2003-11

disco

CSP ALIGNMENT AND CUT FUNCTION

Automatic Dicing Saw

DAD3350

SOFTWARE VERSION 1.2 SERIES

UKBZYE*012A

CONTENTS

CONTENTS

[Data Maintenance Personnel]

INTRODUCTION

Purpose

This is a composite volume of the Operation Manual explaining how to operate the machine to operators, and the Data Maintenance Manual explaining the details of various screens related to certain operations and the procedures for setting the operational data and the machine operation data to the data maintenance personnel, regarding the special specification of the Disco Automatic Dicing Saw Model DAD3350.

This document is written based on the machine equipped with the microscope with Macro-magnification [Optional Accessory]. For the machines without the Macro-magnification microscope, the magnification can neither be selected nor displayed.

> **WARNING**
>
> This is a supplemental manual explaining the operation and data settings for the special specification of the Disco Automatic Dicing Saw Model DAD3350.
>
> To perform the operation properly and safely, follow the Manuals included with the machine as well as this manual.

For your safety

In order to use this machine safely, perform the work after reading this manual thoroughly and sufficiently understanding the contents.

Be sure to perform the operation and data settings in accordance with the procedures in this manual as well as the Manuals included with the standard machine.

Contents of this manual and applicable readers

This manual consists of the following chapters:

Chapter	Title	Applicable Reader
1	CRITICAL SAFETY INFORMATION	Operator/ Data Maintenance Personnel
2	MANUAL OPERATION	Operator/ Data Maintenance Personnel
3	ERROR RECOVERY	Operator/ Data Maintenance Personnel
4	DATA SETUP/OPERATION SCREENS FOR OPERATOR	Data Maintenance Personnel
5	DATA MAINTENANCE	Data Maintenance Personnel

1. CRITICAL SAFETY INFORMATION

Summary of this section

This section mentions the attention caused by addition of this special specification for securing the operational safety.

WARNING

This is a supplemental manual explaining the operation and data settings for the special specification of the Disco Automatic Dicing Saw Model DAD3350.

To perform the operation properly and safely, follow the Manuals included with the machine as well as this manual.

2. MANUAL OPERATION

Summary of this section

This section explains only the operations of the special specification that have been different from or added to the standard machine.

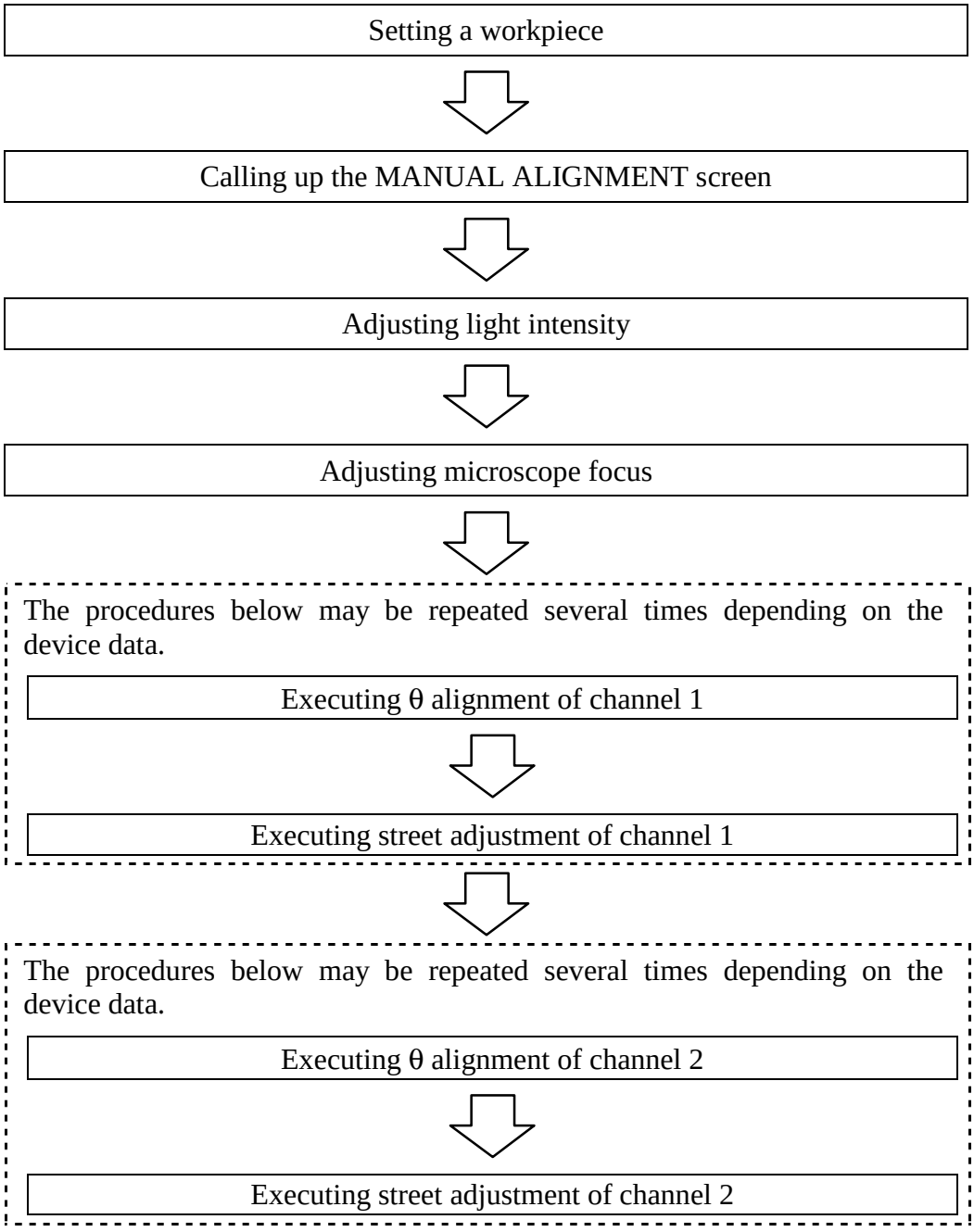
For the operations that are not written in this section or that do not use the special specification, see the Operation Manual of the standard machine. Sections B-3, [Manual Operation] and B-4, [Alignment] of the Operation Manual are closely related to this section.

Section No.	Title
2-1	Manual Alignment
2-2	Automatic Alignment
2-3	Executing Automatic Cutting
2-4	Executing Semi-automatic Cutting
2-5	Executing Process Control Table Running (Except for Cutting)

2-1. Manual Alignment

Operation flow

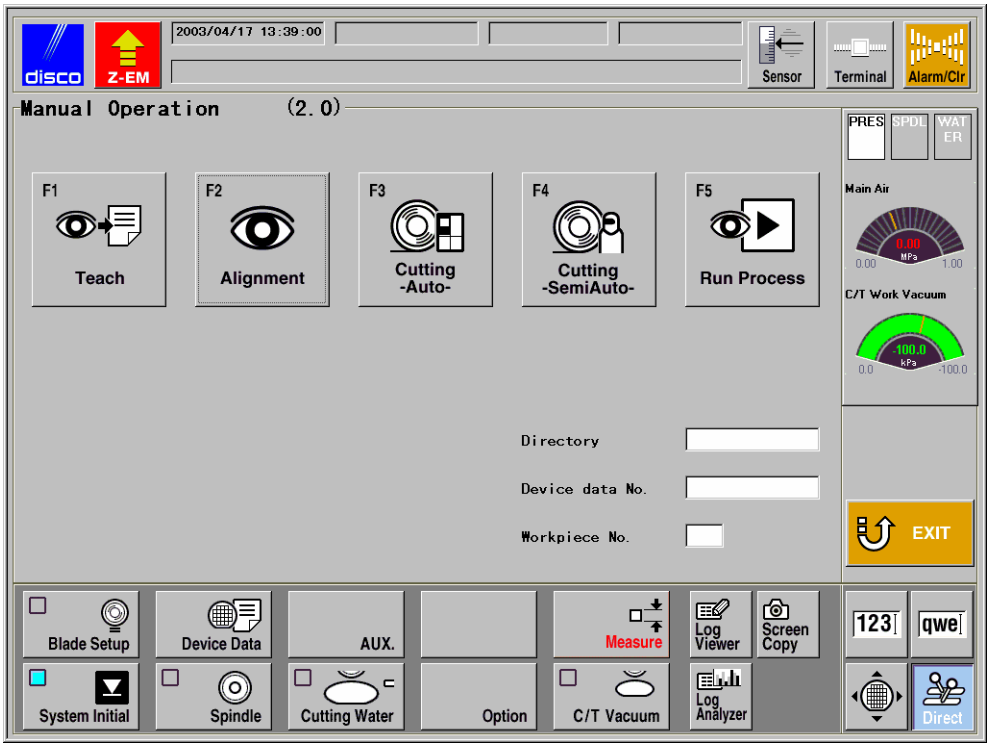
The rough flow does not differ from that of the standard specification.
“Executing θ alignment” and “Executing street adjustment” will be repeated several times depending on the device data.



2-1-1. Calling up the MANUAL ALIGNMENT screen

Procedures for calling up the MANUAL ALIGNMENT screen

!!! This procedure is continued from
setting a workpiece on the chuck table. !!!



Move the cursor to the [Directory] column.

Enter the directory name where the device data to be used is stored.

Move the cursor to the [Device data No.] column.

