P1 Feed Rate".

This function improves the machine's throughput, since the Z-axis descending speed becomes faster. On the other hand, it relatively decreases the actual air cut amount. Therefore, this data should be carefully entered.

<When "Speed change point" parameter is effective>

Wheel

Z-axis escape position

Air cut start position

The Z-axis descends in the speed twice as fast as that of "P1 Feed Rate".

The Z-axis descends in the speed of "P1 Feed Rate".

Setup air cut amount

"Speed change point" setup value

Original wafer thickness

Wafer

This parameter is effective when the setup value is smaller than the air cut amount. If it is set to "0" or to a value equaling to or higher than the air cut amount, this function does not work.

<When "Speed change point" parameter is ineffective>

Wheel

Z-axis escape position

Air cut start position

Setup air cut amount

The Z-axis descends in the speed of "P1 Feed Rate".

Original wafer thickness

Wafer

Grinding mode select	—	Chuck / Surf. / Ch→Su / Su→ Ch	Chuck

This parameter selects the method to control the grinding amount.

<Chuck> : Wafers are ground to the unified thickness level as measured from the chuck table surface. In this method, the finished wafer thickness is fixed and therefore the grinding amount varies by wafer. This method is used when you want to unify the finished wafer thickness of the wafers to be ground.

Wafer

Finished wafer thickness

Chuck table

<Surf.> : The unified amount as measured from the wafer surface is cut off. In this method, the grinding amount is fixed and therefore the finished wafer thickness varies by wafer. Each wafer is measured for its thickness by the height gauge and then ground by the specified amount. This method is used when you want to unify the grinding amount of the wafers to be ground.

Loaded wafer thickness measured by the height gauge

Wafer

Grinding amount

<Ch   Su> :

From the start of full auto operation, wafers are ground in <Chuck> method until the number of wafers specified in "start" parameter is ground. Then the <Surf.> method takes over.
If the "start" parameter is set to "0", wafers are ground in <Surf.> method from the start to the end.

<Su   Ch> :

From the start of full auto operation, wafers are ground in <Surf.> method until the number of wafers specified in "start" parameter is ground. Then the <Chuck> method takes over.
If the "start" parameter is set to "0", wafers are ground in <Chuck> method from the start to the end.

Surface mode wafer limit	μm	1 to 300	1

This function is effective when "Grinding mode select" parameter is set to <Surf.> or during <surf.> period of <Ch   Su > or <Su   Ch> method.
If the thickness of a loaded wafer is not in the range as indicated below, an error is issued. The error causing wafer is not ground.

"Original Thickness" ± "Surface mode wafer limit" (this parameter)

Parameters in "Grinding special select" group (Continued)

start	pcs.	0 to 99	0
This parameter sets up the number of wafers to be ground before the grinding mode is changed when the "Grinding mode select" parameter is set to <Ch　Su> or <Su　Ch>. Refer to the descriptions on the "Grinding mode select" parameter for details.			

Parameters in "Wheel Parameter setting" group

Parameters in "Wheel Parameter setting" group are detailed.

Z1 (Z2) Limit Tooth	μm	0 to 10000	0
This parameter is not used. Even if this parameter is edited, it does not affect any machine movement. "0" should normally be entered.			

Parameters in "Auto process setting" group are detailed.

Auto size process		—	Usual Grind / Auto Size Gr / Usual&PW off / Asize&PW off	Usual Grind
This parameter relates to the automatic program selection function (user-specified spec.) and the automatic power OFF function. Normally, it should be set to <Usual Grind>. If you choose <Auto Size Gr>, the machine measures the size of a loaded wafer (4/5/6/8") on the position table and the thickness of it with the Z1 height gauge to automatically choose the grinding program (No. 1 to 30) suitable for the wafer. - If there is not any suitable grinding program for the loaded wafer, an error is issued.				
Usual Grind	- The automatic program selection function is not used. - The automatic power OFF function is not used.			
Auto Size Gr	- The automatic program selection function is used. - The automatic power OFF function is not used.			

Usual&PW off	- The automatic program selection function is not used.
	- The automatic power OFF function is used.
	  The machine power automatically turns OFF 10 minutes after full auto operation terminates (idling of the machine also automatically terminates).
	  This function is also effective when full auto operation is terminated due to an error.
	  This parameter is set to < Usual Grind > the next time you start up the machine.			

Asize&PW off	- The automatic program selection function is used.
	- The automatic power OFF function is used.
	  The machine power automatically turns OFF 10 minutes after full auto operation terminates (idling of the machine also automatically terminates).
	  This function is also effective when full auto operation is terminated due to an error.
	This parameter is set to <Auto Size Gr> the next time you start up the machine.			

Org wafer min. check set	—	Pass / minimum / Specify / min+specify	Pass

This parameter sets up the detection method of loaded wafer thickness.

< Pass > : The machine checks whether the maximum thickness value of a loaded wafer is smaller than the finished wafer thickness value. If it is smaller than the "Finished Thickness" value, an error is issued.

<minimum> : Using the "Measuring interval" and "Measuring point" parameter data, the machine checks the thickness of a loaded wafer. If the minimum thickness of a loaded wafer is smaller than the "Finished Thickness" value, an error is issued.

<Specify> : If the thickness of a loaded wafer is smaller than <"Original Thickness" value + "Specified detect level" parameter value>, an error is issued.

<min + specify> : Using all of the "Specified detect level", "Measuring interval", and "Measuring point" parameter data, the machine checks the thickness of a loaded wafer. If it is smaller than the "Finished Thickness" value, an error is issued.

Measuring interval	10 msec	1 to 30	8

This parameter is effective when <minimum> or <min + specify> is selected for "Org wafer min. check set" parameter.
The height gauge measures the thickness of a loaded wafer at intervals of the time specified in this parameter (unit: 10 msec).

Specified detect level	μm	-100.0 to 100.0	0.0

This parameter is effective when <Specify> or <min + specify> is selected for "Org wafer min. check set" parameter.
If the thickness of a loaded wafer is smaller than <"Original Thickness" + "Specified detect level" (this parameter value)>, an error is issued.

Measuring point	times	1 to 30	12

This parameter is effective when <minimum> or <min + specify> is selected for "Org wafer min. check set" parameter.

The height gauge measures the thickness of a loaded wafer the number of times specified in this parameter. If this parameter is set to "0" or "1", the height gauge measures the thickness once.

<Ex.>

In the case the "Measuring interval" is 5 (× 10 msec) and the "Measuring point" is 4:
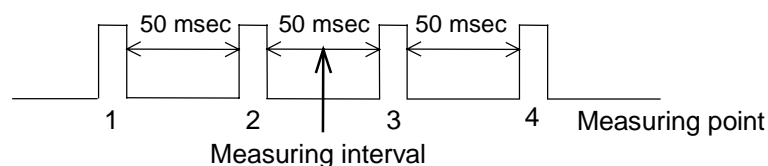
Parameters in "Wafer thickness check setting" group

The parameter in "Wafer thickness check setting" group is detailed.

Error class setting	—	A Class / B Class	A Class

This parameter selects, by the <SEL> key, the error class (A or B) used for issuing "loaded wafer too thick" and "loaded wafer too thin" errors.
The error code for the same situation differs according to error class as shown below.

Detected errors	Error codes used in "A Class" setting	Error codes used in "B Class" setting
Loaded wafer too thick error	A0042 / A0092	B0552 /B0602
Loaded wafer too thin error	A0043 / A0093	B0553 / B0603
Minimum grind amount error	A0189 / A0239	B0578 / B0628
Setup allowance error	A0182 / A0232	B0579 / B0629
Excessive wear error	A0183 / A0233	B0580 / B0630
Loaded wafer thickness error	A0191 / A0241	B0582 / B0632

Parameters in "Z axis standby setting" group

The parameters in "Z axis standby setting" group are detailed.

Auto Z1 (Z2) escape position	mm	1 to 100	1

[User-specified spec.]
This parameter is not used in the standard set up machine.

Each time the Z-axis finishes grinding a wafer in full auto operation, it moves up "40mm + this parameter value" from the chuck table surface.
- Normally, "1" should be entered.

Parameters in "Wafer original thickness up limit setting (Air cut)" group

The parameters in "Wafer original thickness up limit setting (Air cut)" group are detailed.

Z1 (Z2) Wafer org. thick. limit	μm	0 to 100	0

An error is issued when the thickness of a loaded wafer is larger than "Original Thickness + this parameter value" (see Example 1).

To make this function workable, the parameter value should not exceed the air cut value.

If this parameter is set to a value larger than the air cut value, the set up value becomes ineffective and the air cut amount value takes precedence over this setting for issuing an error (see Example 2). Also, if the parameter is set to "0", the air cut amount value takes precedence as well.

    Example 1)

        Original wafer thickness: 500 μm
        Air cut amount: 50 μm
        This parameter: 30 μm
        An error is issued when the thickness of a loaded wafer is larger than 530 μm.

    Example 2)

        Original wafer thickness: 500 μm
        Air cut amount: 50 μm
        This parameter: 100 μm
        An error is issued when the thickness of a loaded wafer is larger than 550 μm:

3-2. Parameters in EDIT PARAMETER (HEIGHT GAUGE) Screen

EDIT PARAMETER (HEIGHT GAUGE) screen

This section describes the parameters in EDIT PARAMETER (HEIGHT GAUGE) screen.

[Screen]

```
Page [MT27]         EDIT PARAMETER (HEIGHT GAUGE)   YYYY/HH/DD HH:MM:SS


 >> Height Gauge Setting
    Z2 Height Offset (μm)              0.0      Z1 Height Offset (μm)              0.0

 >> Height Gauge Zero-point Mode
    Initial Warm Up Action              1
    C/T measuring interval         < Auto >     Wafers interval for measurement      0

 >> Height Gauge Initial Offset
    Minimum Interim (min.)              0
    Z2 Offset Wafers                   0        Z1 Offset Wafers                     0
    Z2 Offset Amount (μm)             0.0       Z1 Offset Amount (μm)              0.0
    Z1   time set     inner :  0         outer :  0         error class    < AClass >
    Z2   time set     inner :  0         outer :  0         error class    < AClass >


 F01 : Parameter menu   F02 : Grind       F03 :            F04 : Transfer
 F05 : Cassette         F06 : Cleaning    F07 : Turntable  F08 : Other
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	Call up the EDIT PARAMETER (GRIND) screen.
F3	(Not used)
F4	Call up the EDIT PARAMETER (TRANSFER) screen.
F5	Call up the EDIT PARAMETER (CASSETTE) screen.
F6	Call up the EDIT PARAMETER (CLEAN) screen.
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	Call up the EDIT PARAMETER (OTHER) screen.

Parameters in "Height Gauge Setting" group

The parameters in "Height Gauge Setting" group are detailed.

Z1 (Z2) Height Offset	μm	-100.0 to 100.0	0.0
This parameter sets up the height offset value common to all grinding programs when finished wafer thickness control is made using the height gauge. The finished thickness of the wafers to be ground is controlled based on the calculation below:			
Actual finished wafer thickness = Setup finished wafer thickness + Height adjustment value of each grinding program + "Height Offset" (this parameter value) + "Chuck offset"			

If zero-point check of the height gauge is performed after a prolonged period of machine disuse or insufficient machine idling, its accuracy may not be assured. Inaccurate zero point check will result in finished thickness variation of the ground wafers.
The Parameters in "Height Gauge Zero-point Mode" group are used when reassurance of correct zero-point measurement is required.

The parameters in "Height Gauge Zero-point Mode" group are detailed here.

Initial Warm Up Action	times	1 to 6	1
This parameter specifies the number of gauge retractions (1 to 6 times) made in the first zero-point check at the start of full auto operation.			

C/T measuring interval	—	Auto / -CST- / n-wfr / Com-A / SP-A / None	Auto

This parameter sets up the timing of zero point check.

\<Auto\> :	Zero point check takes place once at the start of full auto operation.
\<-CST-\> :	Zero point check takes place each time the cassette is changed during full auto operation.
\<n-wfr\> :	Zero point check takes place each time the specified number of wafers is processed. The number of wafers is specified in "Wafers interval for measurement" parameter. When the number 0 or 1 is specified, zero point check takes place upon each wafer processing.
\<Com-A\> :	Zero point check takes place upon each wafer processing until the specified number of wafers is processed. After that, zero point check takes place each time the cassette is replaced. The number of wafers is specified in "Wafers interval for measurement" parameter.
	If the number 0 or 1 is specified, zero point check takes place each time the cassette is replaced.
\<SP-A\> :	Zero point check takes place at the start of full auto operation. If an error is not issued at that time, the setting of this parameter automatically changes to \<None\> and zero point check does not take place from the next full auto operation. If the machine power is turned OFF, however, the setting returns to \<SP-A\>. Therefore, zero point check always takes place in the first full auto operation after the machine is started up.
\<None\> :	Zero point check does not take place. If the machine is turned OFF with this parameter set to \<None\>, the setting automatically changes to \<SP-A\> the next time the machine is started up. Therefore, zero point check always takes place in the first full auto operation after the machine is started up.

Wafers interval for measurement	pcs.	0 to 999	0

This parameter is effective when \<n-wfr\> or \<Com-A\> is selected for "C/T measuring interval" parameter. Refer to the descriptions of "C/T measuring interval" parameter.

Parameters in "Height Gauge Initial Offset" group

It can happen that the first several wafers in full auto operation have varying finished thickness. By adjusting the grinding amount of those wafers using the parameters in "Height Gauge Initial Offset" group, the finished thickness of the ground wafers can be unified.
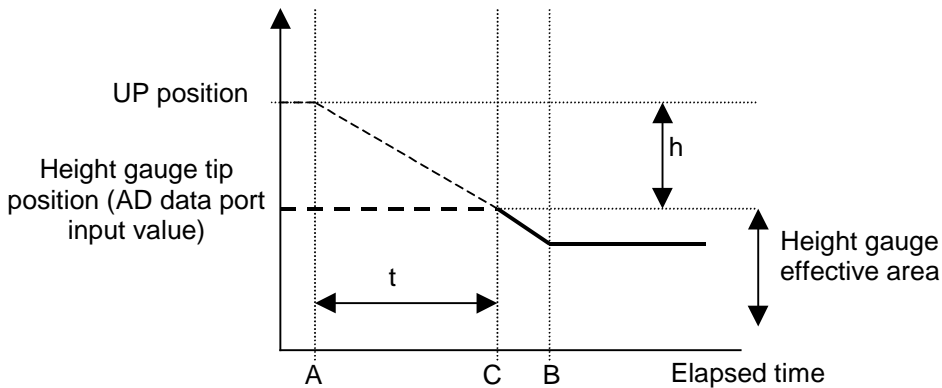
The parameters in "Height Gauge Initial Offset" group are detailed here.

Minimum Interim	min.	0 to 999	0

At the start of each full auto operation, the machine calculates the elapsed time (min) since the end of the last full auto operation. If the calculated value exceeds this parameter value (Minimum Interim), compensatory grinding amount correction is performed.

Grinding amount correction is made according to the settings of the "Z1 (Z2) Offset Wafers" and "Z1 (Z2) Offset Amount" parameters.

If this parameter is set to "0", this function does not work.

Z1 (Z2) Offset Wafers	pcs.	0 to 999	0

This parameter defines the end of the grinding amount correction process by entering the number of wafers to be subjected to the correction process. The parameter is independently set for each axis.

Z1 (Z2) Offset Amount	μm	-20.0 to 20.0	0.0

This parameter sets the finished-wafer-thickness correction amount for each axis independently.

\<Ex.\>

Provided that the following settings have been made:

"Minimum Interim" = 30, "Offset Wafers" = 10, "Offset Amount" = 3.5

If the elapsed time longer than 30 minutes since the end of the last full auto operation is detected, the following corrections will be automatically made in the next full auto operation.

1st wafer :	Ground with the finished thickness targeted to "Finished Thickness + 3.5 μm".
2nd wafer :	Ground with the finished thickness targeted to "Finished Thickness + 3.1 μm".
3rd wafer :	Ground with the finished thickness targeted to "Finished Thickness + 2.8 μm".
11th and subsequent wafers:	Ground with the finished thickness targeted to "Finished Thickness" value.

Z1 (Z2) time set inner (outer)	sec.	0 to 100	0

This parameter sets up the time period (shown as "t" in the figure below) in which the height gauge moves down from the UP position to the height gauge effective area. If moving down of the height gauge to its effective area takes shorter than the time period set up here, an error is issued.

- The moving-down speed of the height gauge increases if oil leakage occurs in the height gauge. This parameter helps find oil leakage in the height gauge.

- Using the "Z1 (Z2) error class setting" parameter, the error class (A or B) can be set up for an error detected by this parameter.

UP position

Height gauge tip position (AD data port input value)

h

Height gauge effective area

t

A   C   B   Elapsed time

t : Set up moving-down time of the height gauge

A: Point where the height gauge starts moving down

B: Point where the height gauge contacts the measuring surface

C: Point where the height gauge becomes effective

Z1 (Z2) error class setting	—	A Class / B Class	A Class

This parameter sets up the error class (A or B) for an error detected by the "Z1 (Z2) time set inner (outer)" parameter.

- Refer to Section 1, [Error Classes] in Chapter E of the Operation Manual for details of the error classes.

3-3. Parameters in EDIT PARAMETER (TRANSFER) Screen

EDIT PARAMETER (TRANSFER) screen

This section describes the parameters in EDIT PARAMETER (TRANSFER) screen.

[Screen]

```
Page [MT28]            EDIT PARAMETER (TRANSFER)   YYYY/HH/DD HH:MM:SS


>> Cassette Parameter Setting (Manual mode)
   Cassette Operating Mode      < A→B Cycle>
   Reverse-Arm Reverse Job      < Both times >

>> Arm Parameter Setting
   Vacuum Timeout (T-Arm) (sec.)      5.0    Vacuum Timeout (Table) (sec.)       3.0
   Timer between 2 STEP (sec)         0.0    First distance of 2 STEP   (mm)     0.0

>> Option Robot Parameter Serring ( 840HS)
   Robot X-axis speed select          10:1
   Robot arm rotation in load        < Pass >    Robot arm rotation in unload    < Pass >



 F01 : Parameter menu │ F02 : Grind     │ F03 : Height gauge │ F04 :
 F05 : Cassette       │ F06 : Cleaning  │ F07 : Turntable    │ F08 : Other
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	Call up the EDIT PARAMETER (GRIND) screen
F3	Call up the EDIT PARAMETER (HEIGHT GAUGE) screen.
F4	(Not used)
F5	Call up the EDIT PARAMETER (CASSETTE) screen.
F6	Call up the EDIT PARAMETER (CLEAN) screen.
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	Call up the EDIT PARAMETER (OTHER) screen.

Parameters in "Cassette Parameter Setting (Manual mode)" group

The parameters in "Cassette Parameter Setting (Manual mode)" group are detailed here.

Cassette Operating Mode	—	A→B Cycle / B → A Cycle	A→B Cycle
This parameter sets up the cassette processing order.			

Reverse-Arm Reverse Job	—	Both times / Loading / Unloading / Deactivate	Both times
This parameter sets up reversal/non-reversal of the robot arm when the robot performs loading and unloading in unit operation.			

As for reversal/non-reversal of the robot arm in full auto operation, the "Robot Pick: flip over movement" parameter in the SPECIAL FUNCTION screen is used.

<Both times> : - When loaded from the cassette, wafers are reversed and then transported to the position table.
- Wafers are reversed again before they are unloaded into the cassette.

<Loading> : - When loaded from the cassette, wafers are reversed and then transported to the position table.
- Wafers are not reversed before they are unloaded into the cassette.

<Unloading> : - Wafers are reversed before they are unloaded into the cassette.
- Wafers are not reversed when they are loaded from the cassette.

<Deactivate> : Wafer reversal by the robot arm is not performed.

Parameters in "Arm Parameter Setting" group

The parameters in " Arm Parameter Setting " group are detailed here.
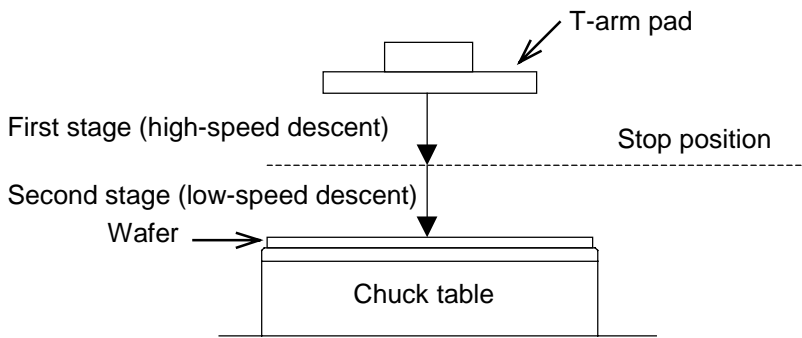
Vacuum Timeout (T-Arm)	sec.	0.0 10.0	5.0
This parameter sets up the time period between the instant at which the T-arm pad begins to attract a wafer on the chuck table by means of a vacuum and the instant at which the transport arm pad starts moving up.			
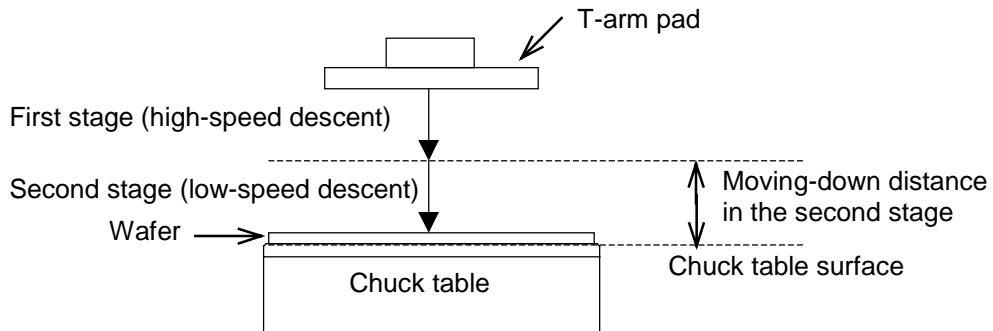
Vacuum Timeout (Table)	sec.	0.0 10.0	3.0
This parameter sets up the time period between the instant at which the T-arm pad turns OFF its vacuum system after placing a wafer on the spinner table and the instant at which the transport arm pad starts moving up.			

Timer between 2 STEP	sec.	0.0	30.0	0.0

Moving down action of the T-arm at the chuck table can be divided into two stages (high-speed descent stage and low-speed descent stage) on the Maker Maintenance screen.

This parameter sets up the time period the T-arm stops between the first stage (high speed) and the second stage (low speed) when the two-stage descent function is made available for the machine on the Maker Maintenance screen.

T-arm pad

First stage (high-speed descent)

Stop position

Second stage (low-speed descent)

Wafer

Chuck table

First distance of 2 STEP	mm	0.0	10.0	0.0

Moving down action of the T-arm at the chuck table can be divided into two stages (high-speed descent stage and low-speed descent stage) on the Maker Maintenance screen.

This parameter sets up the distance the T-arm moves down in the second stage (low speed) when the two-stage descent function is made available for the machine on the Maker Maintenance screen.

- The distance should be measured from the chuck table surface.

- If this parameter is set to "0.0", the distance set up on the Maker Maintenance screen becomes effective.

T-arm pad

First stage (high-speed descent)

Second stage (low-speed descent)

Moving-down distance in the second stage

Wafer

Chuck table

Chuck table surface

Parameters in "Option Robot Parameter Setting" group are detailed.

Robot X-axis speed select	—	10:1 / 4:1 / 2:1 / 1:1	10:1

Ratio of "loading speed versus unloading speed" of the robot X-axis is set up.
<Ex.> If this parameter is set to "10:1" :
The robot X-axis moves 10 times faster in loading than in unloading.

Robot arm rotation in load / unload	—	Pass / Z1 / Z2 / Z1&Z2	Pass

This parameter sets up execution and non-execution of wafer reversal in the wafer loading process.

<Pass> : Wafers are not reversed in the loading/unloading process.

<Z1&Z2> : Wafers are reversed at both Z1-axis and Z2-axis sides in the loading/unloading process.

<Z1> : Wafers are reversed only at the Z1-axis side in the loading/unloading process.

<Z2> : Wafers are reversed only at the Z2-axis side in the loading/unloading process.

3-4. Parameters in EDIT PARAMETER (CASSETTE) Screen

EDIT PARAMETER (CASSETTE) screen

This section describes the parameters in EDIT PARAMETER (CASSETTE) screen.

```
┌─────────────────────────────────────────────────────────────┐
│                        NOTICE                                │
│                                                              │
│  Do not change the standard settings of the parameters in    │
│  this screen in the normal circumstances. If irrelevant      │
│  values are entered for the parameters, the robot arm may    │
│  come into collision with the cassette or other machine      │
│  components to cause machine or wafer breakage.              │
└─────────────────────────────────────────────────────────────┘
```

[Screen 1]

```
Page [MT29]          EDIT PARAMETER (CASSETTE)   YYYY/HH/DD HH:MM:SS


>> Cassette Parameter Setting
    Wafer Number Of 4 inch CST.      25    Wafer Number Of 5 inch CST.      25
    Wafer Number Of 6 inch CST.      25    Wafer Number Of 8 inch CST.      25
    Wafer Number Of X inch CST.      25    X inch Cassette. Inch Size        4

    CST.B 4 inch First Pitch (mm)   14.53  CST.A 4 inch First Pitch (mm)   14.53
        Correct Unload (mm)          0.00      Correct Unload (mm)          0.00
    CST.B 5 inch First Pitch (mm)   14.53  CST.A 5 inch First Pitch (mm)   14.53
        Correct Unload (mm)          0.00      Correct Unload (mm)          0.00
    CST.B 6 inch First Pitch (mm)   14.53  CST.A 6 inch First Pitch (mm)   14.53
        Correct Unload (mm)          0.00      Correct Unload (mm)          0.00
    CST.B 8 inch First Pitch (mm)   25.40  CST.A 8 inch First Pitch (mm)   25.40
        Correct Unload (mm)          0.00      Correct Unload (mm)          0.00
    CST.B X inch First Pitch (mm)   14.53  CST.A X inch First Pitch (mm)   14.53
        Correct Unload (mm)          0.00      Correct Unload (mm)          0.00

    CST.B 4 inch Index Pitch (mm)    4.76  CST.A 4 inch Index Pitch (mm)    4.76
    CST.B 5 inch Index Pitch (mm)    4.76  CST.A 5 inch Index Pitch (mm)    4.76
    CST.B 6 inch Index Pitch (mm)    4.76  CST.A 6 inch Index Pitch (mm)    4.76
    CST.B 8 inch Index Pitch (mm)    6.35  CST.A 8 inch Index Pitch (mm)    6.35
    CST.B X inch Index Pitch (mm)    4.76  CST.A X inch Index Pitch (mm)    4.76

    CST.    4 inch Correct X:        -5.0
    CST.    5 inch Correct X:        -5.0
    CST.    6 inch Correct X:        -5.0
    CST.    8 inch Correct X:        -5.0
    CST. X(3) inch Correct X:        -5.0

    CST A     Correct X center (mm)   0.0   Correct THETA STOP (deg.)        0.0
    CST B     Correct X center (mm)   0.0   Correct THETA STOP (deg.)        0.0
    P-TABLE Correct X center (mm)     0.0   Correct THETA STOP (deg.)        0.0
    SPINNER Correct X center (mm)     0.0   Correct THETA STOP (deg.)        0.0

    Correct Reverse Arm-Load (mm)     0.0   Correct Rev. Arm Unload (mm)     0.0

 F01 : Parameter menu  F02 : Grind      F03 : Height gauge   F04 : Transfer
 F05 :                 F06 : Cleaning   F07 : Turntable      F08 : Other
```