Enter the device data No. to be used.

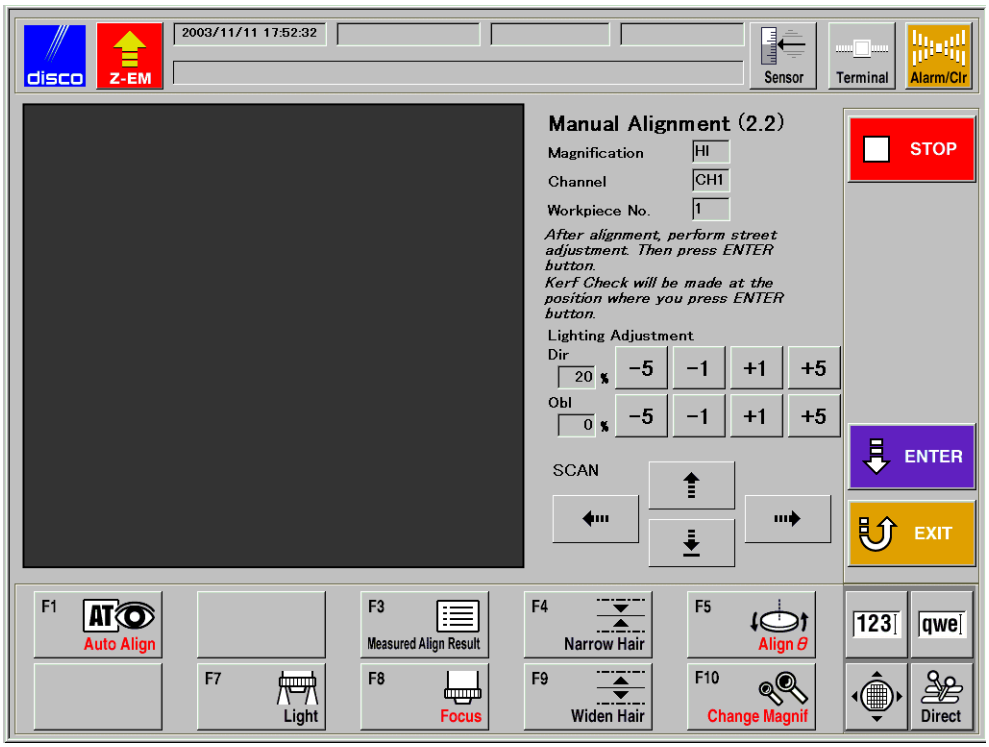
Move the cursor to the [Workpiece No.] column.

When one workpiece is mounted on the chuck table;
Enter “1”.

When two or more workpieces are mounted on the chuck table;
Confirm the workpiece and workpiece No. to be processed to the data maintenance personnel. Enter workpiece No. to be processed.

F2

The axes automatically move so that the street located at the left rear of the workpiece comes below the microscope.

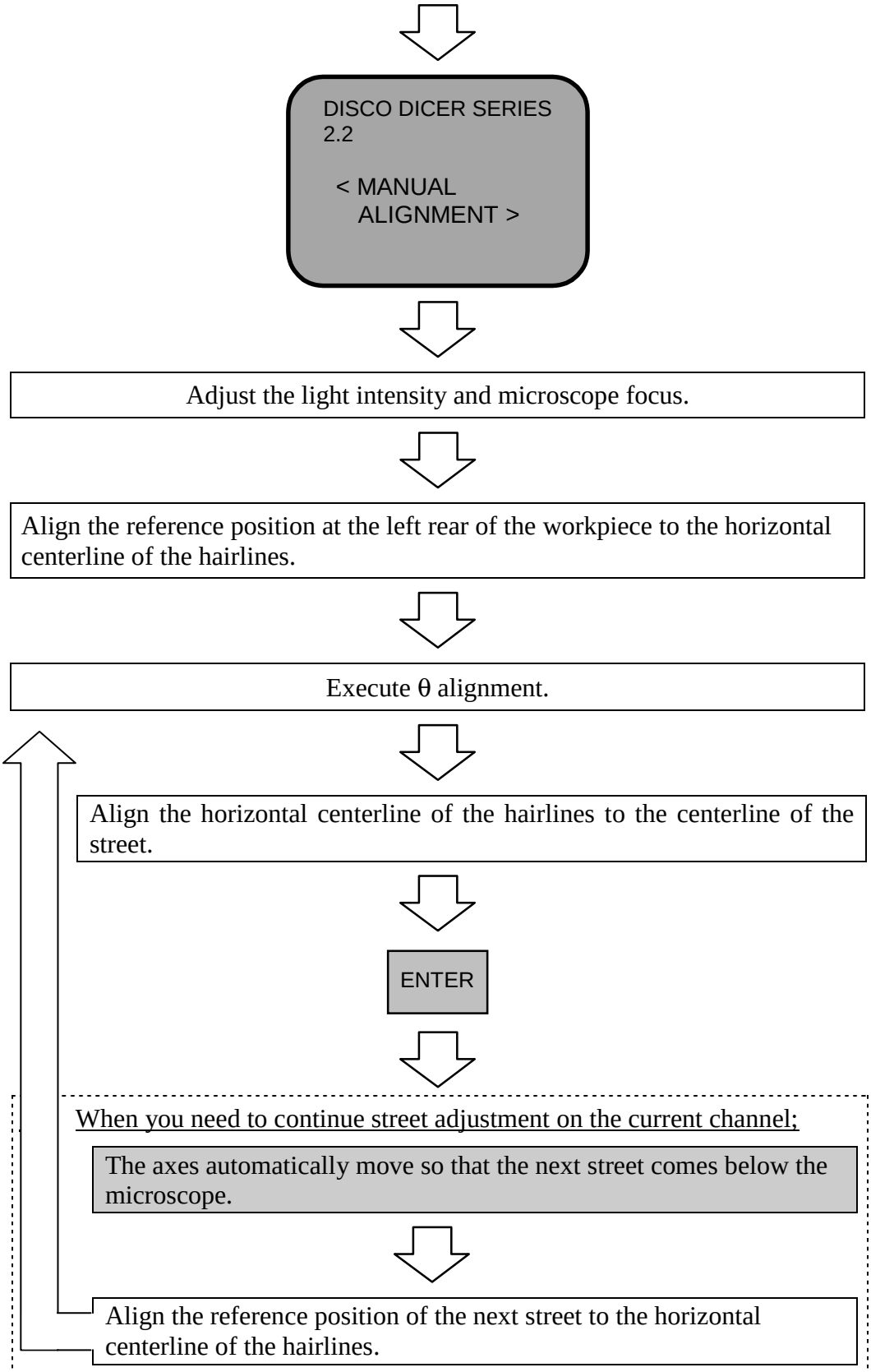


!!! Calling up the MANUAL ALIGNMENT screen has been completed. !!!

2-1-2. Executing street adjustment

Procedures for street adjustment

!!! This procedure is continued from: !!!
Section 2-1-1, [Calling up the MANUAL ALIGNMENT screen]



When channel 1 alignment is finished;

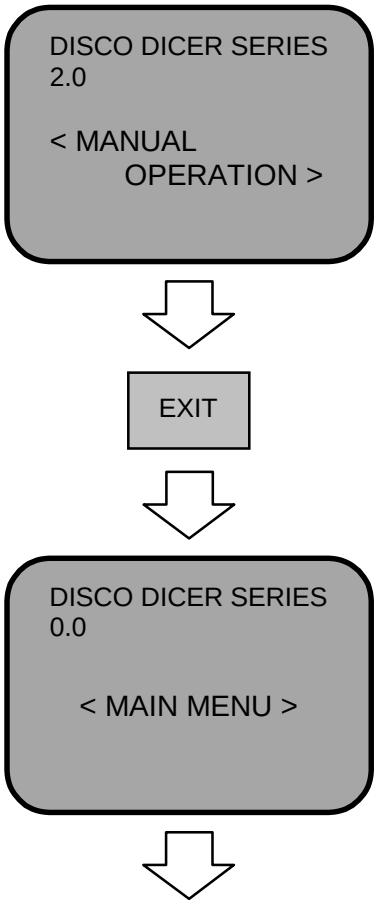
The chuck table automatically rotates by 90°.

The axes automatically move so that the street located at the left rear of the workpiece comes below the microscope.

Repeat the procedures from the first step of this section on channel 2.

When the channel 2 alignment is finished;

A message “Completed alignment.” appears.