[Screen 2]

```
Page [MT29]              EDIT PARAMETER (CASSETTE)   YYYY/HH/DD HH:MM:SS


>> Option Cassette Parameter Setting
  CST.D 4 inch First Pitch (mm)    14.53    CST.C 4 inch First Pitch (mm)    14.53
              Index Pitch (mm)      4.76                Index Pitch (mm)      4.76
           Correct Unload (mm)      0.00             Correct Unload (mm)      0.00
  CST.D 5 inch First Pitch (mm)    14.53    CST.C 5 inch First Pitch (mm)    14.53
              Index Pitch (mm)      4.76                Index Pitch (mm)      4.76
           Correct Unload (mm)      0.00             Correct Unload (mm)      0.00
  CST.D 6 inch First Pitch (mm)    14.53    CST.C 6 inch First Pitch (mm)    14.53
              Index Pitch (mm)      4.76                Index Pitch (mm)      4.76
           Correct Unload (mm)      0.00             Correct Unload (mm)      0.00
  CST.D 8 inch First Pitch (mm)    25.40    CST.C 8 inch First Pitch (mm)    25.40
              Index Pitch (mm)      4.76                Index Pitch (mm)      4.76
           Correct Unload (mm)      0.00             Correct Unload (mm)      0.00
  CST.D X inch First Pitch (mm)    14.53    CST.C X inch First Pitch (mm)    14.53
              Index Pitch (mm)      4.76                Index Pitch (mm)      4.76
           Correct Unload (mm)      0.00             Correct Unload (mm)      0.00

  CST C   Correct X center (mm)     0.0     Correct THETA stop (deg.)         0.0
  CST D   Correct X center (mm)     0.0     Correct THETA stop (deg.)         0.0
  SP-1    Correct X center (mm)     0.0     Correct THETA stop (deg.)         0.0
  SP-2    Correct X center (mm)     0.0     Correct THETA stop (deg.)         0.0

>> Cassette proc-flow Setting
  Cassette flow select              <= SAME =>

>> UNLOAD PICK SPECIAL SET
     UNLOAD PICK DOWN ESCAPE (mm)    0.0

 F01 : Parameter menu   F02 : Grind        F03 : Height gauge    F04 : Transfer
 F05 :                  F06 : Cleaning     F07 : Turntable       F08 : Other
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	Call up the EDIT PARAMETER (GRIND) screen
F3	Call up the EDIT PARAMETER (HEIGHT GAUGE) screen.
F4	Call up the EDIT PARAMETER (TRANSFER) screen.
F5	(Not used)
F6	Call up the EDIT PARAMETER (CLEAN) screen.
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	Call up the EDIT PARAMETER (OTHER) screen.

The parameters in "Cassette Parameter Setting" group are detailed.

Wafer Number Of 4/5/6/8/X inch CST.	pcs.	1 to 30	25
This parameter sets up the number of wafers to be stored in the cassette by wafer size. If a number other than the standard setup value (25) is entered, the robot arm may come into collision with the cassette or other machine components to cause machine breakage.			

X inch Cassette. Inch Size	inch	3/4/5/6/8	4
"X inch cassette" is provided to cope with any cassette size. When "Wafer Diameter" parameter in the GRIND DATA screen is set to "X", this parameter selects the cassette inch size using the <SEL> key.			

CST.A /B 4/5/6/8/X inch First Pitch	mm	10.00 to 60.00	See below.
This parameter sets up the first pitch (distance between the cassette bottom surface and the first layer slot position) of the cassette. The parameter is set up by cassette inch size for each cassette stage (A/B). <Standard setting> 4/5/6/X inch: 14.53 (mm) 8 inch: 25.40 (mm)			

CST.A/B 4/5/6/8/X inch Correct Unload	mm	-10.00 to 10.00	0.00
This parameter fine-tunes the robot arm position (height) for unloading wafers into the cassette. The parameter is set up by cassette inch size for each cassette stage. - Inputting of a plus value will raise the arm position for wafer storage by the entered value. - Inputting of a minus value will lower the arm position for wafer storage by the entered value. If an excessively large value is entered, the robot arm may come into contact with a wafer above or below to cause its breakage.			

CST.A/B 4/5/6/8/X inch Index Pitch	mm	1.00 to 20.00	See below.
This parameter sets up the index pitch of the cassette (space between the wafers in the cassette). The parameter is set up by cassette inch size for each cassette stage. <Standard setting> 4/5/6/X inch: 4.76 (mm) 8 inch: 6.35 (mm)			

CST. 4/5/6/8 inch Correct X:	mm	-10.0 to 0.0	-5.0

This parameter corrects the robot arm X-axis position (wafer insertion amount) for storing wafers into the cassette. The standard setup value is -5.0 mm. If this value is entered, the adjusted wafer storage position in the cassette will shift 5 mm forward from the original storage position.

CST.A/B Correct X center	mm	-10.0 to 10.0	0.0

This parameter fine tunes the amount of robot arm extension for loading/unloading wafers from/into the cassette.

- Inputting of a plus value will move the arm-end position toward the cassette rear end by the entered value.
- Inputting of a minus value will move the arm-end position away from the cassette rear end by the entered value.

If an excessively large value is entered, the robot arm may come into contact with the cassette to cause machine breakage.

CST.A/B Correct THETA STOP	°	-10.0 to 10.0 (step: 0.5)	0.0

This parameter fine-tunes the amount of robot arm turning (angle) for loading/unloading wafers from/into the cassette A (B).

- Inputting of a plus value will move the arm position clockwise from the cassette center by the entered value as viewed from the machine top side.
- Inputting of a minus value will move the arm position counterclockwise from the cassette center by the entered value as viewed from the machine top side.

P-TABLE Correct X center	mm	-10.0 to 10.0	0.0

This parameter fine-tunes the amount of robot arm extension for placing wafers onto the position table.

- Inputting of a plus value will move the arm-end position toward the position table rear end by the entered value.
- Inputting of a minus value will move the arm-end position away from the position table rear end by the entered value.

If an excessively large value is entered, the robot arm may come into contact with the position table to cause machine breakage.

P-TABLE Correct THETA stop	°	-10.0 to 10.0 (step: 0.5)	0.0

This parameter fine-tunes the amount of robot arm turning (angle) for placing wafers onto the position table.

- Inputting of a plus value will move the arm position clockwise from the position table center by the entered value as viewed from the machine top side.
- Inputting of a minus value will move the arm position counterclockwise from the position table center by the entered value as viewed from the machine top side.

SPINNER Correct X center	mm	-10.0 to 10.0	0.0
This parameter fine-tunes the amount of robot arm extension for unloading wafers from the spinner table. - Inputting of a plus value will move the arm-end position toward the spinner table rear end by the entered value. - Inputting of a minus value will move the arm-end position away from the spinner table rear end by the entered value. If an excessively large value is entered, the robot arm may come into contact with the spinner table to cause machine breakage.			

SPINNER Correct THETA stop	°	-10.0 to 10.0 (step: 0.5)	0.0
This parameter fine-tunes the amount of robot arm turning (angle) for unloading wafers from the spinner table. - Inputting of a plus value will move the arm position clockwise from the spinner table center by the entered value as viewed from the machine top side. - Inputting of a minus value will move the arm position counterclockwise from the spinner table center by the entered value as viewed from the machine top side.			

Correct Reverse Arm-Load	mm	-5.0 to 5.0	0.0
This parameter corrects the robot pick (with the pad suction surface facing up) horizontal straightness level after initialization. Enter the deviated height amount of the robot pick at its periphery compared with that at its center as viewed from the robot front side.			

Correct Reverse Arm Unload	mm	-5.0 to 5.0	0.0
This parameter corrects the robot pick (with the pad suction surface facing down) horizontal straightness level after reversal. Enter the deviated height amount of the robot pick at its periphery compared with that at its center as viewed from the robot front side.			

Parameters in "Option Cassette Parameter Setting" group

The parameters in "Option Cassette Parameter Setting" group are detailed.

CST.C/D 45/6/8/X inch First Pitch	mm	10.00 to 45.00	See below.
[User-specified spec.] This parameter is not used in this machine (indication only). This parameter sets up the first pitch (distance between the cassette bottom surface and the first layer slot position) of the cassette. <Standard setting> 4/5/6/X inch: 14.53 (mm) 8 inch: 25.40 (mm)			

CST.C/D 45/6/8/X inch Index Pitch	mm	10.00 to 45.00	See below.

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter sets up the index pitch of the cassette (space between the wafers in the cassette).

<Standard setting>

  4/5/6/X inch: 4.76 (mm)

  8 inch: 6.35 (mm)

CST.C/D 45/6/8/X inch Correct Unload	mm	-10.00 to 10.00	0.00

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter fine-tunes the robot arm position (height) for unloading wafers into the cassette.

- Inputting of a plus value will raise the arm position for wafer storage by the entered value.
- Inputting of a minus value will lower the arm position for wafer storage by the entered value.

If an excessively large value is entered, the robot arm may come into contact with a wafer above or below to cause its breakage.

CST. C/D Correct X:center	mm	-10.0 to 10.0	0.0

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter fine tunes the amount of robot arm extension for loading/unloading wafers from/into the cassette.

- Inputting of a plus value will move the arm-end position toward the cassette rear end by the entered value.
- Inputting of a minus value will move the arm-end position away from the cassette rear end by the entered value.

If an excessively large value is entered, the robot arm may come into contact with the cassette to cause machine breakage.

CST.C/D Correct THETA STOP	°	-10.0 to 10.0	0.0

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter fine-tunes the amount of robot arm turning (angle) for loading/unloading wafers from/into the cassette.
- Inputting of a plus value will move the arm position clockwise from the cassette center by the entered value as viewed from the machine top side.
- Inputting of a minus value will move the arm position counterclockwise from the cassette center by the entered value as viewed from the machine top side.

SP1 (SP2) Correct X:center	mm	-10.0 to 10.0	0.0

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter fine-tunes the amount of robot arm extension for loading/unloading wafers to/from the spinner table.
- Inputting of a plus value will move the arm-end position toward the spinner table rear end by the entered value.
- Inputting of a minus value will move the arm-end position away from the spinner table rear end by the entered value.

If an excessively large value is entered, the robot arm may come into contact with the spinner table to cause machine breakage.

SP1 (SP2) Correct THETA STOP	°	-10.0 to 10.0	0.0

[User-specified spec.]

This parameter is not used in this machine (indication only).

This parameter fine-tunes the amount of robot arm turning (angle) for loading/unloading wafers to/from the spinner table.
- Inputting of a plus value will move the arm position clockwise from the spinner table center by the entered value as viewed from the machine top side.
- Inputting of a minus value will move the arm position counterclockwise from the spinner table center by the entered value as viewed from the machine top side.

E-37
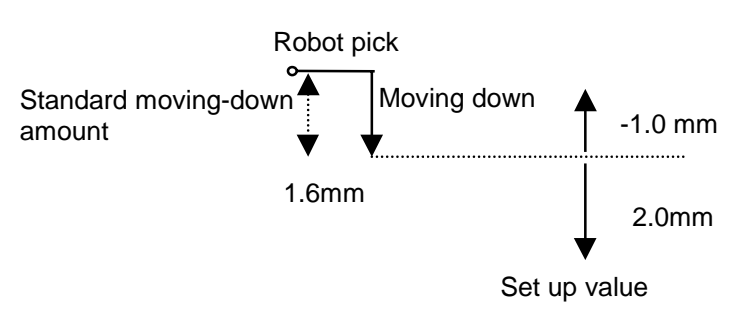
Parameters in "Cassette proc-flow Setting" group

The parameters in "Cassette proc-flow Setting" group are detailed.

Cassette flow select	—	= SAME = / * OPEN *	=SAME=
This parameter selects the method of wafer flow (from "loading" to "unloading"). = SAME = Wafers after grinding are returned back to the same cassette as they came. * OPEN * Wafers after grinding are stored into the other side cassette (wafers loaded from Cassette A are unloaded into Cassette B, and wafers loaded from Cassette B are unloaded into Cassette A).			

Parameters in "UNLOAD PICK SPECIAL SET" group

The parameters in "UNLOAD PICK SPECIAL SET" group are detailed.

UNLOAD PICK DOWN ESCAPE	mm	-1.0 to 2.0	0.0
The robot pick moves down 1.6 mm after storing a wafer into the cassette. This parameter fine tunes the amount the robot pick moves down. - Inputting of a plus value increases the amount of moving down by the entered value. - If you set up this parameter to "0", the robot pick moves down 1.6 mm (standard amount).			

3-5. Parameters in EDIT PARAMETER (CLEAN) Screen

EDIT PARAMETER (CLEAN) screen

This section describes the parameters in EDIT PARAMETER (CLEAN) screen.

[Screen]

```
Page [MT30]              EDIT PARAMETER (CLEAN)      YYYY/HH/DD HH:MM:SS


>> Cleaning Parameter Setting
   Spinner Washing Time (sec.)        5      Chuck Washing Mode         <-STD->
   Spinner Drying Time (sec.)        15      Chuck Washing Time (sec.)        5

>> Wafer Spray Timer Setting (in grind room)
   Z2 wafer spray time (sec)          0      Z1 wafer spray time (sec)        0

>> Wafer Spray Timer Setting (outside)
   ***********************             0      *************************        0

>>Spinner special job select
   spinner Dmy-table sprey(sec)       0      wafer pre dry on Dmy-table (sec)    0
   spinner Dmy-table dryer(sec)       0      wafer post dry on Dmy-table (sec)   0
   Spinner pick insert height (mm)   0.0     Spinner pick pullup height (mm)    0.0
   Spinner positioning device    < Pass >    Spinner positioning time (sec)      0

>>Chucktable cleaning Mode
   Z2 Chuck Cleaning Mode      <-STD->        Z1 Chuck Cleaning Mode      <-STD->
   Z2 Chuck Rotation Speed (rpm)    100       Z1 Chuck Rotation Speed (rpm)    100
   Z2 Scrub Times                     5       Z1 Scrub Times                     5
   Z2 Scrub Duty                     50       Z1 Scrub Duty                     50

>>Chucktable Cleaning Special Mode
   Chuck Special Washing Times (sec.)   0     Interval Time in Warm up (min.)     0
   Cleaning C/T or PAD Select     < none >

>>SPRAY BEFORE FIRST LOAD WAFER
   Spinner Washing Time (sec.)        0
   Spinner Drying Time (sec.)         5
F01 : Parameter menu   F02 : Grind        F03 : Height gauge    F04 : Transfer
F05 : Cassette         F06 :              F07 : Turntable       F08 : Other
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	Call up the EDIT PARAMETER (GRIND) screen.
F3	Call up the EDIT PARAMETER (HEIGHT GAUGE) screen.
F4	Call up the EDIT PARAMETER (TRANSFER) screen.
F5	Call up the EDIT PARAMETER (CASSETTE) screen.
F6	(Not used)
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	Call up the EDIT PARAMETER (OTHER) screen.

Parameters in "Cleaning Parameter Setting" group

The parameters in "Cleaning Parameter Setting" group are detailed.

Spinner Washing. Time	sec.	0 to 500	5
This parameter sets up the duration time of wafer washing (water shower) on the spinner table.			

Spinner Drying. Time	sec.	0 to 500	15
This parameter sets up the duration time of wafer air-drying on the spinner table.			

Chuck Washing Mode	—	-STD- / MODE1 / MODE2 / MODE3	-STD-
This parameter selects the timing of chuck table washing. <STD> : Chuck table washing takes place each time before a wafer is placed onto the Z1/Z2 chuck table during full auto operation. <MODE1> : Chuck table washing takes place right before the first wafer is placed on the chuck table at the start of full auto operation, and before the first wafer is placed on the chuck table at the re-start of full auto operation after B-class error occurrence. <MODE 2> : Adding to the timing of <MODE1>, chuck table washing also takes place when a wafer to be placed on the chuck table belongs to the cassette slot numbers 1, 5, 10, 15, 20 and 25. <MODE 3> : Each time the number of wafers set up in the "Chuck Wash mode-3 interval wfr." parameter (in "Spindle Parameter Setting" group on the EDIT PARAMETER (GRIND) screen) is ground, chuck table washing takes place. Refer to Section 3-1, [Parameters in EDIT PARAMETER (GRIND) Screen] in this chapter for details of the "Chuck Wash mode-3 interval wfr." parameter.			

Chuck Washing time	sec.	0 to 90	5
This parameter sets up the duration time the chuck table is washed in the washing mode set up in the "Chuck Washing Mode" parameter.			

Parameters in "Wafer Spray Timer Setting (in grind room)" group

The parameters in "Wafer Spray Timer Setting (in grind room)" group are detailed.

Z1 (Z2) wafer spray time	sec.	0 to 999	0
This parameter relates to the function in which a wafer is spray-washed even after the grinding process completes (with the spindle moved up to its escape position). This parameter sets up the duration time (sec.) a wafer is kept spray-washed. The wafer processing time per wafer becomes longer by the amount set up here. This parameter therefore affects the machine's throughput.			

The parameters in "Spinner special job select" group are detailed.

ground wafer position home	—	Pass / Z1 / Z2 / Z1&Z2	Pass
This parameter is not used in this machine. Normally, it should be set to "Pass."			

spinner Dmy-table sprey	sec.	0 to 90	0
This parameter sets up the time period (sec.) the spinner table is washed after a wafer is unloaded from the spinner table into the cassette. If you set this parameter to "0", spinner washing is not performed. This parameter affects the machine's throughput.			

wafer pre dry on Dmy-table	sec.	0 to 90	0
This parameter sets up the time period the spinner table is air-dried after a wafer is unloaded from the spinner table into the cassette. If you set this parameter to "0", air-drying of the spinner table is not performed. This parameter affects the machine's throughput.			

spinner Dmy-table dryer	sec.	0 to 90	0
[User-specified spec.] This parameter is not used in this machine (indication only). This parameter sets up the duration time the back surface of a ground wafer is washed before it is placed on the dummy table. If you set this parameter to "0", wafer washing is not performed.			

wafer post dry on Dmy-table	sec.	0 to 90	0
[User-specified spec.] This parameter is not used in this machine (indication only). This parameter sets up the duration time the back surface of a ground wafer is washed when it is picked up from the dummy table. If you set this parameter to "0", wafer washing is not performed.			

Spinner pick insert height	mm	-10.0 to 10.0	0.0
This parameter fine-tunes the robot arm position (height) when it picks up a wafer from the spinner table. - Inputting of a plus value will raise the arm position by the entered value. - Inputting of a minus value will lower the arm position by the entered value. If an excessively large value is entered, the robot arm may come into contact with the spinner table to cause breakage to the robot pick.			

Parameters in "Spinner special job select" group (Continued)

Spinner pick pullup height	mm	-10.0 to 10.0	0.0

This parameter fine-tunes the robot arm position (height) after picking up a wafer from the spinner table.
- Inputting of a plus value will raise the arm position by the entered value.
- Inputting of a minus value will lower the arm position by the entered value.

Spinner positioning device	—	Pass / Set	Pass

This parameter is not used.
Even if this parameter is set up, it does not affect any machine movement.
- "Pass" should normally be entered.

Spinner positioning time	sec.	0 to 90	0

This parameter is not used.
Even if this parameter is set up, it does not affect any machine movement.
"0" should normally be entered.

Parameters in "Chucktable cleaning Mode" group

The parameters in "Chucktable cleaning Mode" group are detailed.

Z1 (Z2) Chuck Cleaning Mode	—	-STD- / MODE1 / MODE2 / MODE3	-STD-

This parameter is not used.
Even if this parameter is set up, it does not affect any machine movement.
"-STD-" should normally be entered.

Z1 (Z2) Chuck Rotation Speed	rpm	-300 to 300	100

The rotative speed of the chuck table when the chuck table is washed is set up.
If this parameter is set to "0", the chuck table does not rotate.
If this parameter is set to a minus value, the chuck table rotates in the reverse direction.