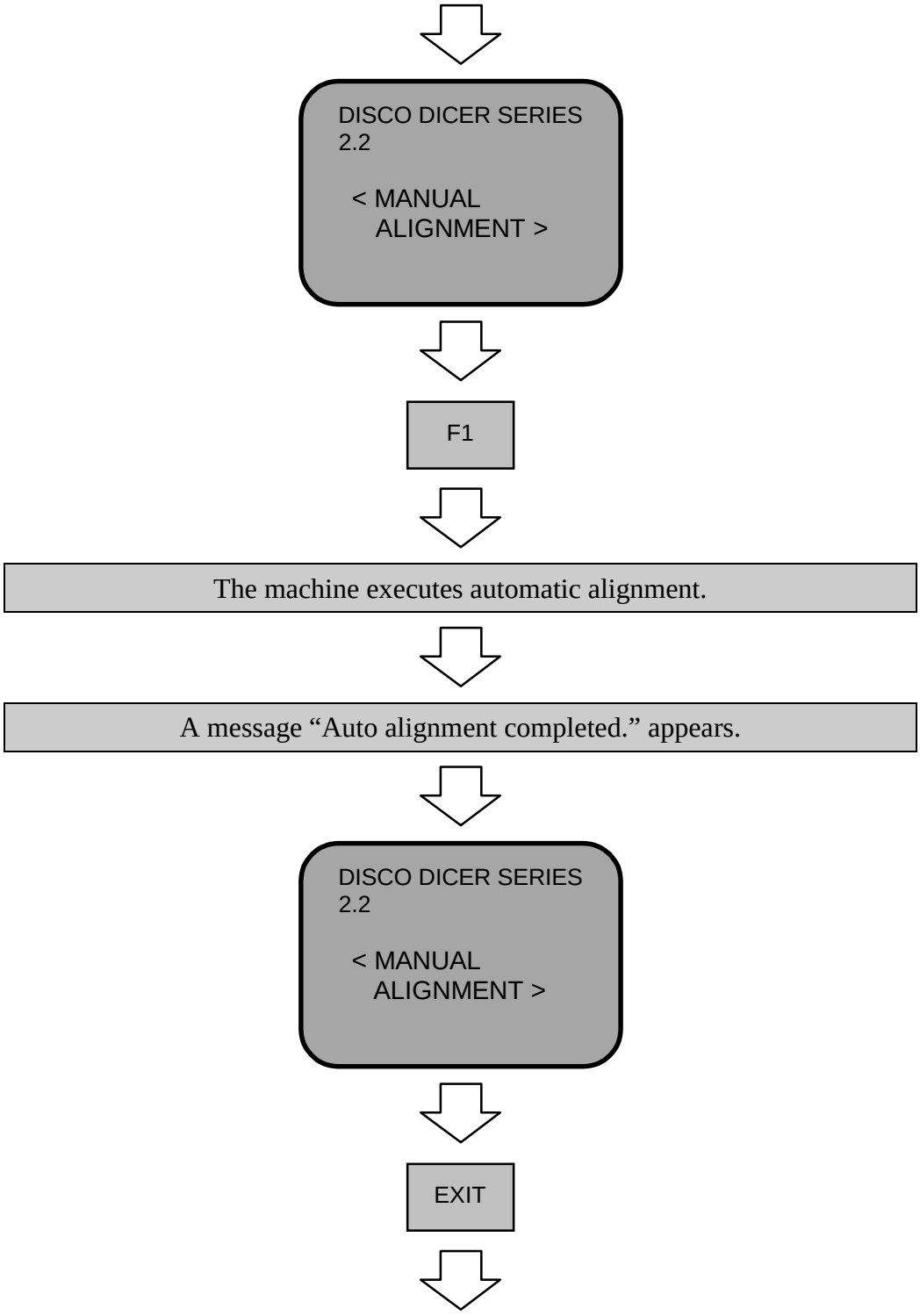


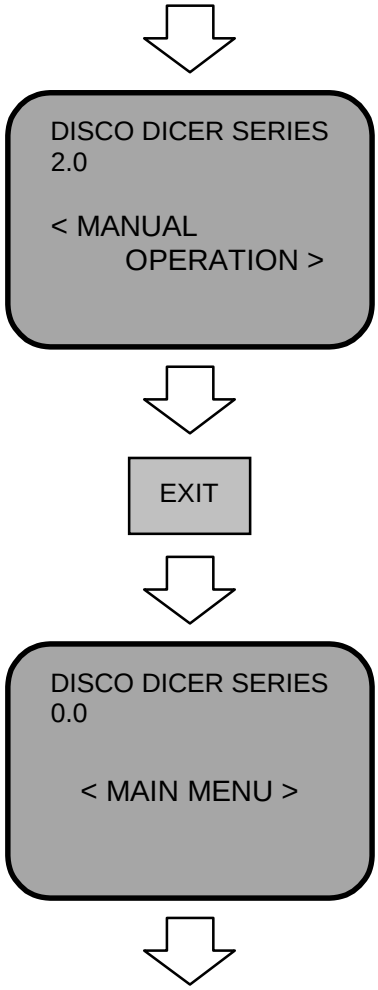
!!! The manual alignment operation has been completed. !!!

2-2. Automatic Alignment

Procedures for automatic alignment

!!! This procedure is continued from: !!!
Section 2-1-1, [Calling up the MANUAL ALIGNMENT screen]



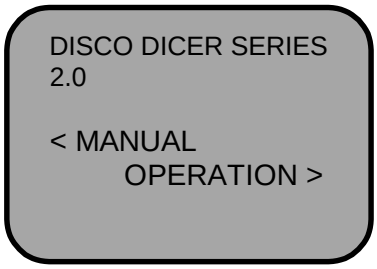


!!! The automatic alignment operation has been completed. !!!

2-3. Executing Automatic Cutting

Procedures for automatic cutting

!!! This procedure is continued from
setting a workpiece on the chuck table. !!!



Move the cursor to the [Directory] column.

Enter the directory name where the device data to be used is stored.

Move the cursor to the [Device data No.] column.

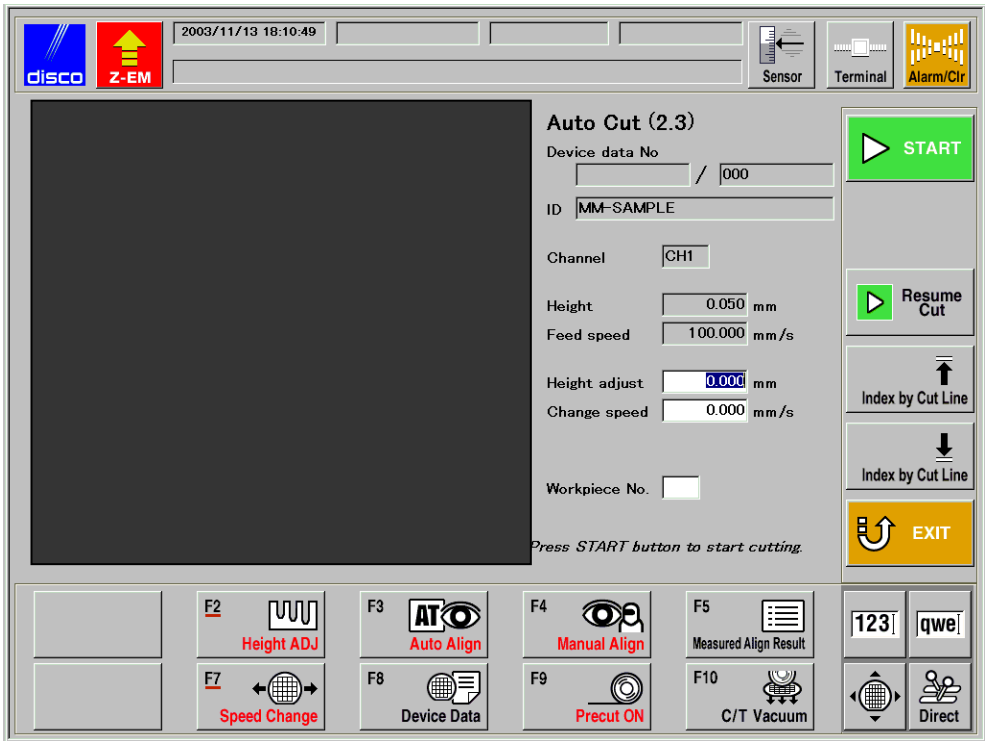
Enter the device data No. to be used.

Move the cursor to the [Workpiece No.] column.

When one workpiece is mounted on the chuck table;
Enter “1”.

When two or more workpieces are mounted on the chuck table;
Confirm the workpiece and workpiece No. to be processed to the data maintenance personnel. Enter workpiece No. to be processed.

F3


disco
Z-EM
2003/11/13 18:10:49
Sensor
Terminal
Alarm/Clr
Auto Cut (2.3)
Device data No
/ 000
ID MM-SAMPLE
Channel CH1
Height 0.050 mm
Feed speed 100.000 mm/s
Height adjust 0.000 mm
Change speed 0.000 mm/s
Workpiece No.
Press START button to start cutting.
START
Resume Cut
Index by Cut Line
Index by Cut Line
EXIT
F2 Height ADJ
F3 Auto Align
F4 Manual Align
F5 Measured Align Result
F7 Speed Change
F8 Device Data
F9 Precut ON
F10 C/T Vacuum
123
qwe
Direct

Specify the cutting position.

<u>To perform the automatic alignment;</u>

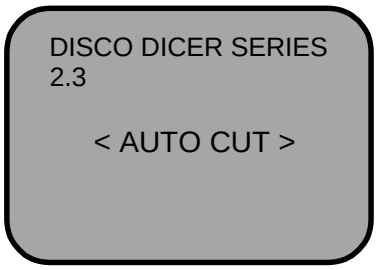
Press the F3 button.

<u>To perform the manual alignment;</u>

Press the F4 button.

<u>For the procedures of manual alignment operation;</u>

→ See section 2-1, [Manual Alignment].