Z1 (Z2) Scrub Times	rev	0 to 300	5

The number of the swaying (back/forth) movements the oilstone makes in chuck table washing is set up.
If this parameter is set to "0", the oilstone does not make any swaying movement.

Z1 (Z2) Scrub Duty	%	0 to 100	50

This parameter sets up the percentage of the time the oilstone is pressed in its swaying movement.

Parameters in "Chucktable Cleaning Special Mode" group

The parameters in "Chucktable Cleaning Special Mode" group are detailed.

Chuck Special Washing Times	sec.	0 to 90	0
In the warm up operation initiated by pressing the <F02 : Syc. C/T washer> key on the WARM UP screen, chuck table washing is performed for the time period set up here at the intervals of the time set up in the "Interval Time in Warm up" parameter.			

Interval Time in Warm up	min.	0 to 999	0
In the warm up operation initiated by pressing the <F02 : Syc. C/T washer> key on the WARM UP screen, chuck table washing is performed for the time period set up in the "Chuck Special Washing Times" parameter at the intervals of the time set up here.			

Cleaning C/T or PAD Select	—	none / PAD / Chuck	none
Washing of the T-arm L-pad/M-pad at the chuck table at the start of full auto operation is set up here. <none>: The pads and chuck table are not washed at the start of full auto operation. <PAD>: The pads are washed with the chuck table rotated. <Chuck>: The chuck table is washed by the washing unit.			

Parameters in "SPRAY BEFORE FIRST LOAD WAFER" group

The parameters in "SPRAY BEFORE FIRST LOAD WAFER" group are detailed.

Spinner Washing Time	sec.	0 to 90	0
[User-specified spec.] This parameter is not used in this machine.			

Spinner Drying Time	sec.	0 to 90	5
[User-specified spec.] This parameter is not used in this machine.			

3-6. Parameters in EDIT PARAMETER (OTHER) Screen

EDIT PARAMETER (OTHER) screen

This section describes the parameters in EDIT PARAMETER (OTHER) screen.

[Screen]

```
Page [MT31]              EDIT PARAMETER (OTHER)      YYYY/HH/DD HH:MM:SS


>> Others
   Language                    < English >     Screen Saver Time (min.)            10
   Password <PARAMETER>        [       ]

>> Wafer Thickness Measure Parameter Setting
   Select Thickness-Measure    < Pass >        Measure offset                     0.0
   (+)Value Limit                        0     (-)Value Limit                       0
   Meathd of Hold Wafer        < 3-P >         Measure Time                         1

>> SPECIAL E.L.P SET
   SPECIAL E.L.P               < Pass >        Auto Correct height off-set   < Pass >

>> Surface Routghness Parameter Setting
   Select Roughness-Measure    < Pass >
   Correct X:   (mm)                    0.0    Correct THETA :   (mm)             0.0
   Correct Z:   (mm)                   0.00

>> Self-Grinding Data Protect Setting
      1)          2)          3)          4)          5)          6)

>> Dressing Data Protect Setting
      1)          2)          3)          4)          5)          6)

>> Grinding Data Protect Setting
      1)          2)          3)          4)          5)          6)
      7)          8)          9)         10)         11)         12)
     13)         14)         15)         16)         17)         18)
     19)         20)         21)         22)         23)         24)
     25)         26)         27)         28)         29)         30)
     31)         32)         33)         34)         35)         36)
     37)         38)         39)         40)         41)         42)
     43)         44)         45)         46)         47)         48)
     49)         50)         51)         52)         53)         54)
     55)         56)         57)         58)         59)         60)

>> Auto history setting
   Z-azis wheel wear Record           < Cumul >
F01 : Parameter menu   F02 : Grind       F03 : Height gauge    F04 : Transfer
F05 : Cassette         F06 : Cleaning    F07 : Turntable       F08 :
```

[Function Key]

Press	To
F1	Return to the parameter menu (EDIT PARAMETER) screen.
F2	Call up the EDIT PARAMETER (GRIND) screen.
F3	Call up the EDIT PARAMETER (HEIGHT GAUGE) screen.
F4	Call up the EDIT PARAMETER (TRANSFER) screen.
F5	Call up the EDIT PARAMETER (CASSETTE) screen.
F6	Call up the EDIT PARAMETER (CLEAN) screen.
F7	Call up the EDIT PARAMETER (TURNTABLE) screen. - Not used in this machine. -
F8	(Not used)

Parameters in "Others" group

The parameters in "Others" group are detailed.

Language	—	Japanese / English	Japanese
The language (Japanese or English) used for screen display is selected using the <SEL> key.			

Screen Saver Time	min	0 to 100	10
If the CRT display is allowed to show exactly the same screen contents for a prolonged period of time, it may become burned. To prevent such CRT screen burn from occurring, switching to the "screen saver" screen takes place when the time specified in this parameter elapses with the screen contents unchanged. To return to the original screen, press any key.			

Password <PARAMETER>	—	Within 5 digits	-
The password (number of up to 5 digits) to enter the EDIT PARAMETER screen is set up. If you place the cursor to this parameter and press the <ENTER> key, the password input screen appears. Refer to Section 2-2, [Password Check/Set up Procedures] in chapter C for details of the password set up procedures.			

Parameters in "Wafer Thickness Measure Parameter Setting" group

The parameters in "Wafer Thickness Measure Parameter Setting" group are detailed.

Select Thickness-Measure	—	Pass / Set	Pass
[User-specified spec.] This parameter is not used in the standard set up machine. - "Pass" should be entered for the standard set up machine.			

Parameters in "Wafer Thickness Measure Parameter Setting" group (Continued)

Measure offset	μm	-99.0 to 99.0	0.0
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

(+) Value Limit	μm	0 to 999	0
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

(-) Value Limit	μm	-999 to 0	0
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

Meathd of Hold Wafer	—	3-P / 1-P	3-P
[User-specified spec.] This parameter is not used in the standard set up machine. - "3-P" should be entered for the standard set up machine.			

Measure Time	times	1 to 5	1
[User-specified spec.] This parameter is not used in the standard set up machine. - "1" should be entered for the standard set up machine.			

Parameters in "SPECIAL E.L.P SET" group

The parameters in "SPECIAL E.L.P SET" group are detailed.

SPECIAL E.L.P	—	Pass / Set	Pass
[User-specified spec.] This parameter is not used in the standard set up machine. - "Pass" should be entered for the standard set up machine.			

Auto Correct height off-set	—	Pass / Set	Pass
[User-specified spec.] This parameter is not used in the standard set up machine. - "Pass" should be entered for the standard set up machine.			

Parameters in "Surface Roughness Parameter Setting" group

The parameters in "Surface Roughness Parameter Setting" group are detailed.

Select Roughness-Measure	—	Pass / Set	Pass
[User-specified spec.] This parameter is not used in the standard set up machine. - "Pass" should be entered for the standard set up machine.			

Correct X :	mm	-10.0 to 10.0	0.0
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

Correct THETA :	°	-10.0 to 10.0	0.0
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

Correct Z :	mm	-10.00 to 10.00	0.00
[User-specified spec.] This parameter is not used in the standard set up machine. - "0.0" should be entered for the standard set up machine.			

Parameters in "Self-Grinding Data Protect Setting" group

The parameters in "Self-Grinding Data Protect Setting" group are detailed.

1) to 6)	—	wr protect / exec. lock / wr/ex lock / blank	See below.
This parameter sets up the attributes for the self-grinding programs. <wr protect> : The program is write-protected and its data cannot be changed. <exec. lock> : Execution of the program (performing self-grinding operation using the program) is disabled. <wr/ex lock> : Data change/execution of the program are both disabled. <blank> : Data change/execution of the program are both enabled. The program is free from attribute binding. <Standard setting> 1) : <wr protect> Others : < blank >			

Parameters in "Dressing Data Protect Setting" group

The parameters in "Dressing Data Protect Setting" group are detailed.

1) to 6)	—	wr protect / exec. lock / wr/ex lock / blank	See below.

This parameter sets up the attributes for the dressing programs.
 <wr protect> : The program is write-protected and its data cannot be changed.
 <exec. lock> : Execution of the program (performing dressing operation using the program) is disabled.
 <wr/ex lock> : Data change/execution of the program are both disabled.
 <blank> : Data change/execution of the program are both enabled. The program is free from attribute binding.
 <Standard setting>
  1)   : <wr protect>
  Others : < blank >			

Parameters in "Grinding Data Protect Setting" group

The parameters in "Grinding Data Protect Setting" group are detailed.

1) to 60)	—	wr protect / exec. lock / wr/ex lock / blank	See below.

This parameter sets up the attributes for the grinding programs.
 <wr protect> : The program is write-protected and its data cannot be changed.
 <exec. lock> : Execution of the program (performing grinding operation using the program) is disabled.
 <wr/ex lock> : Data change/execution of the program are both disabled.
 <blank> : Data change/execution of the program are both enabled. The program is free from attribute binding.
 <Standard setting>
  1)   : <wr protect>
  Others : < blank >			

Parameters in "Auto history setting" group

The parameters in "Auto history setting" group are detailed.

Z-axis wheel wear Record	—	Cumul. / simple	Cumul.
[User-specified spec.] This parameter is not used in the standard set up machine. - "Cumul." should be entered for the standard set up machine.			

F. DATA AND FILE MANAGEMENT

Contents of this Chapter

This chapter describes the functions used for managing the various machine data and files.

Section No.	Title	Contents
1	Event History	- Descriptions on the HISTORY screen
2	Data Management by Floppy Disk	- Procedures to manage the various machine data using floppy disk
3	Grind Record Function	- Descriptions on grind record function

1. Event History

Summary of this section

This section describes about the event history function for checking the past operational and error data.

Section No.	Title	Contents
1-1	Calling up the HISTORY Screen	- Procedures to call up the HISTORY screen
1-2	Contents of the HISTORY Screen	- Descriptions on the indication items in the HISTORY screen
1-3	Saving of Event History Data	- Procedures to save the event history data into floppy disk.

Outline of event history function

Each time an event (error, operational event, etc.) occurs, the occurred time/date, contents, and assigned code name for the event are registered in the event history log of the machine. Up to 9999 event history data are registered in the machine and you can check them on the HISTORY screen.
The event history data can be saved into floppy disk and the saved data can be read by a PC.

1-1. Calling up the HISTORY Screen

Procedures to call up the HISTORY screen

The procedures to call up the HISTORY screen are described here.

Step No.	Do This
1	Press the <STATUS> key on the top menu screen. - The STATUS screen appears. Page [E03]　　　　　　　　　　STATUS　　　　YYYY/MM/DD HH:MM:SS 　　　　　　　　　　　　　　　　　　　　　　　　Ver.********* Main Air Pressure　　　　　[OPTION]　Sub Air Pressure　　　　[OPTION] Z2 Chuck Vacuum　　　　　[OPTION]　Z1 Chuck Vacuum　　　　[OPTION] Z2 Spindle Current (A)　　　[　　#.#]　Z1 Spindle Current (A)　　[　　#.#] Z2 Spindle R.P.M.　　　　　[　####]　Z1 Spindle R.P.M.　　　　[　####] Z2 Usable Tooth (µm)　　　　[　###.#]　Z1 Usable Tooth (µm)　　　[　###.#] Z2 Wheel Wear (µm/piece)　[　#.###]　Z1 Wheel Wear (µm/ piece)　[　#.###] Z2 Estimated Number Of Wafer [　####]　Z1 Estimated Number Of Wafer [　####] Total Time-A (hr)　　　　　[　###]　Total Time-B (hr)　　　　[　###] Ground Wafers on Z2 (pcs)　[　###]　Ground Wafers on Z1 (pcs)　[　###] Total wafers　　　　　　　[　####]　Total grinding Time (min.)　[　####] F01 : Previous scrn.　　F02 : Reset T-time　　F03 :　　　　F04 : F05 : Reset A-time　　F06 : Reset B-time　　F07 : Reset Total-Wf　F08 : Event hist.
2	Press the <F8> key. - The HISTORY screen appears. Page [E04]　　　　　　　　　　HISTORY　　　　YYYY/MM/DD HH:MM:SS No.　　Date　　Time　　Code　Class　　Contents　　Ver.********* ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### ####　YY/MM/DD HH:MM:SS ####　#　############################### F01 : Previous scrn.　　F02 : Previous Page　F03 : Select errcode　F04 : F05 :　　　　F06 :　　Next Page　　F07 :　　　　F08 : All copy hist. G : [　] [　] key: Scroll - One page contains up to 100 events. You can scroll up and down the display on the page by the cursor keys. - You can change the page by using the <F2> or <F6> key. - Refer to Section 1-2, [Contents of the HISTORY Screen] in this chapter for details of the indications on the HISTORY screen.

1-2. Contents of the HISTORY Screen

Contents of the HISTORY screen

The HISTORY screen is detailed here.
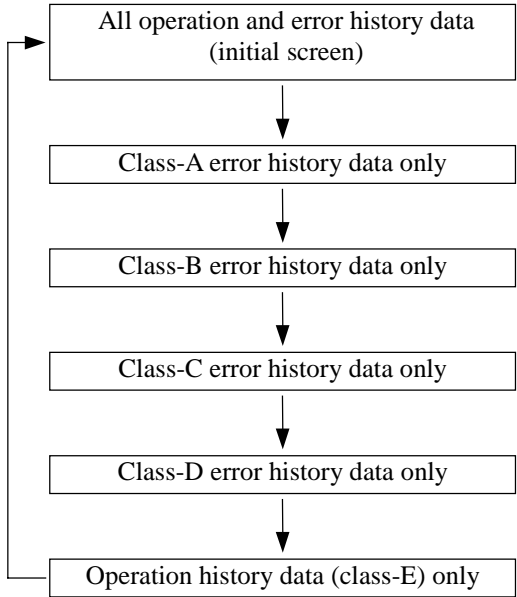
[Screen]

```
Page [E04]                          HISTORY              YYYY/MM/DD HH:MM:SS
   No.        Date        Time      Code  Class      Contents         Ver.*********
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################
   ####    YY/MM/DD    HH:MM:SS    ####    #     ###############################

 F01 : Previous scrn.    F02 : Previous Page    F03 : Select errcode   F04 :
 F05 :                   F06 :     Next Page    F07 :                  F08 : All copy hist.
 G : [   ] [   ] key: Scroll
```

[Setting Item]

Item No.	Descriptions
[1]	Serial number assigned to each error/operational event data (from 0001 to 9999) is shown. When the number 9999 is reached, it starts with 0001 again (the oldest data is erased as the newest data enters).
[2]	Date the operation was executed (operational event), or date the error occurred (error event) is shown.
[3]	Time the operation was executed (operational event), or time the error occurred (error event) is shown. - (Ex) January 1, 2000: 00/01/01
[4]	Code assigned to the operational/error event is shown.
[5]	Class assigned to the operational/error event is shown.
[6]	Contents of the operational event or error message are shown.
[7]	Page number (No. 00 - 99) is shown.

[Function Key]

Press	To
F1	Return to the previous screen.
F2	Move to the page with lower-numbered data items
F3	Switch on-screen displays. At each press of this key, the on-screen indication changes as follows.
F4	Not used.
F5	Not used.
F6	Move to the page with higher-numbered data items.
F7	Not used.
F8	Copy registered data into floppy disk. - Refer to Section 1-3, [Saving of Event History Data] in this chapter for the procedures to save the data.

For F3, the on-screen indication changes in the following cycle:

All operation and error history data (initial screen)
↓
Class-A error history data only
↓
Class-B error history data only
↓
Class-C error history data only
↓
Class-D error history data only
↓
Operation history data (class-E) only
(returns to initial screen)

1-3. Saving of Event History Data

Procedures to save event history data

The procedures to save event history data into floppy disk (hereinafter referred to as FD) are described here.
The data is saved in CSV data format (comma-separated text format) and therefore can be read by a PC.

Step No.	Do This
1	Press the <STATUS> key on the top menu screen. - The STATUS screen appears. Page [E03] STATUS YYYY/MM/DD HH:MM:SS Ver.********* Main Air Pressure [OPTION] Sub Air Pressure [OPTION] Z2 Chuck Vacuum [OPTION] Z1 Chuck Vacuum [OPTION] Z2 Spindle Current (A) [#.#] Z1 Spindle Current (A) [#.#] Z2 Spindle R.P.M. [####] Z1 Spindle R.P.M. [####] Z2 Usable Tooth (μm) [###.#] Z1 Usable Tooth (μm) [###.#] Z2 Wheel Wear (μm/piece) [#.###] Z1 Wheel Wear (μm/ piece) [#.###] Z2 Estimated Number Of Wafer [####] Z1 Estimated Number Of Wafer [####] Total Time-A (hr) [###] Total Time-B (hr) [###] Ground Wafers on Z2 (pcs) [###] Ground Wafers on Z1 (pcs) [###] Total wafers [####] Total grinding Time (min.) [####] F01 : Previous scrn. F02 : Reset T-time F03 : F04 : F05 : Reset A-time F06 : Reset B-time F07 : Reset Total-Wf F08 : Event hist.
2	Press the <F8> key. - The HISTORY screen appears. Page [E04] HISTORY YYYY/MM/DD HH:MM:SS No. Date Time Code Class Contents Ver.********* #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ #### YY/MM/DD HH:MM:SS #### # ############################ F01 : Previous scrn. F02 : Previous Page F03 : Select errcode F04 : F05 : F06 : Next Page F07 : F08 : All copy hist. G : [ ] [ ] key: Scroll
3	Insert a formatted FD into the floppy disk drive.
4	Press the <F8> key. - Data saving into FD starts with the message "Disk Free space ####### byte: <Making> " displayed. - After several minutes, the massage changes to "Start saving. Please wait a moment...". - When saving of the data into FD completes, the system returns to the HISTORY screen.
5	Remove the FD out of the floppy disk drive. - The event history data is saved under the file name "JOB_HIST.CSV".

2. Data Management by Floppy Disk

Summary of this section

This section describes the procedures to manage the various machine data using floppy disks (FD).

Section No.	Title	Contents
2-1	Saving Data into Floppy Disk	- Procedures to format FD - Procedure to save the machine data on FD.
2-2	Reading Data from Floppy Disk	- Procedures to read the data stored in FD into the machine memory.
2-3	FILE MAINTENANCE Screen	- Contents of the FILE MAINTENANCE screen.
2-4	FD Content Display Screen	- Contents of the FD content display screen.
2-5	Comparison of Floppy Disk Data with Machine Data	- Procedures to compare FD data with its corresponding data in the machine

2-1. Saving Data into Floppy Disk

Contents of this section

The procedures to save the machine data into FD are described here. FD of 3.5-inch/2HD type only can be used for saving the data.
If an FD on hand is unformatted, make sure to format it before proceeding to save data on it.

Section No.	Title	Contents
2-1-1	Formatting of Floppy Disk	- Procedures to format FD
2-1-2	Data saving	- Procedures to save the machine data into FD

The types of the data that can be saved into FD and their contents are described as follows.

Type of data	Contents	File name
Grinding data (All)	- All grinding programs (60 programs)	***.P_G ***.P_X
Grinding data (each)	- Specific grinding program (selected when saved)	***.POG ***.POX
Dressing/Self-grinding data	- All dressing programs (6 programs) - All self-grinding programs (6 programs)	***.P_D
Packed data	- Grinding data (All) - Dressing/self-grinding data - Set up data in the SPECIAL FUNCTION screen	***.PRG ***.PEX
Parameter data	- All parameter (setup) data in the EDIT PARAMETER screen - Set up data in the WARM UP screen	PARADATA.840 WARMDATA.840
Preventive maintenance data	- All preventive maintenance data	MNT_DATA.840
Machine unit data	- "Grinding data (All)" - "Dressing/Self-grinding data" - Set up data in the SPECIAL FUNCTION screen - "Parameter data" - "Preventive maintenance data" - "Maker maintenance parameter (setup) data" - Set up data in the WARM UP screen	***.PRG ***.PEX PARADATA.840 MNT_DATA.840 CONDDATA.840 MMPMPD.DAT MMPIOD.DAT MMPMCD.DAT MMPVCD.DAT WARMDATA.840
Machine unit data text	The following data are saved in the plain text format. - "Grinding data (All)" - "Dressing/Self-grinding data" - Set up data in the SPECIAL FUNCTION screen - "Parameter data" - "Preventive maintenance data" - Parameter (setup) data in the STATUS screen	UNITDATA.TXT (Readable by a PC)
Event history data	All event history data (past operational and error events)	JOB HIST.CSV (Readable by a PC)

Data that can be saved into FD (Continued)

Type of data	Contents	File name
All data	- "Machine unit data" - "Machine unit data text" - "Event history data"	***.PRG ***.PEX PARADATA.840 MNT_DATA.840 CONDDATA.840 JOB_HIST.CSV MMPMPD.DAT MMPIOD.DAT MMPMCD.DAT MMPVCD.DAT UNITDATA.TXT WARMDATA.840
SRAM data	- SRAM data	Sramdata.840

2-1-1. Formatting of Floppy Disk

Procedures of formatting FD

An unformatted FD cannot be used for saving data. The procedures to format the FD are described here.

NOTICE

If you format a floppy disk, all data saved in the disk is erased and cannot be restored.

Step No.	Do This
1	Insert an FD (3.5-inch/2HD type) you want to format into the floppy disk drive.
2	Press the <OP-1> key on the top menu screen. - The OTHER screen appears. Page [OP1] OTHER Ver.******** F1 : TOP MENU F2 : MACHINE MODE DISPLAY F3 : PURGE WATER F4 : MACHINE POWER OFF F5 : FILE MAINTENANCE F6 : GRIND RECORD F01 : TOP MENU F02 : Change Mode F03 : Water Purge F04 : M/C Power off F05 : File Maint. F06 : Grind record F07 : F08 :
3	Press the <F5> key. - The FILE MAINTENANCE screen appears. - If the screen is password-protected, enter the password (PARAMETER) and press the <ENTER> key. Page [OP5] FILE MAINTENANCE YYYY/MM/DD HH:MM:SS >> File processing Grinding data [All] [each] (Save/load) [Dressing/self-data] (Save/load) [Packed data] (Save/load) [Parameter data] (Save/load) [Preventive maintenance data] (Save/load) [Machine unit data] (Save/load) [Machine unit data text] (Save only) [Event history data] (Save only) [All data related] (Save only) [SRAM data] (Save/load) F01 : Previous scrn. F02 : grind list F03 : FD contents F04 : save F05 : dress list F06 : self list F07 : Format FD F08 : load G : [↑] [↓] Key : Moved by cursor and executed by function key G : OP1 key to compare operation screen

Step No.	Do This
4	Press the <F7> key. - The following message appears. Will format FD. OK?　　[[ENTER] : Yes / No : [CE]]
5	Press the <ENTER> key. - The following message appears. 1 : 1.25M format size 2 : 1.44M format size Select 1 or 2 ([CE]: Cancel)
6	Press the <1> key to select the 1.25MB format size and the <2> key to select the 1.44MB format size. - The following message appears when formatting completes (the example here selected the 1.44MB format size). Enter key : Press please [1.44M format size]
7	Press the <ENTER> key. - The system returns to the FILE MAINTENANCE screen

2-1-2. Data Saving

Data saving procedures

The procedures to save the machine data into FD is described.

```
                    ┌─────────────┐
                    │   NOTICE    │
                    └─────────────┘

If you save the same type data as already in the FD, the data in the
FD is overwritten by the new data and erased.

Before saving new data into FD, check the existing data in the FD by
pressing the <F3> key on the FILE MAINTENANCE screen to display
the FD contents.
```

Step No.	Do This
1	Insert a formatted FD (3.5-inch/2HD type) into the floppy disk drive.
2	Press the <OP-1> key on the top menu screen. - The OTHER screen appears.
3	Press the <F5> key. - The FILE MAINTENANCE screen appears. - If the screen is password-protected, enter the password (PARAMETER) and press the <ENTER> key.

Step 2 screen:

```
Page [OP1]                        OTHER
                                                        Ver.*********

            F1 : TOP MENU
            F2 : MACHINE MODE DISPLAY
            F3 : PURGE WATER
            F4 : MACHINE POWER OFF
            F5 : FILE MAINTENANCE
            F6 : GRIND RECORD


F01 : TOP MENU      F02 : Change Mode   F03 : Water Purge   F04 : M/C Power off
F05 : File Maint.   F06 : Grind record  F07 :               F08 :
```

Step 3 screen:

```
Page [OP5]              FILE MAINTENANCE       YYYY/MM/DD HH:MM:SS
>> File processing

            Grinding data        [  All  ] [  each  ]   (Save/load)
        [   Dressing/self-data                      ]   (Save/load)
        [   Packed data                             ]   (Save/load)
        [   Parameter data                          ]   (Save/load)
        [   Preventive maintenance data             ]   (Save/load)
        [   Machine unit data                       ]   (Save/load)
        [   Machine unit data text                  ]   (Save only)
        [   Event history data                      ]   (Save only)
        [   All data related                        ]   (Save only)
        [   SRAM data                               ]   (Save/load)


F01 : Previous scrn.   F02 : grind list    F03 : FD contents   F04 : save
F05 : dress list       F06 : self list     F07 : Format FD     F08 : load
G : [↑] [↓] Key : Moved by cursor and executed by function key
G : OP1 key to compare operation screen
```

Step No.	Do This
4	Using the cursor keys, select the data type you want to save. - If you select "grinding data (each)", enter the program number you want to save and its file name for saving (up to 8 characters).
5	Press the <F4> key. - The following message appears. 　Will save in FD. OK?　　[[ENTER] : Yes / No : [CE]]
6	Press the <ENTER> key. - Data saving starts. When data saving normally completes, the following message appears. 　　　　　　　Now Copying...　　　　　　 - If data saving is not normally made, the following message appears. Since insufficient FD capacity may be a cause, repeat the same procedures using a new FD. 　　　　　　FDD : Empty ! 　　　Impossible to open the FDD 　　　[ENTER] key press please

2-2. Reading Data from Floppy Disk

Types of data that can be read from FD

The types of data that can be read from FD into the machine memory are described as follows.

Type of data	Contents	File name
Grinding data (All)	- All grinding programs (60 programs)	***.P_G ***.P_X
Grinding data (each)	- Specific grinding program (selected when saved)	***.POG ***.POX
Dressing/Self-grinding data	- All dressing programs (6 programs) - All self-grinding programs (6 programs)	***.P_D
Packed data	- Grinding data (All) - Dressing/self-grinding data - Set up data in the SPECIAL FUNCTION screen	***.PRG ***.PEX
Parameter data	- All parameter (setup) data in the EDIT PARAMETER screen - Set up data in the WARM UP screen	PARADATA.840 WARMDATA.840
Preventive maintenance data	- All preventive maintenance data	MNT_DATA.840
Machine unit data	- "Grinding data (All)" - "Dressing/Self-grinding data" - "Parameter data" - "Preventive maintenance data" - "Maker maintenance parameter (setup) data" - Set up data in the WARM UP screen	***.PRG ***.PEX PARADATA.840 MNT_DATA.840 CONDDATA.840 MMPMPD.DAT MMPIOD.DAT MMPMCD.DAT MMPVCD.DAT WARMDATA.840
SRAM data	- SRAM data	Sramdata.840

The procedures to read data stored in FD into the machine memory are described here.

NOTICE

If you read from FD the same type data as already in the machine memory, the data in the machine memory is overwritten by the new data and erased. If you want to keep the data in the machine memory, save it first referring to Section 2-1, [Saving Data into Floppy Disk] in this chapter.

Step No.	Do This
1	Insert the FD containing the data you want to read into the machine memory into the floppy disk drive.
2	Press the <OP-1> key on the top menu screen. - The OTHER screen appears.

Page [OP1]   OTHER

Ver.*********

       F1 : TOP MENU

       F2 : MACHINE MODE DISPLAY

       F3 : PURGE WATER

       F4 : MACHINE POWER OFF

       F5 : FILE MAINTENANCE

       F6 : GRIND RECORD

F01 : TOP MENU	F02 : Change Mode	F03 : Water Purge	F04 : M/C Power off
F05 : File Maint.	F06 : Grind record	F07 :	F08 :

Step No.	Do This
3	Press the <F5> key. - The FILE MAINTENANCE screen appears. - If the screen is password-protected, enter the password (PARAMETER) and press the <ENTER> key.

Page [OP5]   FILE MAINTENANCE   YYYY/MM/DD HH:MM:SS

>> File processing

      Grinding data   [All] [each] (Save/load)
[Dressing/self-data   ] (Save/load)
[Packed data   ] (Save/load)
[Parameter data   ] (Save/load)
[Preventive maintenance data   ] (Save/load)
[Machine unit data   ] (Save/load)
[Machine unit data text   ] (Save only)
[Event history data   ] (Save only)
[All data related   ] (Save only)
[SRAM data   ] (Save/load)

F01 : Previous scrn.	F02 : grind list	F03 : FD contents	F04 : save
F05 : dress list	F06 : self list	F07 : Format FD	F08 : load

G : [↑] [↓] Key : Moved by cursor and executed by function key
G : OP1 key to compare operation screen

Step No.	Do This
4	Using the cursor keys, select the data type you want to read into the machine memory and press the <F8> key. - If you select "grinding data (each)", enter the program number you want to read into the machine memory. - If you select a data type that cannot be read, the message "Can't read selected item" appears.
5	Press the <ENTER> key. - The FILE ACCESS screen appears. A list of the files in the FD (files of the selected data type only) are shown on the screen.
6	Select the objective file by using the cursor keys and press the <ENTER> key. - The selected file data is read into the machine memory. When reading completes, the system returns to the FILE MAINTENANCE screen.

2-3. FILE MAINTENANCE Screen

FILE MAINTENANCE screen

Saving into and reading from FD of various machine data are performed on the FILE MAINTENANCE screen. The contents of the FILE MAINTENANCE screen are described here.

[Screen]

```
Page [OP5]                   FILE MAINTENANCE              YYYY/MM/DD HH:MM:SS

>> File processing

              Grinding data          [  All  ] [  each  ]   (Save/load)
          [   Dressing/self-data                         ]   (Save/load)
          [   Packed data                                ]   (Save/load)
          [   Parameter data                             ]   (Save/load)
          [   Preventive maintenance data                ]   (Save/load)
          [   Machine unit data                          ]   (Save/load)
          [   Machine unit data text                     ]   (Save only)
          [   Event history data                         ]   (Save only)
          [   All data related                           ]   (Save only)
          [   SRAM data                                  ]   (Save/load)



 F01 : Previous scrn.   F02 : grind list    F03 : FD contents    F04 : save
 F05 : dress list       F06 : self list     F07 : Format FD      F08 : load
 G : [ ↑ ] [ ↓ ] Key : Moved by cursor and executed by function key
 G : [OP1] key to compare operation screen
```

[Setting Item]

Items indicated on the FILE MAINTENANCE screen are for saving into/reading from FD of the various machine data.
Refer to section 2-1, [Saving Data into Floppy Disk] and 2-2, [Reading Data from Floppy Disk] in this chapter for details of the indication items.

[Function Key]

Press	To
F1	Return to the OTHER screen.
F2	Call up the GIRND DATA LIST screen.
F3	Call up the "FD content display" (list of the files saved in the floppy disk) screen. - Refer to Section 2-4, [FD Content Display Screen] in this chapter for details.
F4	Save data into FD. - Refer to Section 2-1, [Saving Data into Floppy Disk] in this chapter for details.
F5	Call up the dress program list screen.
F6	Call up the self grind program list screen.
F7	Format FD. - Refer to Section 2-1-1, [Formatting of Floppy Disk] in this chapter for details.
F8	Read data from FD. - Refer to Section 2-2, [Reading Data from Floppy Disk] in this chapter for details.

2-4. FD Content Display Screen

FD content display screen

Files in FD can be checked on the FD content display screen.