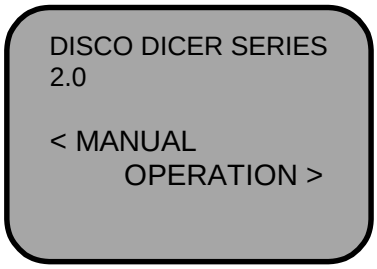


<u>!!! See the Operation Manual for the procedures after this. !!!</u>
<u>The cutting operation will be the next.</u>

2-4. Executing Semi-automatic Cutting

Procedures for semi-automatic cutting

!!! This procedure is continued from
setting a workpiece on the chuck table. !!!



Move the cursor to the [Directory] column.

Enter the directory name where the device data to be used is stored.

Move the cursor to the [Device data No.] column.

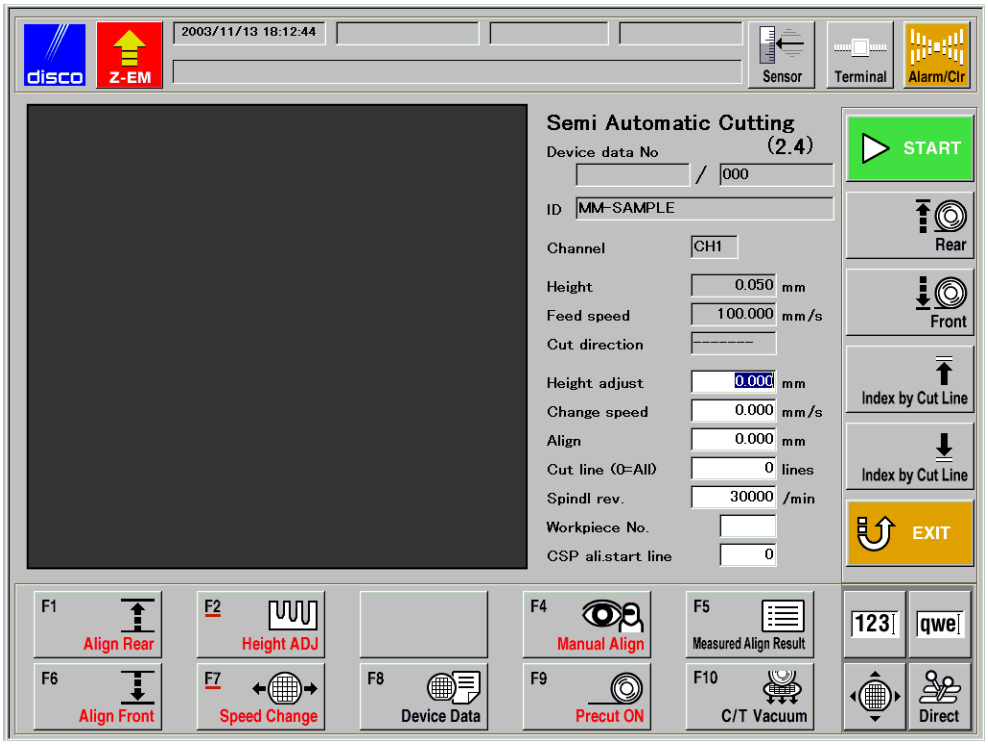
Enter the device data No. to be used.

Move the cursor to the [Workpiece No.] column.

When one workpiece is mounted on the chuck table;
Enter “1”.

When two or more workpieces are mounted on the chuck table;
Confirm the workpiece and workpiece No. to be processed to the data maintenance personnel. Enter workpiece No. to be processed.

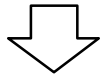
F4



Confirm the channel that alignment and cutting are to be done to the data maintenance personnel.

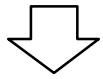
Press the  buttons to change the channel that alignment and cutting are to be done. Confirm that the [Channel] column shows the channel to be processed.

Move the cursor to the [CSP ali. start line] column.

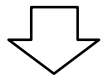


When starting alignment from the beginning of the channel;
Enter “0”.

When starting alignment from the middle of the channel;
Confirm the starting line No. to the data maintenance personnel. Enter the starting line No.

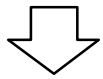


Move the cursor to the [Cut line] column.

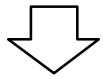


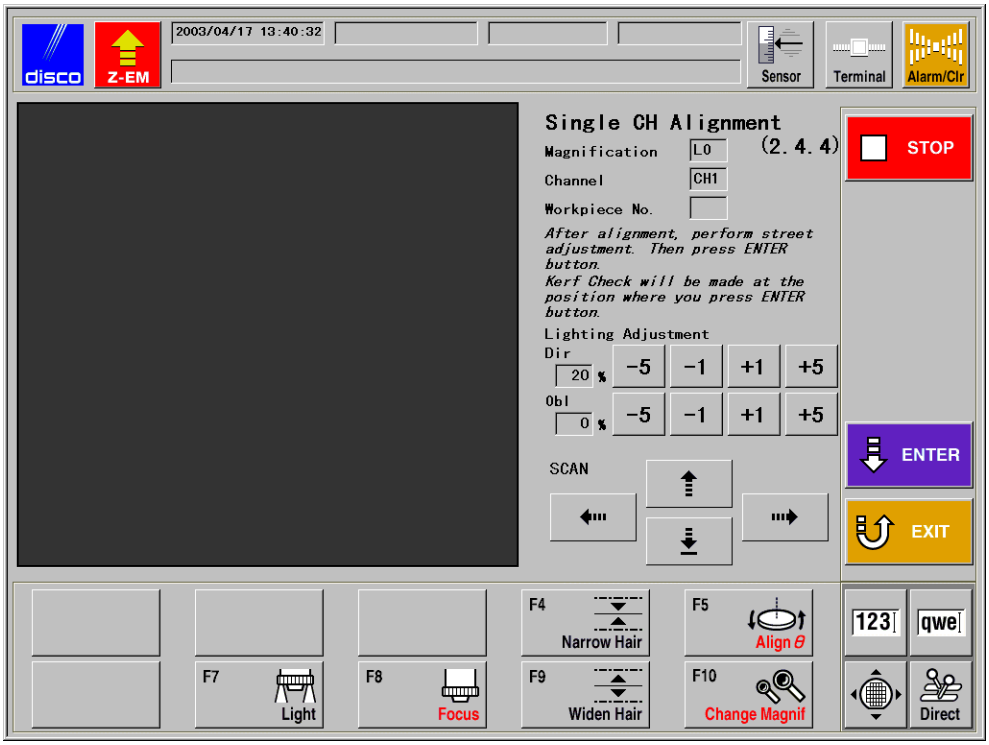
When cutting all the lines of the channel;
Enter “0”.

When cutting a part of the channel;
Confirm the number of line to be cut to the data maintenance personnel and enter it.



F4



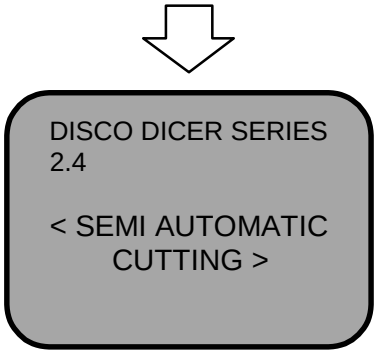


Execute single channel alignment.

For the procedures of the single channel alignment;

→ See section 2-1, [Manual Alignment].

In the “single channel alignment” operation, the alignment will be completed without proceeding to the next channel after registration of all the street adjustment for the current channel.



Specify the cutting direction.

When cutting in the rear direction;

Press the Rear button.

When cutting in the front direction;

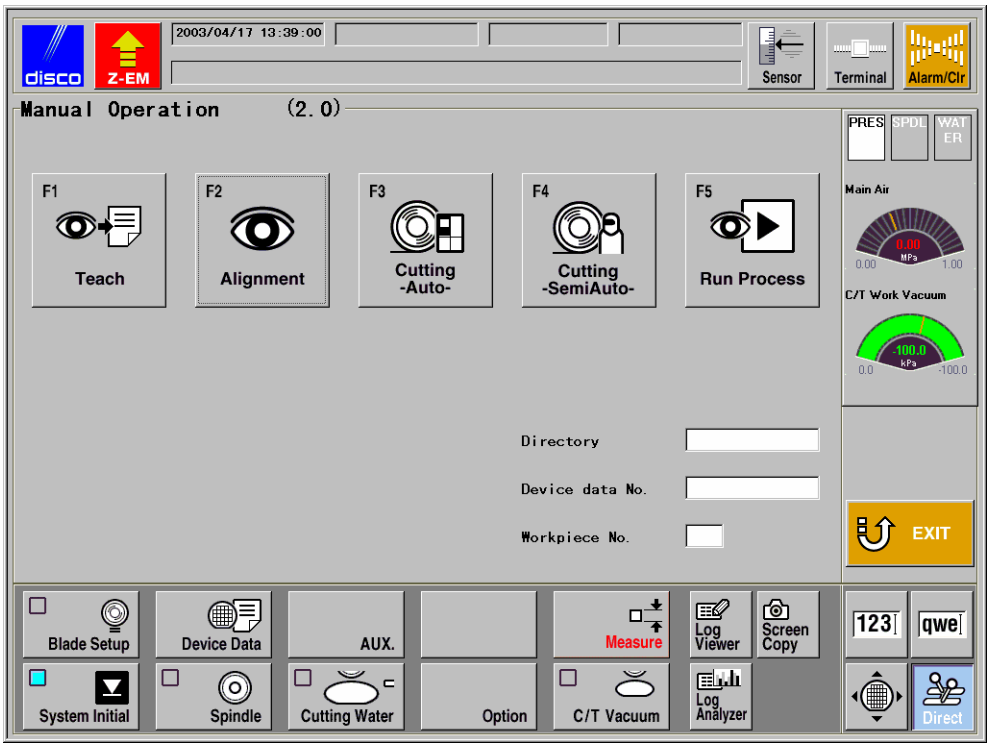
Press the Front button.

!!! See the Operation Manual for the procedures after this. !!!
The cutting operation will be the next.

2-5. Executing Process Control Table Running (Except for Cutting)

Procedures for running process control table

!!! This procedure is continued from setting a workpiece on the chuck table. !!!



Move the cursor to the [Directory] column.

Enter the directory name where the device data to be used is stored.

Move the cursor to the [Device data No.] column.

Enter the device data No. to be used.

Move the cursor to the [Workpiece No.] column.

When one workpiece is mounted on the chuck table;
Enter “1”.

When two or more workpieces are mounted on the chuck table;
Confirm the workpiece and workpiece No. to be processed to the data maintenance personnel. Enter workpiece No. to be processed.

F5

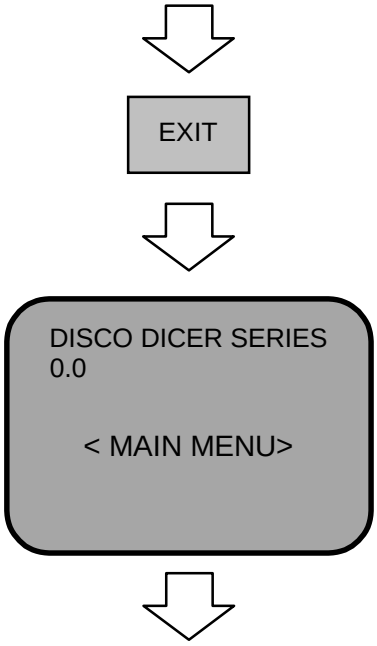
The machine executes the operations specified in the process control table excluding cutting.

After the process control running is completed, the machine automatically stops.

EXIT

DISCO DICER SERIES
2.0

< MANUAL
OPERATION >



!!! The process control table running has been completed. !!!

3. ERROR RECOVERY

Summary of this section

This section explains only the error recovery of the special specification that has been different from or added to the standard machine.

For the operations that are not written in this section or that do not use the special specification, see the Operation Manual of the standard machine. Section C, [ERROR RECOVERY] of the Operation Manual is closely related to this section.

Section No.	Title
3-1	Errors during Alignment

3-1. Errors during Alignment

Summary of this section

This section describes the errors that occur during alignment and the remedies of this special specification.

For the errors, remedies and operations that do not use the special specification, see the Operation Manual of the standard machine.

Section No.	Title
3-1-1	Remedies for alignment
3-1-2	Details of error recovery for alignment errors

3-1-1. Remedies for alignment

When does the error occur?

This section describes the errors relating to the alignment operation when using this special specification.

The error recovery screens differ depending on the situation of error occurrence.

Section No.	Title	Situation of error occurrence
3-1-1-1	ERROR RECOVERY (ALIGNMENT) screen (1)	When the error that the target is not found occurs during full automation operation.
3-1-1-2	ERROR RECOVERY (ALIGNMENT) screen (2)	When the other errors occur during full automation operation.
3-1-1-3	ERROR RECOVERY (ALIGNMENT) screen (3)	When the error that the target is not found occurs during other situations than full automation operation.

3-1-1-1. ERROR RECOVERY (ALIGNMENT) screen (1)

When does the error occur?

These errors occur when the target is not found during alignment operation of full automation.

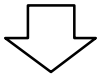
Error message

The following message will appear when these errors occur:

Error No.	Error Message
A0531	Not found macro target.
A0532	Not found micro target.

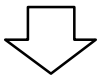
Procedures for error recovery

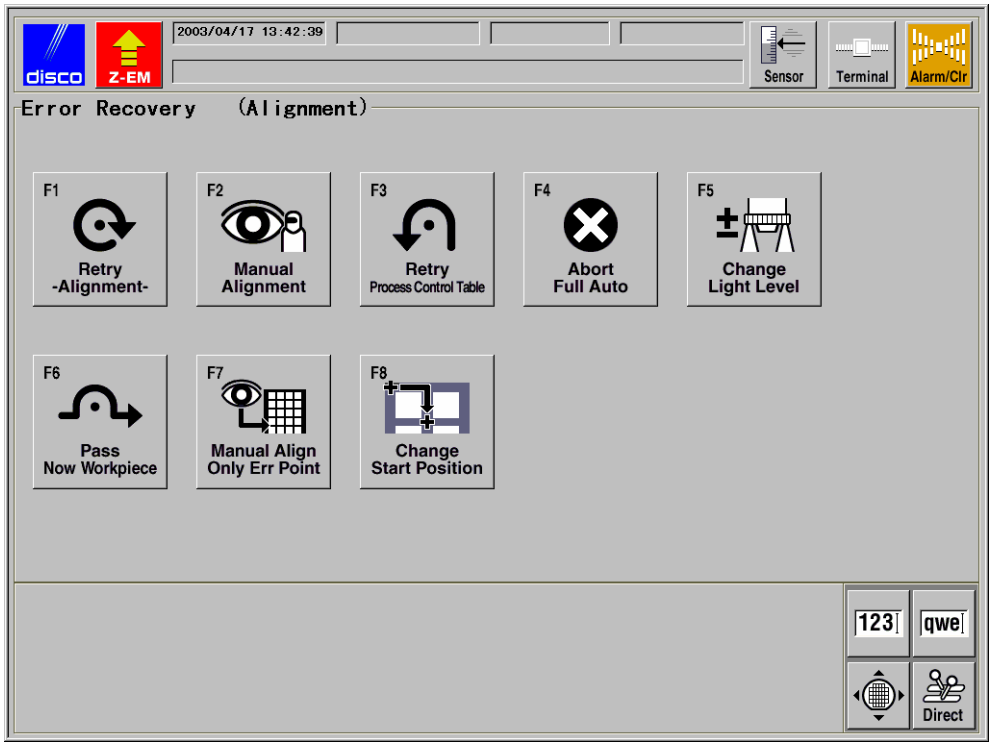
An alarm sounds when an error occurs.



Press the 

button to cancel the alarm.





Press	To Do	Go To
F1	RETRY -ALIGNMENT- Select <F1> when you want to retry the auto alignment operation from the current workpiece and the current channel.	3-1-2-1
F2	MANUAL ALIGNMENT Select <F2> when you want to perform the manual alignment.	3-1-2-2
F3	RETRY PROCESS CONTROL TABLE Select <F3> when you want to retry the alignment operation from the top of the “Process Control Table” of the device data.	3-1-2-3
F4	ABORT FULL AUTO Select <F4> when you want to cancel the FULL AUTO operation.	3-1-2-4
F5	CHANGE LIGHT LEVEL Select <F5> when you want to change the light intensity before retrying alignment.	3-1-2-5

Press	To Do	Go To
F6	PASS NOW WORKPIECE This is effective when two or more workpieces are mounted. Select <F6> when you quit processing the current workpiece and want to perform the alignment for the next workpiece.	3-1-2-6
F7	MANUAL ALIGN ONLY ERR POINT Select <F7> when you want to register the target or street at the error occurrence position. (It is the data maintenance personnel to register.)	3-1-2-7
F8	CHANGE START POSITION Select <F8> when you want to change the position to start macro target searching. (It is the data maintenance personnel to change the position.)	3-1-2-8

3-1-1-2. ERROR RECOVERY (ALIGNMENT) screen (2)

When does the error occur?

These errors occur during alignment operation of full automation.

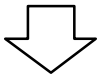
Error message

The following message will appear when these errors occur:

Error No.	Error Message
A0533	Alignment time limit over.
A0537	Angle between channels error.
A0545	Least square approximation θ adjust limit error.
A0801	Y correction limit error.
A0802	θ correction limit error.
A1163	Abnormal device data. Please confirm device data and re-teach.
A1164	Y axes will get near too much.

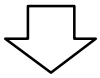
Procedures for error recovery

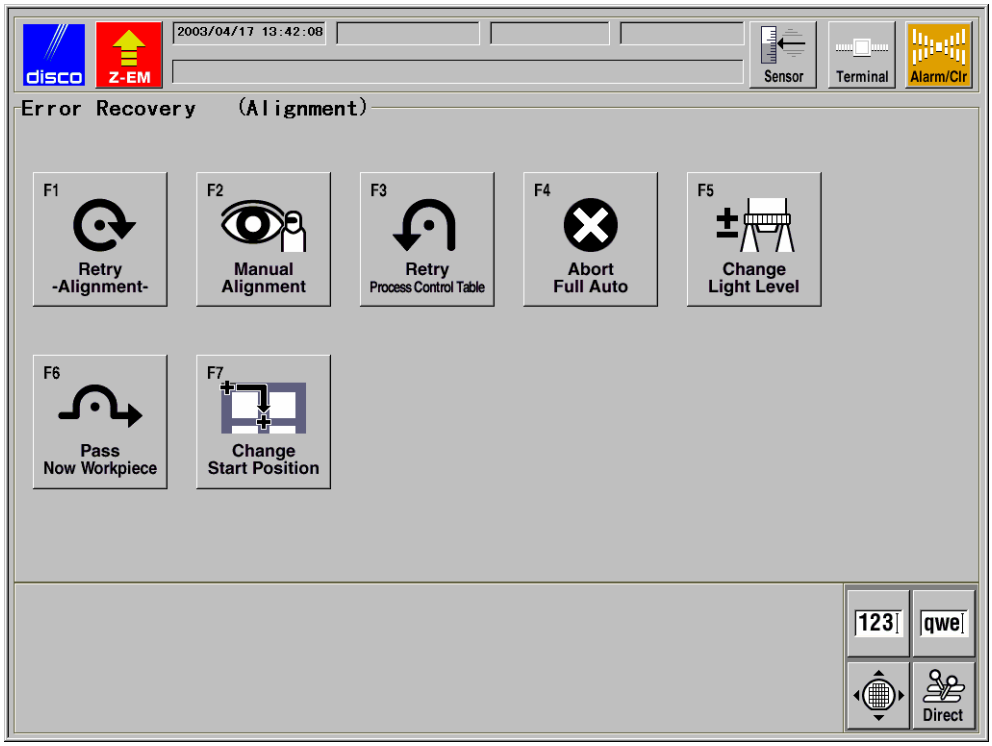
An alarm sounds when an error occurs.