Insert the FD containing the data you want to check into the floppy disk drive and press the <F3> key on the FILE MAINTENANCE screen. The FD content display screen then appears.

[Screen]

```
Page [OP51]                    FD content display           YYYY/MM/DD HH:MM:SS

  Space :     [1]          File No. :    [2]        Disp.mode :    [3]          [  [4]   ] page
     File Name          Size      Date       Time    File Name       Size      Date       Time
        [5]            [6]       [7]        [8]
   ########.POG       ####    YY-MM-DD HH:MM
   ########.P_G       ####    YY-MM-DD HH:MM
   ########.P_D       ####    YY-MM-DD HH:MM
   ########.PRG       ####    YY-MM-DD HH:MM
   PARADATA.840       ####    YY-MM-DD HH:MM
   MNT_DATA.840       ####    YY-MM-DD HH:MM




  F01 : Previous scrn.    F02 : Next Page        F03 : Specified file    F04 : All files disp
  F05 :                   F06 : Previous Page    F07 :                   F08 :
```

[Setting Item]

Item No.	Descriptions
[1]	Available disk space (byte) in the FD is shown.
[2]	Number of files saved in the FD is shown.
[3]	File list display mode is shown. (The display mode is selected using the <F3> or <F4> key.)
	<F3> file disp. Files stored in the forms (excluding plain text format) that allow saving and reading of data are displayed.
	<F4> All files All files in the FD are displayed.
[4]	Current page No./total page No. is shown.
[5]	File name is shown.
[6]	File size (byte) is shown.
[7]	Date the file was saved is shown.
[8]	Time the file was saved is shown.

[Function Key]

Press	To
F1	Return to the FILE MAINTENANCE screen.
F2	Display the next page.
F3	Switch the file list display mode to "file disp.".
F4	Switch the file list display mode to "All files".
F5	Not used.
F6	Display the previous page.
F7	Not used.
F8	Not used.

2-5. Comparison of Floppy Disk Data with Machine Data

About data comparison function

The data comparison function checks if a data stored in the FD agrees with its corresponding data in the machine memory.

The following data types can be compared using this function.
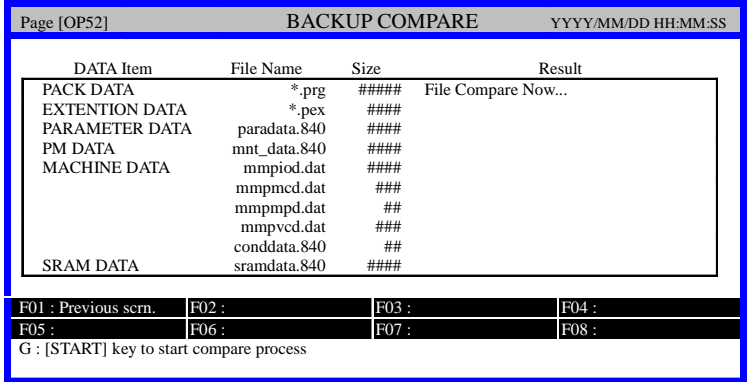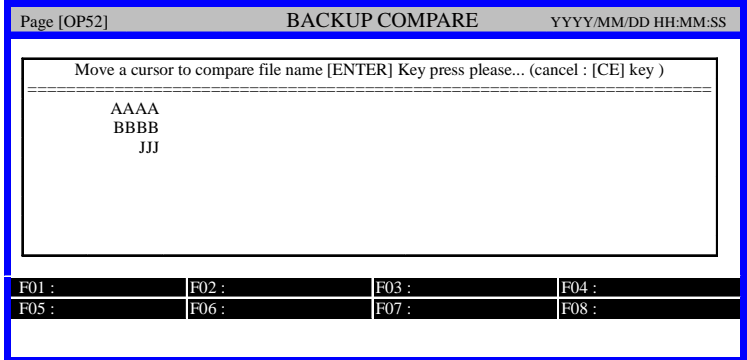
Data type	File name	
Packed data	*.prg	"*" : Name assigned for saving data on the FD
Extension data	*.pex	
Parameter data	paradata.840	
Preventive maintenance data	mnt_data.840	
Machine data	mmpiod.dat mmpmcd.dat mmpmpd.dat mmpvcd.dat conddata.840 warmdata.840	

Procedures of data comparison

Step No.	Do This
1	Insert the FD containing the data you want to compare into the floppy disk drive.
2	Press the <OP-1> key on the top menu screen. - The OTHER screen appears.
3	Press the <F5> key. - The FILE MAINTENANCE screen appears. - If the screen is password-protected, enter the password (PARAMETER) and then press the <ENTER> key.

4	Press the <OP-1> key.
	- The BACKUP COMPARE screen appears.
	
	Page [OP52] BACKUP COMPARE YYYY/MM/DD HH:MM:SS
	
	        DATA Item File Name Size Result
	        PACK DATA *.prg #####
	        EXTENTION DATA *.pex ####
	        PARAMETER DATA paradata.840 ####
	        PM DATA mnt_data.840 ####
	        MACHINE DATA mmpiod.dat ####
	                mmpmcd.dat ###
	                mmpmpd.dat ##
	                mmpvcd.dat ###
	                conddata.840 ##
	        SRAM DATA sramdata.840 ####
	
	F01 : Previous scrn. F02 : F03 : F04 :
	F05 : F06 : F07 : F08 :
	G : [START] key to start compare process

Step No.	Do This
5	Press the <START> key. - The data comparison process starts. The compared results are shown in "Result" column of each data. Refer to "Meanings of comparison result messages" in this section for meanings of the indicated messages. Page [OP52]　　　　BACKUP COMPARE　　　YYYY/MM/DD HH:MM:SS 　　DATA Item　　　File Name　　Size　　　　　Result 　PACK DATA　　　　*.prg　　#####　File Compare Now... 　EXTENTION DATA　　*.pex　　#### 　PARAMETER DATA　paradata.840　#### 　PM DATA　　　　mnt_data.840　#### 　MACHINE DATA　　mmpiod.dat　#### 　　　　　　　　mmpmcd.dat　### 　　　　　　　　mmpmpd.dat　## 　　　　　　　　mmpvcd.dat　### 　　　　　　　conddata.840　## 　SRAM DATA　　sramdata.840　#### F01 : Previous scrn.　F02 :　　F03 :　　F04 : F05 :　　F06 :　　F07 :　　F08 : G : [START] key to start compare process - If there are more than one pack data stored in the floppy disk, the following file selection screen appears. Select the data you want to compare and press the <ENTER> key. If you press the <CE> key here, pack data comparison is not performed. Page [OP52]　　　　BACKUP COMPARE　　　YYYY/MM/DD HH:MM:SS 　Move a cursor to compare file name [ENTER] Key press please... (cancel : [CE] key) === 　　　AAAA 　　　BBBB 　　　JJJ F01 :　　F02 :　　F03 :　　F04 : F05 :　　F06 :　　F07 :　　F08 :

Meanings of comparison result messages

Meanings of the messages shown in the "Result" column are as follows.

Message	Meaning
File Compare Now...	Data comparison is in progress…
File not found.	Can't find the file to compare the data against.
Size not matched.	Data size is illegal.
Data not matched.	The compared data did not agree.
File matched.	The compared data agreed.

3. Grind Record Function

Summary of this section

This section describes the grind record function for recording and managing the various grinding related data used in the past grinding operations.

Section No.	Title	Contents
3-1	GRIND RECORD Screen	- Contents of the GRIND RECORD screen
3-2	Grind Record Data Display	- Procedures to check the grind record data. - Descriptions on the Data display screen
3-3	Saving of Grind Record Data	- Procedures to save the grind record data into floppy disk.

About grind record function

The grind record function records and manages the various grinding related data used in the past grinding operations.
The data recorded by using this function is called grind record data and they can be checked on the Data display screen. The grind record data can also be saved into floppy disk and be read by a PC.

Contents of grind record data

Each grind record data has the pieces of information indicated in the following table.

If you choose to have less pieces of information per data, you can record the larger number of data (data over a longer period of time) in the GRIND RECORD screen. If you want to make change in the information items each data should have, contact your nearest Disco office or Disco service office.

Information item	Contents
Grinding (full auto operation) data	Grinding program data used in the full auto operation.
Full auto operation start time	Full auto operation start time (time the <START> key was pressed.)
Grinding start time and the maximum loaded wafer thickness of each wafer	- Grinding sequence start time of each wafer - Maximum loaded wafer thickness value of each wafer (measured by the height gauge)
Wafer reversal	Execution/non-execution of wafer reversal by the robot
Grinding start time and the minimum loaded wafer thickness of each wafer	- Grinding sequence start time of each wafer - Minimum loaded wafer thickness value of each wafer (measured by the height gauge)
Loaded wafer thickness	Loaded wafer thickness:
	- O.K.: Normal
	- THICK: Thick
	- THIN: Thin
Grinding finish time of each wafer	Grinding sequence end time of each wafer
Maximum spindle current per wafer	Maximum spindle current value recorded in each wafer grinding
Accumulated wheel wear amount	Amount of wheel wear accumulated during full auto operation
Wafer thickness change data	Finished wafer thickness correction during full auto operation (offset value)

3-1. GRIND RECORD Screen

GRIND RECORD Screen

The GRIND RECORD screen is used to check grind record data or save grind record data into floppy disk.
To call up the GRIND RECORD screen, press the <F6> key on the OTHER screen. If the screen is password-protected, entry of the password (PARAMETER) is required.

If any failure occurs in the grind record data preparation process, one of the following messages appears. In such a case, press the <ENTER> key to return to the previous screen.

Message	Meaning
No index file exists.	The index file cannot be found.
No grind record file exists.	The grind record data file cannot be found.
Grind record data error.	The grind record data cannot be found or the data size is illegal.

[Screen]

```
Page [OP7]                    GRIND RECORD        YYYY/MM/DD HH:MM:SS

    Date          Time          Record      [  [1]  ] files  [  [2] / [3]  ] data
    [4]           [5]
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.  [6]  | Grind record data list |
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
 F01 : Previous scrn.   F02 : Jump forward   F03 : Save        F04 : Top of data
 F05 : Jump no. input   F06 : Jump backward  F07 :             F08 : End of data
 G : [ ↑ ] [ ↓ ] key : Move cursor      [ENTER] key : display records
 G : [SEL] key : Selects data to save. (alternate save and cancel)
 G : [CE] key : Clears all selections.
```

[Setting Item]

Item No.	Descriptions
[1]	The number of currently selected data items is shown. The data to be saved into floppy disk is selected using the <SEL> key.
[2]	The (serial) data number of the data item currently highlighted by the cursor is shown.
[3]	The total number of grind record data items recorded in the machine is shown. Up to 99999 data items can be recorded. After the number reaches 99999, the oldest data item is erased as the newest data item enters.

[Setting Item]

Item No.	Descriptions
[4]	The date and time the full auto operation started for each data item is shown.
[5]	Each grind record data is identified by the date/time indicated here.
[6]	List of grind record data is shown. Select the data item you want to check by the cursor keys and press the <ENTER> key to display its contents.

[Function Key]

Press	To
F1	Return to the OTHER screen.
F2	Jump forward by the specified number of lines (the number is specified using the <F5> key).
F3	Save the selected data into floppy disk. - Refer to Section 3-3, [Saving of Grind Record Data] in this chapter for details.
F4	Jump to the first line of the grind record data list.
F5	Specify the number of the lines (1 - 1000) to jump over when you press the <F2> or <F6> key.
F6	Jump backward by the specified number of lines (the number is specified using the <F5> key).
F7	Not used.
F8	Jump to the last line of the grind record data list.

3-2. Grind Record Data Display

Procedures to display the grind record data

The procedures to show on the GRIND RECORD screen the descriptions on the grind record data item you want to check are described here.

Step No.	Do This
1	Press the <OP-1> key on the top menu screen. - The OTHER screen appears.
2	Press the <F6> key. - The GRIND RECORD screen appears. - If the screen is password-protected, enter the password (PARAMETER) and press the <ENTER> key. Page [OP7]　　　　　　GRIND RECORD　　　　YYYY/MM/DD HH:MM:SS 　Date　　　Time　　　　　Record　　　　[#####] files　[##### / #####] data YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. YYYY/MM/DD HH/MM/SS AUTO start. F01 : Previous scrn.　F02 : Jump forward　F03 : Save　　F04 : Top of data F05 : Jump no. input　F06 : Jump backward　F07 :　　　F08 : End of data G : [↑] [↓] key : Move cursor　　[ENTER] key : display records G : [SEL] key : Selects data to save. (alternate save and cancel) G : [CE] key : Clears all selections.
3	Select the data item you want to check by the cursor keys and press the <ENTER> key. - The contents of the selected grind record data item appear on the Data display screen. (See the next page for details of the Data display screen.) Page [OP71]　　　　　　Data display　　　　YYYY/MM/DD HH:MM:SS 　Date　　　Time　　　　　Record　　　　[#####] files　[##### / #####] data 　　　Program No. = #　　　　ID = ######## 　　　　　　Rmrk = ################################ 　Wafer　　Diameter　　　　#　inch 　　Original Thickness　　###　μm 　　Finished Thickness　###.#　μm Z1 Grinding　　< #### >　Height Gauge　< #### >　Spindle (rpm)　　#### Original Thick. (μm)　　##　Aircut (μm)　　　## P1 Thick　(μm)　###.#　P2 Thick　(μm)　###.#　P3 Thick　(μm)　###.# Feed Rate　(μm/s)　#.##　Feed Rate　(μm/s)　#.##　Feed Rate　(μm/s)　#.## Chuck Table　(rpm)　###　Chuck Table　(rpm)　###　Chuck Table　(rpm)　### F01 : Previous scrn.　F02 : Jump forward　F03 : Next data　F04 : Top of data F05 : Jump no. input　F06 : Jump backward　F07 : Previous data　F08 : End of data G : [↑] [↓] key : Scroll

Contents of the selected grind record data item are displayed on the Data display screen. The Data display screen is explained here.

[Screen]

```
Page [OP71]                      Data display              YYYY/MM/DD HH:MM:SS
     Date          Time              Record        [#####] files  [ [1]  /   [2] ] data


                          Program No. = #           ID = ########
                           Rmrk = ###################################
                      Wafer    Diameter        #   inch
                      Original Thickness     ###   μm
                      Finished Thickness     ###.#  μm
[3]  Z1 Grinding          < #### >  Height Gauge       < #### >  Spindle (rpm)         ####
     Original Thick. (μm)       ##  Aircut (μm)            ##
     P1 Thick     (μm)      ###.#  P2 Thick      (μm)   ###.#  P3 Thick      (μm)    ###.#
     Feed Rate    (μm/s)     #.##  Feed Rate    (μm/s)   #.##  Feed Rate     (μm/s)   #.##
     Chuck Table   (rpm)      ###  Chuck Table  (rpm)    ###  Chuck Table   (rpm)    ###
     F01 : Previous scrn.   F02 : Jump forward    F03 : Next data      F04 : Top of data
     F05 : Jump no. input   F06 : Jump backward   F07 : Previous data  F08 : End of data
     G : [ ↑ ] [ ↓ ] key : Scroll
```

[Setting Item]

Item No.	Descriptions
[1]	(Serial) data number of the displayed grind record data item is shown.
[2]	Total number of grind record data items recorded in the machine is shown.
[3]	Contents of the selected grinding record data item are shown.

[Function Key]

Press	To
F1	Return to the GRIND RECORD screen.
F2	Jump forward by the specified number of lines (the number is specified using the <F5> key).
F3	Display the contents of the next grinding record data in the list.
F4	Display the contents of the first grinding record data in the list.
F5	Specify the number of lines to jump over (1 - 1000) when you press the <F2> or <F6> key.
F6	Jump backward by the specified number of lines (the number is specified using the <F5> key).
F7	Display the contents of the previous grind record data item in the list
F8	Display the contents of the last grind record data item in the list.

3-3. Saving of Grind Record Data

Files to be saved

Grind record data can be saved on FD. One grind record data item is saved as one file. The data is saved in the plain text format and therefore can be read by a PC.