Press the 

button to cancel the alarm.





Press	To Do	Go To
F1	RETRY -ALIGNMENT- Select <F1> when you want to retry the auto alignment operation from the current workpiece and the current channel.	3-1-2-1
F2	MANUAL ALIGNMENT Select <F2> when you want to perform the manual alignment.	3-1-2-2
F3	RETRY PROCESS CONTROL TABLE Select <F3> when you want to retry the alignment operation from the top of the “Process Control Table” of the device data.	3-1-2-3
F4	ABORT FULL AUTO Select <F4> when you want to cancel the FULL AUTO operation.	3-1-2-4
F5	CHANGE LIGHT LEVEL Select <F5> when you want to change the light intensity before retrying alignment.	3-1-2-5

Press	To Do	Go To
F6	PASS NOW WORKPIECE This is effective when two or more workpieces are mounted. Select <F6> when you quit processing the current workpiece and want to perform the alignment for the next workpiece.	3-1-2-6
F7	CHANGE START POSITION Select <F7> when you want to change the position to start macro target searching. (It is the data maintenance personnel to change the position.)	3-1-2-8

3-1-1-3. ERROR RECOVERY (ALIGNMENT) screen (3)

When does the error occur?

These errors occur when the target is not found during alignment operation of a situation other than the full automation.

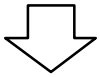
Error message

The following message will appear when these errors occur:

Error No.	Error Message
A0531	Not found macro target.
A0532	Not found micro target.

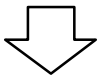
Procedures for error recovery

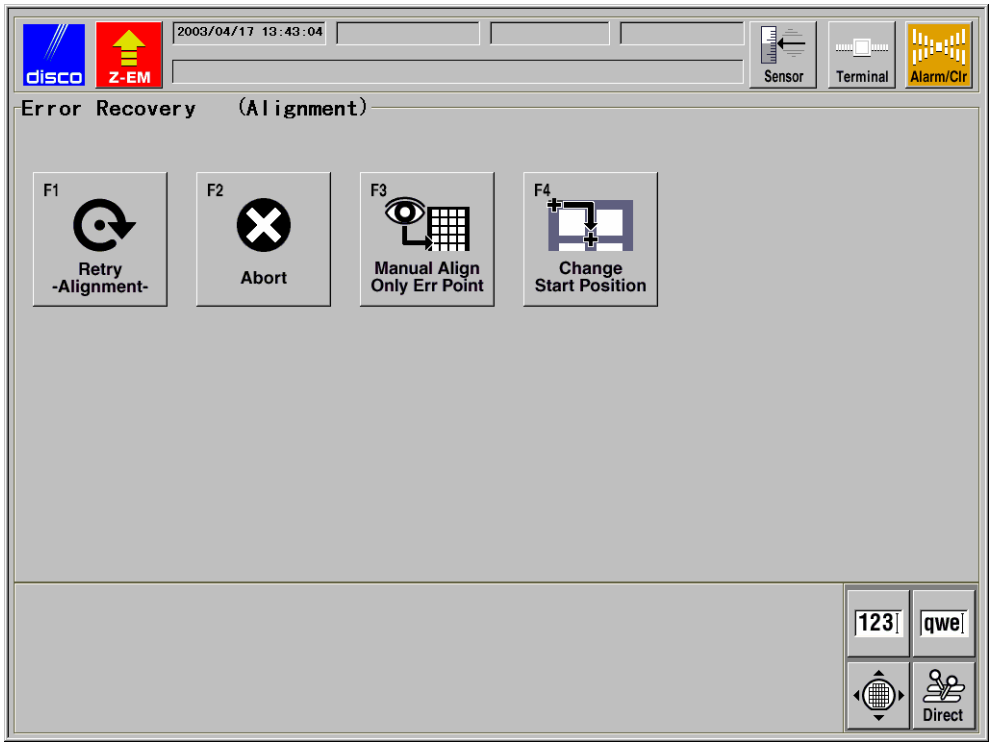
An alarm sounds when an error occurs.



Press the 

button to cancel the alarm.





Press	To Do	Go To
F1	RETRY -ALIGNMENT- Select <F1> when you want to retry the auto alignment operation from the current workpiece and the current channel.	3-1-2-1
F2	ABORT Select <F2> when you want to abort the alignment operation.	3-1-2-9
F3	MANUAL ALIGN ONLY ERR POINT Select <F3> when you want to register the target or street at the error occurrence position. (It is the data maintenance personnel to register.)	3-1-2-7
F4	CHANGE START POSITION Select <F4> when you want to change the position to start macro target searching. (It is the data maintenance personnel to change the position.)	3-1-2-8

3-1-2. Details of error recovery for alignment errors

Summary of this section

This section describes the operation procedures for error recovery on the ERROR RECOVERY (ALIGNMENT) screen.

Section No.	Title
3-1-2-1	Executing RETRY -ALIGNMENT-
3-1-2-2	Executing MANUAL ALIGNMENT
3-1-2-3	Executing RETRY PROCESS CONTROL TABLE
3-1-2-4	Executing ABORT FULL AUTO
3-1-2-5	Executing CHANGE LIGHT LEVEL
3-1-2-6	Executing PASS NOW WORKPIECE
3-1-2-7	Executing MANUAL ALIGNMENT ONLY ERROR POINT
3-1-2-8	Executing CHANGE START POSITION
3-1-2-9	Executing ABORT

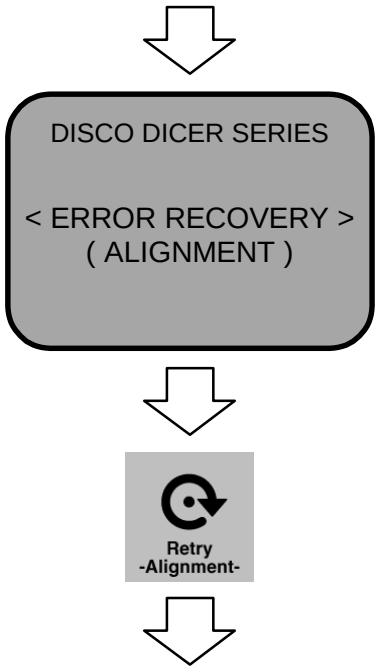
3-1-2-1. Executing RETRY -ALIGNMENT-

Procedures for error recovery

Press the 

button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
When this button is pressed, the machine performs the automatic alignment operation again.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]
Section 3-1-1-3, [ERROR RECOVERY (ALIGNMENT) screen (3)]



The machine retries the automatic alignment from the current channel.

When the error occurs frequently;
Ask the data maintenance personnel to perform the teach operation.

3-1-2-2. Executing MANUAL ALIGNMENT

Procedures for error recovery

Press the 

button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
After the manual alignment is completed by the operator, the machine starts performing the full automation operation.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]

DISCO DICER SERIES

< ERROR RECOVERY >
(ALIGNMENT)

DISCO DICER SERIES

< MANUAL
ALIGNMENT >

Execute manual alignment.
→ See section 2-1-2, [Executing street adjustment].

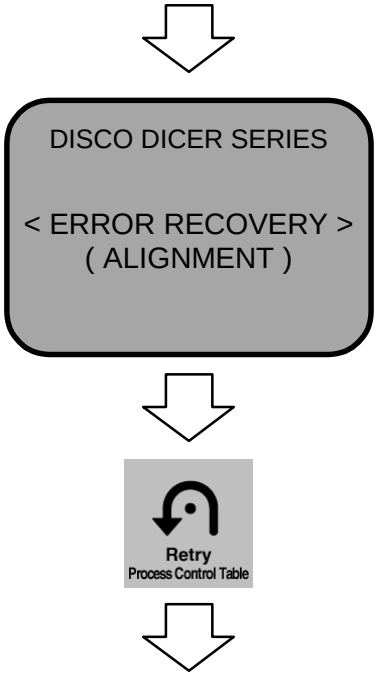
The machine resumes the full automation operation.

3-1-2-3. Executing RETRY PROCESS CONTROL TABLE

Procedures for error recovery

Press the button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine retries the alignment operation specified in the process control table of the device data from the beginning of it.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]



The machine retries the alignment operation specified in the “Process Control Table” in the device data from the beginning.