File name used for saving data on FD

Each file is named according to the following rule.

#####_##.grf   (Ex.: 00001_01.grf)

File No.   FD No.

File No.	A serial number of the saved grind record data item (When the number reaches 99999, it begins with 1.)
FD No.	A serial FD number in the case the saved grind record data item spreads over more than one FD. When the number reaches 99 (Max.), it begins with 1.

Data saving procedures

The procedures to save grind record data on FD are described here.

Step No.	Do This
1	Press the <OP-1> key on the top menu screen. - The OTHER screen appears.
2	Press the <F6> key. - The GRIND RECORD screen appears. - If the screen is password-protected, enter the password (PARAMETER) and then press the <ENTER> key.

```
Page [OP7]                    GRIND RECORD          YYYY/MM/DD HH:MM:SS
      Date        Time           Record      [#####] files  [##### / #####] data
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
  YYYY/MM/DD HH/MM/SS AUTO start.
 F01 : Previous scrn.   F02 : Jump forward   F03 : Save        F04 : Top of data
 F05 : Jump no. input   F06 : Jump backward  F07 :             F08 : End of data
 G : [↑ ] [ ↓] key : Move cursor     [ENTER] key : display records
 G : [SEL] key : Selects data to save. (alternate save and cancel)
 G : [CE] key : Clears all selections.
```

Step No.	Do This
3	Move the cursor to the data item you want to save and press the <SEL> key. - The selected data item is shown in yellow. - To cancel the selection, move the cursor to the data item and press the <SEL> key again. The selection is canceled when you move the cursor away from the data item. - If you press the <CE> key, all selections are canceled.
4	Select all the grind record data items you want to save by repeating the step 3.
5	Press the <F3> key. - The following message appears. Okay to save data to FD?
6	Press the <ENTER> key. - The following message appears. Please prepare FD.

7	Insert a formatted FD into the FD drive and press the <ENTER> key.
	- Data saving starts. When data saving normally completes, the following message appears.
	
	        Copying.　please wait.
	
	- When the inserted FD does not have enough space for saving the grind record data, the following message appears.
	
	        Disk is full.
	
	 In this case, replace the FD with another FD having enough space for saving the data.
	- If the FD space is running out in saving more than one data item, those data items are saved in more than one FD. In such a case, the following message appears.
	
	        Insert the next FD.
	
	Remove the FD and insert the next FD into the FD drive.

G. PROGRAM SETUP SAMPLES

Contents of this chapter

This chapter provides, for your reference, setup samples of the grinding, dressing and self-grinding programs.
Since the setup details of the programs may differ according to the used conditions, contact your nearest DISCO office or DISCO service office for details.

Section No.	Title	Contents
1	Grinding Program Setup Samples	- Setup samples of grinding programs
2	Dressing Program Setup Samples	- Setup samples of dressing programs
3	Self-grinding Program Setup Samples	- Setup samples of self-grinding programs

1. Grinding Program Setup Samples

Summary of this section

This section provides setup samples of the grinding programs.

Section No.	Title	Contents
1-1	Grinding Program Sample (1)	(Grinding conditions) Wafer size: 8 inch Used wheel: Z1 #360 　　　　　　Z2 #2000
1-2	Grinding Program Sample (2)	(Grinding conditions) Wafer size: 6 inch Used wheel: Z1 #360 　　　　　　Z2 #2000
1-3	Grinding Program Sample (3)	(Grinding conditions) Wafer size: 4 inch Used wheel: Z1 #360 　　　　　　Z2 #2000

Setup Procedures of grinding program

Refer to Section 3, [Set up and Edition of Grinding Program Data] in Chapter D for the procedures and the screens used to set up the grinding program data.

1-1. Grinding Program Sample (1)

Grinding conditions

A grinding program sample that uses the following grinding conditions is provided in this section.

Item	Condition
Wafer size	8 inch
Used wheel	Z1 axis: #360 (IF-01-1-40/60-V)
	Z2 axis: #2000 (IF-01-1-4/6-B-K04)
Original wafer thickness	725 μm
Finished wafer thickness	400 μm

Data setup on the GRIND DATA screen (8 inch / Z1: #360, Z2: #2000)

Details of the data setup on the GRIND DATA screen are described as follows.

```
Page [G01]                    GRIND DATA              YYYY/MM/DD HH:MM:SS
                        Program No.    #
                   ID    == ########
                   Rmrk== ############################
                   Wafer      Diameter          8    inch
                   Original Thickness          725    μm
                              off amount   (   325)
         Z2               Finished Thickness      400   μm        Z1
GR mode sel  < Chuck>    start   <  0>        GR mode sel  < Chuck>   start   <  0>
  Z2- GRIND : [   Use ]    SPINDLE : [Rotate]  Z1- GRIND : [   Use ]    SPINDLE : [Rotate]
    GAUSE : [    Set ]    C-WATER : [ Blow ]      GAUSE : [    Set ]    C-WATER : [ Blow ]
    CST-B : [    Set ]    C-LEVEL : [ nomal ]     CST-A : [    Set ]    C-LEVEL : [ nomal ]

F01 : TOP MENU          F02 : Edit Program     F03 : Input cst. ID     F04 : Process status
F05 : Save              F06 : Program List     F07 : Chg Thick. list   F08 : Test H-Gauge
G : [START] key: Start FULL AUTO operation.
```

Setup item	Setup value
Wafer Diameter (inch)	8
Original Thickness (μm)	725
Finished Thickness (μm)	400

Details of the data setup on the Edit Program screen are described as follows.

```
Page [G03]                    GRIND MODE          YYYY/MM/DD HH:MM:SS
                               Edit Program
                  Program  No.  = ##          ID  = ########
                        Rmrk= ################################
                  Wafer    Diameter            8          inch
                  Original Thickness          725         μm
                  Finished Thickness        400.0         μm
  Z1 Grinding        <  Use  >  Height Gauge   <  Set  >  Spindle (rpm)          4800
  Original Thick. (μm)  725    Aircut (μm)            50
  P1 Thick     (μm)   435.0   P2 Thick    (μm)    420.0  P3 Thick    (μm)      420.0
  Feed Rate    (μm/s)  5.00   Feed Rate   (μm/s)   3.00  Feed Rate   (μm/s)     3.00
  Chuck Table  (rpm)    200   Chuck Table (rpm)     100  Chuck Table (rpm)       100
                             Escape Thic  (μm)     3.0
  Spark Out    (rev)      1   Feed Rate   (μm/s)   3.00
  Chuck Table  (rpm)    100   Chuck Table (rpm)     100  Process Time (s)   [    75 ]
  Z2 Grinding        <  Use  >  Height Gauge   <  Set  >  Spindle (rpm)          5500
  Original Thick. (μm)  420    Aircut (μm)            15
  P1 Thick     (μm)   402.0   P2 Thick    (μm)    400.0  P3 Thick    (μm)      400.0
  Feed Rate    (μm/s)  0.20   Feed Rate   (μm/s)   0.30  Feed Rate   (μm/s)     0.30
  Chuck Table  (rpm)    150   Chuck Table (rpm)     120  Chuck Table (rpm)        80
                             Escape Thic  (μm)     3.0
  Spark Out    (rev)      3   Feed Rate   (μm/s)   1.00
  Chuck Table  (rpm)     80   Chuck Table (rpm)      80  Process Time (s)   [    78 ]
  F01 : Previous scrn.    F02 : Auto Set         F03 : Special func.    F04 :
  F05 : Save              F06 : Program List     F07 :                  F08 :
```

Setup item	Setup value
Z1 Grinding	Use
Height Gauge	Set
Spindle (rpm)	4800
Aircut (μm)	50
P1 Thick (μm)	(435.0) *
Feed Rate (μm/s)	5.00
Chuck Table (rpm)	200
P2 Thick (μm)	(420.0) *
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100
P3 Thick (μm)	(420.0) *
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100
Spark Out (rev)	1
Chuck Table (rpm)	100
Escape Thic (μm)	3.0
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100

Setup item	Setup value
Z2 Grinding	Use
Height Gauge	Set
Spindle (rpm)	5500
Aircut (µm)	15
P1 Thick (µm)	(402.0) *
Feed Rate (µm/s)	0.50
Chuck Table (rpm)	150
P2 Thick (µm)	(400.0) *
Feed Rate (µm/s)	0.30
Chuck Table (rpm)	120
P3 Thick (µm)	(400.0) *
Feed Rate (µm/s)	0.30
Chuck Table (rpm)	80
Spark Out (rev)	3
Chuck Table (rpm)	80
Escape Thic (µm)	3.0
Feed Rate (µm/s)	1.00
Chuck Table (rpm)	80

(*) Automatically calculated from the related setup data on the GRIND DATA
screen and Automatic Program Set, Edit screen.

Details of the data setup on the Automatic Program Set, Edit screen are described as follows.

The set up value of "Height Adjust" depends on the wafer size and finished wafer thickness data. Enter an appropriate value as needed.

```
Page [G04]                         GRIND MODE          YYYY/MM/DD HH:MM:SS
                                     Edit Program
                    Program   No.  = ##          ID   = ########
                              Rmrk= ################################
                    Wafer    Diameter            8        inch
                    Original Thickness          725       μm
                    Finished Thickness          400.0     μm

      Z1          Aircut (μm)       50        Escape Amount      (μm)      3
      P1^^P2 Off Amount (μm)      15.0        Height Adjust      (μm)     0.0
      P2^^P3 Off Amount (μm)       0.0        Off Amount Guarant. (μm)    15

      Z2          Aircut (μm)       15        Escape Amount      (μm)      3
      P1^^P2 Off Amount (μm)       2.0        Height Adjust      (μm)     0.0
      P2^^P3 Off Amount (μm)       0.0        Off Amount Guarant. (μm)    15
      Z2 Total Amount    (μm)     20.0
F01 : Previous scrn.   F02 :              F03 :              F04 :
F05 : Save             F06 :              F07 :              F08 :
```

Setup item	Setup value
Z1 Aircut (μm)	50
P1~~P2 Off Amount (μm)	15.0
P2~~P3 Off Amount (μm)	0.0
Escape Amount (μm)	3
Height Adjust (μm)	0.0
Off Amount Guarant. (μm)	15
Z2 Aircut (μm)	15
P1~~P2 Off Amount (μm)	2.0
P2~~P3 Off Amount (μm)	0.0
Escape Amount (μm)	3
Height Adjust (μm)	0.0
Off Amount Guarant. (μm)	15
Z2 Total Amount (μm)	20.0

1-2. Grinding Program Sample (2)

Grinding conditions

A grinding program sample that uses the following grinding conditions is provided in this section.

Item	Condition
Wafer size	6 inch
Used wheel	Z1: #360 (IF-01-1-40/60-V)
	Z2: #2000 (IF-01-1-4/6-B-K04)
Original wafer thickness	725 μm
Finished wafer thickness	400 μm

Data setup on the GRIND DATA screen (6 inch / Z1: #360, Z2: #2000)

Details of the data setup on the GRIND DATA screen are described as follows.

```
Page [G01]                      GRIND DATA            YYYY/MM/DD HH:MM:SS
                          Program No.   #
                    ID   == ########
                    Rmrk== ############################
                    Wafer       Diameter         6   inch
                    Original Thickness         725   µm
                              off amount  (   325)
            Z2          Finished Thickness       400   µm          Z1
 GR mode sel  < Chuck>    start   <  0>        GR mode sel  < Chuck>  start   <  0>
   Z2- GRIND : [   Use ]    SPINDLE : [Rotate]  Z1- GRIND : [   Use ]    SPINDLE : [Rotate]
       GAUSE : [   Set ]    C-WATER : [ Blow ]      GAUSE : [   Set ]    C-WATER : [ Blow ]
       CST-B : [   Set ]    C-LEVEL : [ nomal ]     CST-A : [   Set ]    C-LEVEL : [ nomal ]

 F01 : TOP MENU        F02 : Edit Program      F03 : Input cst. ID       F04 : Process status
 F05 : Save            F06 : Program List      F07 : Chg Thick. list     F08 : Test H-Gauge
 G : [START] key: Start FULL AUTO operation.
```

Setup item	Setup value
Wafer Diameter (inch)	6
Original Thickness (μm)	725
Finished Thickness (μm)	400

Details of the data setup on the Edit Program screen are described as follows.

```
Page [G03]                      GRIND MODE           YYYY/MM/DD HH:MM:SS
                                Edit Program
                Program   No.  = ##          ID   = ########
                        Rmrk= ###############################
                Wafer    Diameter            6          inch
                Original Thickness          725         µm
                Finished Thickness         400.0        µm
Z1 Grinding          <  Use  >  Height Gauge    <  Set  >  Spindle (rpm)        4800
Original Thick. (µm)   725      Aircut (µm)           50
P1 Thick    (µm)      435.0     P2 Thick    (µm)     420.0  P3 Thick    (µm)    420.0
Feed Rate   (µm/s)    8.00      Feed Rate   (µm/s)   3.00   Feed Rate   (µm/s)  3.00
Chuck Table (rpm)      200      Chuck Table (rpm)     100   Chuck Table (rpm)    100
                                Escape Thic  (µm)     3.0
Spark Out    (rev)      1       Feed Rate   (µm/s)   3.00
Chuck Table (rpm)      100      Chuck Table (rpm)     100   Process Time (s)  [    49 ]
Z2 Grinding          <  Use  >  Height Gauge    <  Set  >  Spindle (rpm)        5500
Original Thick. (µm)   420      Aircut (µm)           15
P1 Thick    (µm)      402.0     P2 Thick    (µm)     400.0  P3 Thick    (µm)    400.0
Feed Rate   (µm/s)    0.80      Feed Rate   (µm/s)   0.30   Feed Rate   (µm/s)  0.30
Chuck Table (rpm)      150      Chuck Table (rpm)     120   Chuck Table (rpm)    80
                                Escape Thic  (µm)     3.0
Spark Out    (rev)      3       Feed Rate   (µm/s)   1.00
Chuck Table (rpm)      80       Chuck Table (rpm)     80    Process Time (s)  [    53 ]
F01 : Previous scrn.   F02 : Auto Set        F03 : Special func.    F04 :
F05 : Save             F06 : Program List    F07 :                  F08 :
```

Setup item	Setup value
Z1 Grinding	Use
Height Gauge	Set
Spindle (rpm)	4800
Aircut (µm)	50
P1 Thick (µm)	(435.0) *
Feed Rate (µm/s)	8.00
Chuck Table (rpm)	200
P2 Thick (µm)	(420.0) *
Feed Rate (µm/s)	3.00
Chuck Table (rpm)	100
P3 Thick (µm)	(420.0) *
Feed Rate (µm/s)	3.00
Chuck Table (rpm)	100
Spark Out (rev)	1
Chuck Table (rpm)	100
Escape Thic (µm)	3.0
Feed Rate (µm/s)	3.00
Chuck Table (rpm)	100

Setup item	Setup value
Z2 Grinding	Use
Height Gauge	Set
Spindle (rpm)	5500
Aircut (μm)	15
P1 Thick (μm)	(402.0) *
Feed Rate (μm/s)	0.80
Chuck Table (rpm)	150
P2 Thick (μm)	(400.0) *
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	120
P3 Thick (μm)	(400.0) *
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	80
Spark Out (rev)	3
Chuck Table (rpm)	80
Escape Thic (μm)	3.0
Feed Rate (μm/s)	1.00
Chuck Table (rpm)	80

(*) Automatically calculated from the related setup data on the GRIND DATA screen and Automatic Program Set, Edit screen.

Details of the data setup on the Automatic Program Set, Edit screen are described as follows.

The set up value of "Height Adjust" depends on the wafer size and finished wafer thickness data. Enter an appropriate value as needed.

```
Page [G04]                        GRIND MODE              YYYY/MM/DD HH:MM:SS
                                  Edit Program
                   Program   No.  = ##          ID  = ########
                             Rmrk= ################################
                   Wafer    Diameter          6          inch
                   Original Thickness         725         µm
                   Finished Thickness         400.0       µm

        Z1          Aircut (µm)       50      Escape Amount      (µm)      3
        P1~~P2 Off Amount (µm)      15.0      Height Adjust      (µm)    0.0
        P2~~P3 Off Amount (µm)       0.0      Off Amount Guarant. (µm)    15

        Z2          Aircut (µm)       15      Escape Amount      (µm)      3
        P1~~P2 Off Amount (µm)       2.0      Height Adjust      (µm)    0.0
        P2~~P3 Off Amount (µm)       0.0      Off Amount Guarant. (µm)    15
        Z2 Total Amount    (µm)     20.0
  F01 : Previous scrn.   F02 :              F03 :              F04 :
  F05 : Save             F06 :              F07 :              F08 :
```

Setup item	Setup value
Z1 Aircut (µm)	50
P1~~P2 Off Amount (µm)	15.0
P2~~P3 Off Amount (µm)	0.0
Escape Amount (µm)	3
Height Adjust (µm)	0.0
Off Amount Guarant. (µm)	15
Z2 Aircut (µm)	15
P1~~P2 Off Amount (µm)	2.0
P2~~P3 Off Amount (µm)	0.0
Escape Amount (µm)	3
Height Adjust (µm)	0.0
Off Amount Guarant. (µm)	15
Z2 Total Amount (µm)	20.0

1-3. Grinding Program Sample (3)

Grinding conditions

A grinding program sample that uses the following grinding conditions is provided in this section.

Item	Condition
Wafer size	4 inch
Used wheel	Z1: #360 (IF-01-1-40/60-V)
	Z2: #2000 (IF-01-1-4/6-B-K01)
Original wafer thickness	525 μm
Finished wafer thickness	400 μm

Data setup on the GRIND DATA screen (4 inch / Z1: #360, Z2: #2000)

Details of the data setup on the GRIND DATA screen are described as follows.

```
Page [G01]                      GRIND DATA            YYYY/MM/DD HH:MM:SS
                          Program No.   #
                       ID   == ########
                       Rmrk== ############################
                       Wafer      Diameter        4   inch
                       Original Thickness        525   μm
                                    off amount  (   125)
            Z2             Finished Thickness      400   μm        Z1
GR mode sel   < Chuck>     start    <  0>        GR mode sel   < Chuck>   start    <  0>
  Z2- GRIND : [   Use ]    SPINDLE : [Rotate]  Z1- GRIND : [   Use ]   SPINDLE : [Rotate]
      GAUSE : [   Set ]    C-WATER : [ Blow ]      GAUSE : [   Set ]   C-WATER : [ Blow ]
      CST-B : [   Set ]    C-LEVEL : [ nomal ]      CST-A : [   Set ]   C-LEVEL : [ nomal ]

F01 : TOP MENU         F02 : Edit Program    F03 : Input cst. ID    F04 : Process status
F05 : Save             F06 : Program List    F07 : Chg Thick. list  F08 : Test H-Gauge
G : [START] key: Start FULL AUTO operation.
```

Setup item	Setup value
Wafer Diameter (inch)	4
Original Thickness (μm)	525
Finished Thickness (μm)	400

Details of the data setup on the Edit Program screen are described as follows.

```
Page [G03]                      GRIND MODE           YYYY/MM/DD HH:MM:SS
                                 Edit Program
                    Program   No.  = ##           ID  = ########
                           Rmrk= ################################
                    Wafer    Diameter          4          inch
                    Original Thickness        525          μm
                    Finished Thickness       400.0         μm
Z1 Grinding         <  Use  >  Height Gauge    <  Set  >  Spindle (rpm)        4800
Original Thick. (μm)   525    Aircut (μm)            50
P1 Thick     (μm)    435.0    P2 Thick     (μm)   420.0  P3 Thick    (μm)      420.0
Feed Rate   (μm/s)    8.00    Feed Rate   (μm/s)   3.00  Feed Rate  (μm/s)      3.00
Chuck Table  (rpm)     200    Chuck Table  (rpm)    100  Chuck Table (rpm)       100
                             Escape Thic   (μm)    3.0
Spark Out    (rev)       1    Feed Rate   (μm/s)   3.00
Chuck Table  (rpm)     100    Chuck Table  (rpm)    100  Process Time (s)  [     24 ]
Z2 Grinding         <  Use  >  Height Gauge    <  Set  >  Spindle (rpm)        5500
Original Thick. (μm)   420    Aircut (μm)            15
P1 Thick     (μm)    402.0    P2 Thick     (μm)   400.0  P3 Thick    (μm)      400.0
Feed Rate   (μm/s)    0.80    Feed Rate   (μm/s)   0.30  Feed Rate  (μm/s)      0.30
Chuck Table  (rpm)     150    Chuck Table  (rpm)    120  Chuck Table (rpm)        80
                             Escape Thic   (μm)    3.0
Spark Out    (rev)       3    Feed Rate   (μm/s)   1.00
Chuck Table  (rpm)      80    Chuck Table  (rpm)     80  Process Time (s)  [     53 ]
F01 : Previous scrn.   F02 : Auto Set      F03 : Special func.    F04 :
F05 : Save             F06 : Program List  F07 :                  F08 :
```

Setup item	Setup value
Z1 Grinding	Use
Height Gauge	Set
Spindle (rpm)	4800
Aircut (μm)	50
P1 Thick (μm)	(435.0) *
Feed Rate (μm /s)	8.00
Chuck Table (rpm)	200
P2 Thick (μm)	(420.0) *
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100
P3 Thick (μm)	(420.0) *
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100
Spark Out (rev)	1
Chuck Table (rpm)	100
Escape Thic (μm)	3.0
Feed Rate (μm/s)	3.00
Chuck Table (rpm)	100

Data setup on the Edit Program screen (4 inch / Z1: #360, Z2: #2000) (Continued)

Setup item	Setup value
Z2 Grinding	Use
Height Gauge	Set
Spindle (rpm)	5500
Aircut (μm)	15
P1 Thick (μm)	(402.0) *
Feed Rate (μm/s)	0.80
Chuck Table (rpm)	150
P2 Thick (μm)	(400.0) *
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	120
P3 Thick (μm)	(400.0) *
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	80
Spark Out (rev)	3
Chuck Table (rpm)	80
Escape Thic (μm)	3.0
Feed Rate (μm/s)	1.00
Chuck Table (rpm)	80

(*) Automatically calculated from the related setup data on the GRIND DATA screen and Automatic Program Set, Edit screen.

Details of the data setup on the Automatic Program Set, Edit screen are described as follows.

The set up value of "Height Adjust" depends on the wafer size and finished wafer thickness data. Enter an appropriate value as needed.

```
Page [G04]                    GRIND MODE          YYYY/MM/DD HH:MM:SS
                              Edit Program
                 Program   No.  = ##        ID   = ########
                          Rmrk= ###############################
                 Wafer    Diameter          4        inch
                 Original Thickness         525      μm
                 Finished Thickness        400.0     μm

        Z1         Aircut (μm)       50      Escape Amount    (μm)     3
        P1~~P2 Off Amount (μm)     15.0      Height Adjust    (μm)    0.0
        P2~~P3 Off Amount (μm)      0.0      Off Amount Guarant. (μm)  15

        Z2         Aircut (μm)       15      Escape Amount    (μm)     3
        P1~~P2 Off Amount (μm)      2.0      Height Adjust    (μm)    0.0
        P2~~P3 Off Amount (μm)      0.0      Off Amount Guarant. (μm)  15
        Z2 Total Amount    (μm)    20.0
 F01 : Previous scrn.   F02 :            F03 :            F04 :
 F05 : Save             F06 :            F07 :            F08 :
```

Setup item	Setup value
Z1 Aircut (μm)	50
P1~~P2 Off Amount (μm)	15.0
P2~~P3 Off Amount (μm)	0.0
Escape Amount (μm)	3
Height Adjust (μm)	0.0
Off Amount Guarant. (μm)	15
Z2 Aircut (μm)	15
P1~~P2 Off Amount (μm)	2.0
P2~~P3 Off Amount (μm)	0.0
Escape Amount (μm)	3
Height Adjust (μm)	0.0
Off Amount Guarant. (μm)	15
Z2 Total Amount (μm)	20.0

2. Dressing Program Setup Samples

Summary of this section

This section provides setup samples of the dressing programs.

Section No.	Title	Contents
2-1	Dressing Program Sample (1)	(Dressing conditions) Axis: Z1 Wheel: #360 Dresser board: GC150
2-2	Dressing Program Sample (2)	(Dressing conditions) Axis: Z2 Wheel: #2000 Dresser board: GC600
2-3	Dressing Program Sample (3)	(Dressing conditions) Axis: Z1/Z2 Wheel: SG-M2 (self-grinding wheel) Dresser board: GC150

Setup Procedure of dressing program

Refer to Section 4, [Set up and Edition of Dressing Program Data] in Chapter D for the procedures and the screens used to set up the dressing program data.

2-1. Dressing Program Sample (1)

Dressing conditions

A dressing program sample that uses the following dressing conditions is provided in this section.

Item	Condition	
Axis	Z1 axis	
Wheel	#360	
Used dresser board	GC150	
	Part No.	BVDS0068 (8 inch)
		BVDS0052 (6 inch)

Data setup on the dress data edit screen

Details of the data setup on the dress data edit screen are described as follows.

Enter the thickness (measured value) of the dresser board to be used to "Thickness of Dresser".

```
Page [B01]                        DRESS                 YYYY/MM/DD HH:MM:SS

                                 ID    == ########
              Program No. == ##          Rmrk == ################################

                        Dressed Axis              Z1    Axis
                        Thickness of Dresser     ####    μm
                        Spindle R.P.M.           2000    rpm    [ #### rpm]
                        Aircut                    100    μm
                        Dressing Amount           200    μm
                        Feed Rate                5.00    μm/s
                        Chuck Table R.P.M.         40    rpm
                        Process Time               60    Sec.

  F01 : Previous scrn.   F02 :              F03 :              F04 :
  F05 : Save             F06 : Program List F07 :              F08 :
```

Setup item	Setup value
Dressed Axis	Z1
Thickness of Dresser (μm)	Measured value
Spindle R.P.M. (rpm)	2000
Aircut (μm)	100
Dressing Amount (μm)	200
Feed Rate (μm/s)	5.00
Chuck Table R.P.M. (rpm)	40

2-2. Dressing Program Sample (2)

Dressing conditions

A dressing program sample that uses the following dressing conditions is provided in this section.

Item	Condition	
Axis	Z2	
Wheel	#2000	
Used dresser board	GC600	
	Part No.	BVDS0073 (8 inch)
		BVDS0019 (6 inch)

Data setup on the dress data edit screen

Details of the data setup on the dress data edit screen are described as follows.

Enter the thickness (measured value) of the dresser board to be used to "Thickness of Dresser".

```
Page [B01]                          DRESS                YYYY/MM/DD HH:MM:SS

                                    ID    == ########
                Program No. == ##        Rmrk == ###################################

                        Dressed Axis              Z2    Axis
                        Thickness of Dresser      ####  μm
                        Spindle R.P.M.            2000  rpm    [ #### rpm]
                        Aircut                    100   μm
                        Dressing Amount           200   μm
                        Feed Rate                 1.00  μm/s
                        Chuck Table R.P.M.         40   rpm
                        Process Time              300   Sec.

 F01 : Previous scrn.  F02 :              F03 :              F04 :
 F05 : Save            F06 : Program List F07 :              F08 :
```

Setup item	Setup value
Dressed Axis	Z2
Thickness of Dresser (μm)	Measured value
Spindle R.P.M. (rpm)	2000
Aircut (μm)	100
Dressing Amount (μm)	200
Feed Rate (μm/s)	1.00
Chuck Table R.P.M. (rpm)	40

2-3. Dressing Program Sample (3)

Dressing conditions

A dressing program sample that uses the following dressing conditions is provided in this section.

Item	Condition	
Axis	Z1 or Z2	
Wheel	Self-grinding wheel (IF-01-1-SG-M2)	
Used dresser board	GC150	
	Part No.	BVDS0068 (8 inch)
		BVDS0052 (6 inch)

Data setup on the dress data edit screen

Details of the data setup on the dress data edit screen are described as follows.

Enter the thickness (measured value) of the dresser board to be used to "Thickness of Dresser".

```
 Page [B01]                          DRESS              YYYY/MM/DD HH:MM:SS

                                 ID    == ########
             Program No. == ##       Rmrk == ################################

                          Dressed Axis            Z#    Axis
                          Thickness of Dresser    ####   µm
                          Spindle R.P.M.          2000   rpm    [ #### rpm]
                          Aircut                  100    µm
                          Dressing Amount         200    µm
                          Feed Rate               3.00   µm/s
                          Chuck Table R.P.M.       40    rpm
                          Process Time            100    Sec.

  F01 : Previous scrn.   F02 :            F03 :            F04 :
  F05 : Save             F06 : Program List   F07 :        F08 :
```

Setup item	Setup value
Dressed Axis	Z1 or Z2
Thickness of Dresser (µm)	Measured value
Spindle R.P.M. (rpm)	2000
Aircut (µm)	100
Dressing Amount (µm)	200
Feed Rate (µm/s)	3.00
Chuck Table R.P.M. (rpm)	40

3. Self-grinding Program Setup Samples

Setup Procedures of self-grinding program

Refer to Section 5, [Set up and Edition of Self-grinding Program Data] in Chapter D for the procedures and the screens used to set up the self-grinding program data.

Self-grinding conditions

A self-grinding program sample that uses the following self-grinding condition is provided in this section.

Item	Condition
Wheel	IF-01-1-SG-M2

Data setup on the self grind data edit screen

Details of the data setup on the self grind data edit screen are described as follows.

```
┌─────────────────────────────────────────────────────────┐
│                      NOTICE                             │
│                                                          │
│  For "Self Grinding Amount" data, 60 µm should normally  │
│  be entered. To perform self-grinding for the first time │
│  after the brand new chuck table is mounted, however,    │
│  enter 200 µm.                                           │
└─────────────────────────────────────────────────────────┘
```

```
Page [S01]                     SELF GRIND          YYYY/MM/DD HH:MM:SS

                                    ID     == ########
          Program No. == ##         Rmrk == ###############################
          Self Grind Axis   Z# Axis      Spindle R.P.M.        1700 rpm   [ #### rpm]
                                         Self Grinding Amount      60 µm
     Aircut (µm)        100  P1->P2Thick. (µm)     0.0  P2->P3Thick. (µm)      0.0

     P1 Grind (µm)     -60.0  P2 Grind (µm)       -60.0  P3 Grind (µm)       -60.0
     Feed Rate (µm/s)   0.30  Feed Rate (µm/s)     0.30  Feed Rate (µm/s)     0.30
     Chuck Table (rpm)    10  Chuck Table (rpm)      10  Chuck Table (rpm)      10
                              Escape Thic (µm)      5.0
     Spark Out (rev)       5  Feed Rate (µm/s)     0.30
     Chuck Table (rpm)    10  Chuck Table (rpm)      10  Process Time (s)  [    580 ]
     Total Amount of Self-Grind     0 µm /    0 Times
     F01 : Previous scrn.   F02 :           F03 :              F04 :
     F05 : Save             F06 : Program List   F07 :         F08 :
```

Data setup on the self grind data edit screen (Continued)

Setup item	Setup value
Spindle R.P.M. (rpm)	1700
Self Grinding Amount (μm)	60 ("200" if the chuck table is brand new.)
Aircut (μm)	100
P1 -> P2 Thick. (μm)	0.0
P2 -> P3 Thick. (μm)	0.0
P1 Grind (μm)	(-60.0)
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	10
P2 Grind (μm)	(-60.0)
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	10
P3 Grind (μm)	(-60.0)
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	10
Spark Out (rev)	5
Chuck Table (rpm)	10
Escape Thic (μm)	5.0
Feed Rate (μm/s)	0.30
Chuck Table (rpm)	10

INDEX

INDEX

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