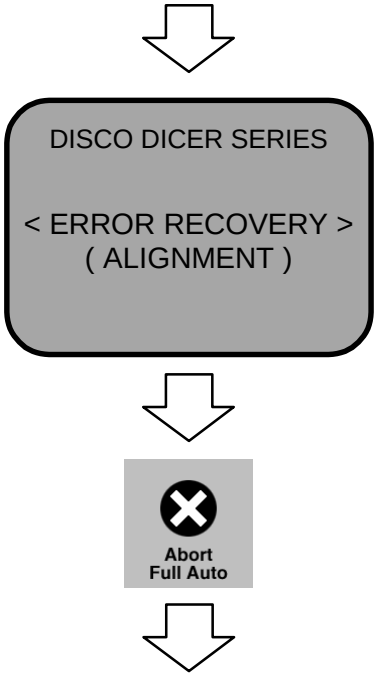
3-1-2-4. Executing ABORT FULL AUTO

Procedures for error recovery

Press the 

button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine stops the alignment operation, and then stops the full automation operation.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]



The machine stops the full automation operation.

3-1-2-5. Executing CHANGE LIGHT LEVEL

Procedures for error recovery

Press the 

button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine retries alignment, after adjusting the light intensity. Ask the data maintenance personnel to adjust the light intensity.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]

DISCO DICER SERIES

< ERROR RECOVERY >
(ALIGNMENT)

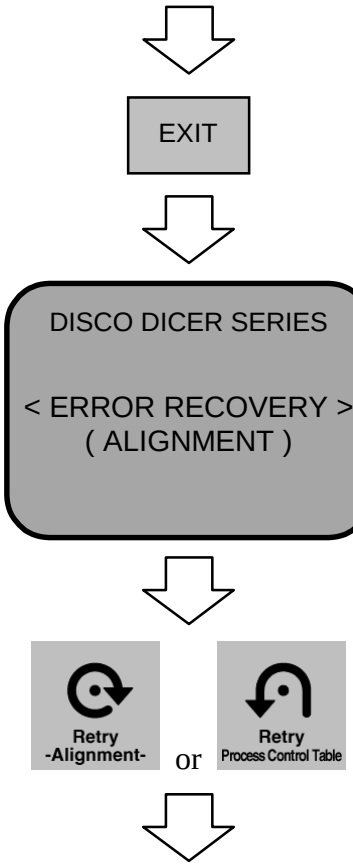
DISCO DICER SERIES

< LIGHT ADJUSTMENT >

Ask the data maintenance personnel to adjust the light intensity.

Light intensity adjustment is executed by the data maintenance personnel.

The changed data is effective to all the workpieces currently mounted on the chuck table. (When one workpiece is mounted on the chuck table, the effective range is the same as the standard specification.)



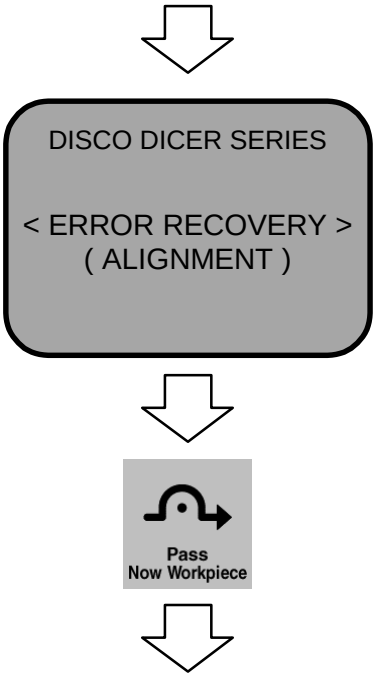
The machine retries the alignment operation.

3-1-2-6. Executing PASS NOW WORKPIECE

Procedures for error recovery

Press the button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine stops processing the workpiece that an error occurs and starts processing from the next workpiece. If the next workpiece cannot be processed, the machine moves as the same as executing rejection.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]



The machine stops processing the workpiece that an error occurs.

The machine starts to process the next workpiece.

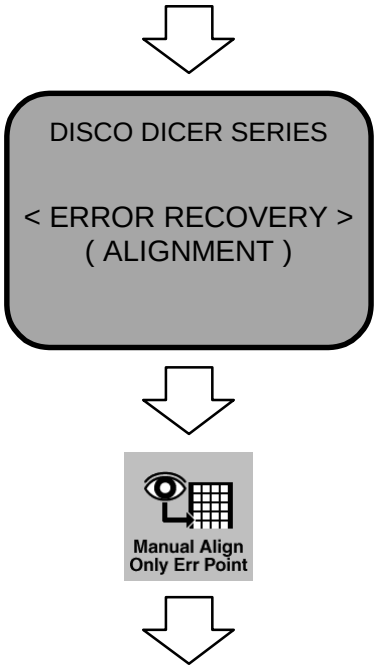
If the error workpiece is the last one;
If there are other workpieces to be processed on the chuck table, the machine continues processing. If not, the machine ends the full automation operation.

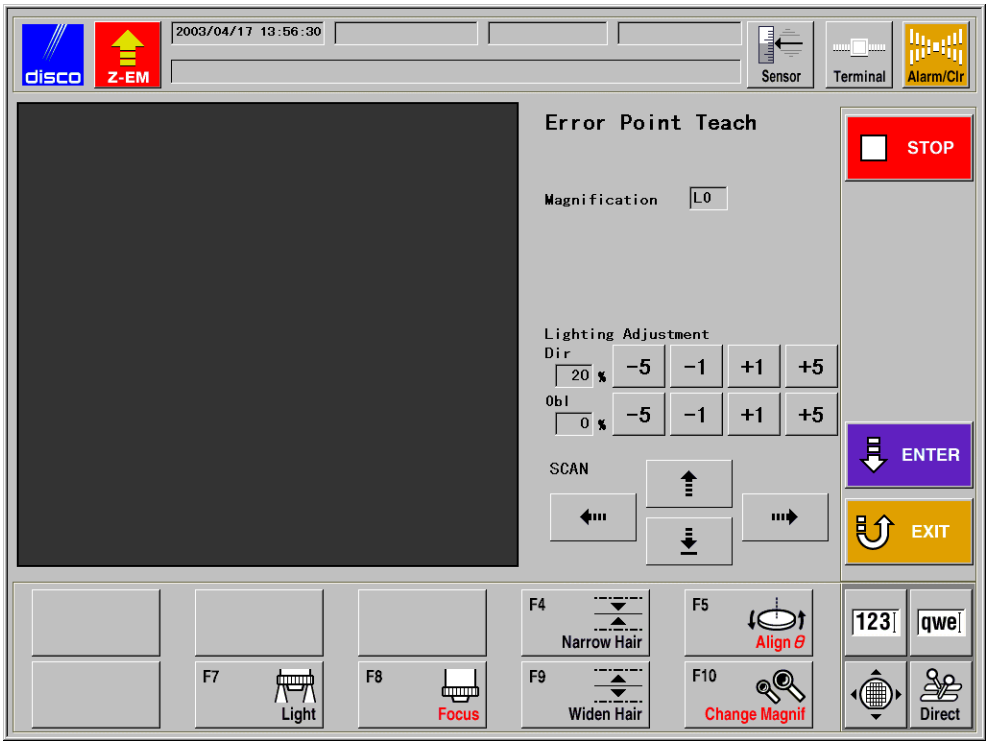
3-1-2-7. Executing MANUAL ALIGNMENT ONLY ERROR POINT

Procedures for error recovery

Press the button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine registers the target or street at the position where the error occurs.
Ask the data maintenance personnel to register only the error point.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-3, [ERROR RECOVERY (ALIGNMENT) screen (3)]





Ask the data maintenance personnel to register the target or the street.

Only the error point is registered by the data maintenance personnel.

The screen preceding the error is displayed, and the machine resumes the alignment operation.

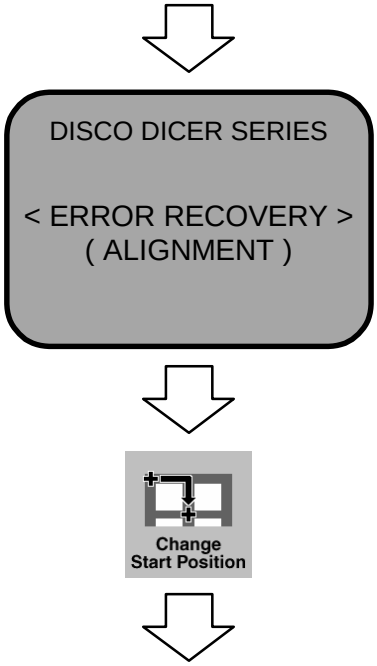
3-1-2-8. Executing CHANGE START POSITION

Procedures for error recovery

Press the 

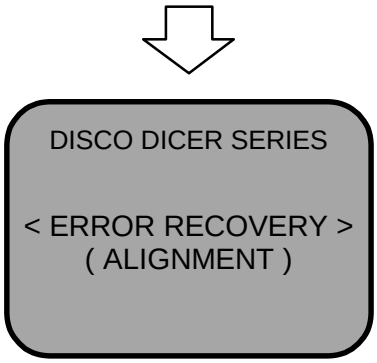
button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine designates the position to start macro target searching. Ask the data maintenance personnel to change the alignment start position.

!!! This procedure is continued from: !!!
Section 3-1-1-1, [ERROR RECOVERY (ALIGNMENT) screen (1)]
Section 3-1-1-2, [ERROR RECOVERY (ALIGNMENT) screen (2)]
Section 3-1-1-3, [ERROR RECOVERY (ALIGNMENT) screen (3)]



Ask the data maintenance personnel to designate the position where macro alignment starts.

The position where the alignment starts is changed by the data maintenance personnel.



The machine retries the alignment operation.

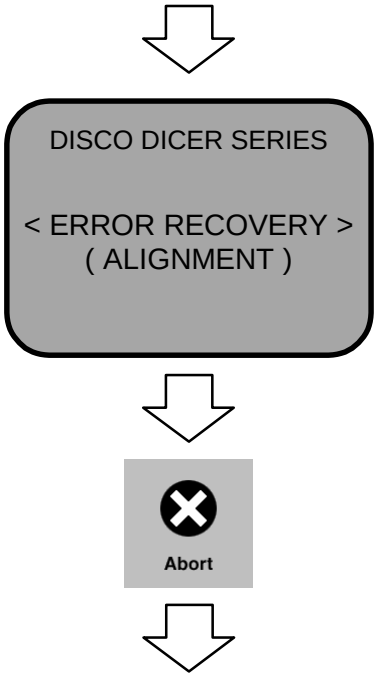
3-1-2-9. Executing ABORT

Procedures for error recovery

Press the 

button on the ERROR RECOVERY (ALIGNMENT) screen to select this error recovery procedure.
The machine interrupts the alignment operation.

!!! This procedure is continued from: !!!
Section 3-1-1-3, [ERROR RECOVERY (ALIGNMENT) screen (3)]



The machine aborts the alignment operation.

4. DATA SETUP/OPERATION SCREENS FOR OPERATOR

Summary of this section

This section explains the items that have been different from or added to the standard specification on the screens used by operators for setting data and operating the machine.

For the explanations that are not written in this section or that do not use the special specification, see the Data Maintenance Manual of the standard machine. Section B-1, [Data Setup/Operation Screens Used by Operators] of the Data Maintenance Manual is closely related to this section.

Section No.	Title	Contents
4-1	Full Automation Related Screens	Describes the screen relating the full automation. - FULL AUTOMATION microscope screen
4-2	Correction-in-cutting Related Screens	Describes the screens displayed during a pause of cutting in order to make some corrections. - STOP CORRECTION screen - EXIT FULL AUTO screen
4-3	Manual Operation Related Screens	Describes the screens relating the manual operation. - MANUAL OPERATION screen - MANUAL ALIGNMENT screen - AUTO CUT screen - CUT STATUS screen (During auto cutting) - SEMI AUTOMATIC CUTTING screen - SINGLE CHANNEL ALIGNMENT screen

Section No.	Title	Contents
4-4	Device Data Related Screens	Describes the screens relating the device data for setting the cutting data. - DEVICE DATA screen - PROCESS CONTROL TABLE screen - MEASURING ALIGNMENT DATA screen - LEAST SQUARE METHOD θ ADJUST DATA screen - MULTIPLE MOUNTING DATA screen - ALIGNMENT MEASUREMENT DATA screen
4-5	Error Recovery Related Screens	Describes the screen relating the error recovery displayed when an error occurs. - ERROR RECOVERY (ALIGNMENT) screen - ERROR POINT TEACH screen - MODIFICATION OF ALIGNMENT START POSITION screen
4-6	Alignment Related Screens	Describes the data setting relating the alignment. - ALIGNMENT DATA screen [screen 5.3.4]
4-7	Setup Related Screens	Describes the data setting relating the setup. - SETUP AREA DATA screen [screen 4.7.4]

4-1. Full Automation Related Screens

Summary of this section

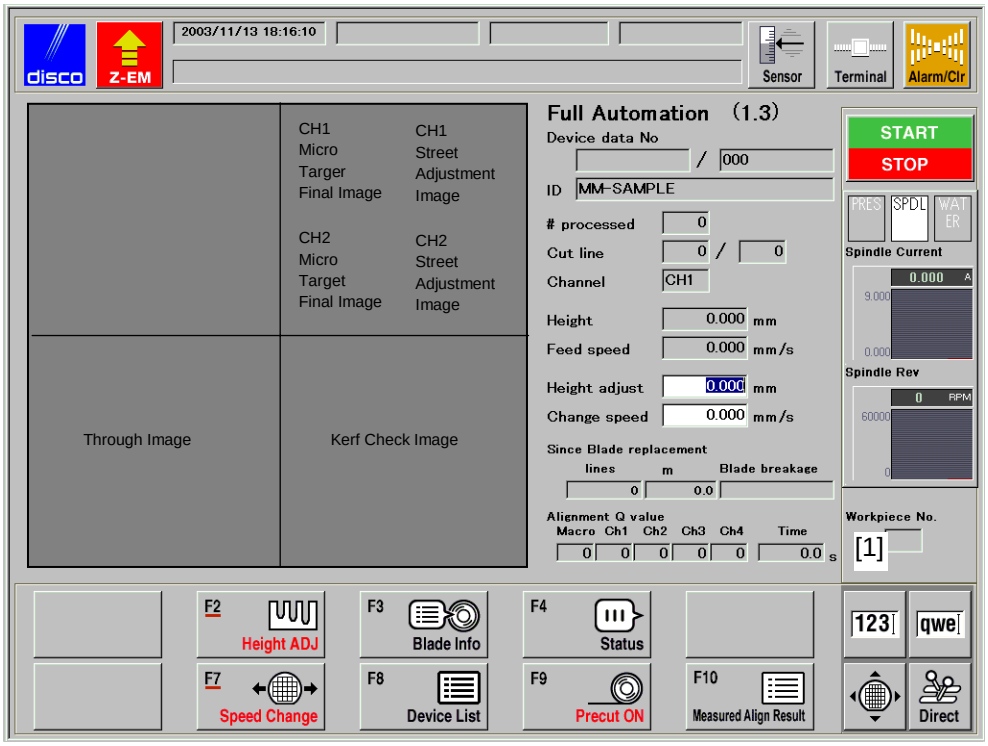
This section describes the items that have been different from or added to the standard specification on the microscope screens displayed during full automation.

Section No.	Title
4-1-1	FULL AUTOMATION microscope screen [screen 1.3]

4-1-1. FULL AUTOMATION microscope screen [screen 1.3]

FULL AUTOMATION microscope screen [screen 1.3]

[Screen]



[Setting Item]

Item No.	Description
[1]	Displays the workpiece No. currently processed. When the number of workpiece on the chuck table is one, “1” is displayed. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-2. Correction-in-cutting Related Screens

Summary of this section

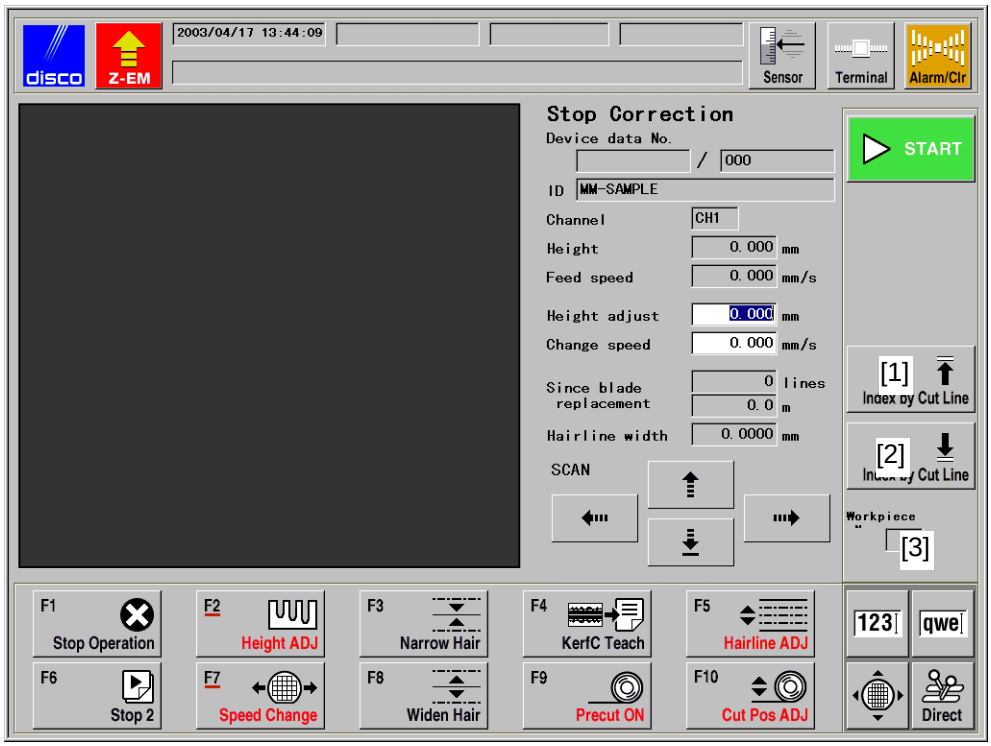
This section describes the items that have been different from or added to the standard specification on the screens displayed during a pause of the cutting operation for performing corrections.

Section No.	Title
4-2-1	STOP CORRECTION screen
4-2-2	EXIT FULL AUTO screen

4-2-1. STOP CORRECTION screen

STOP CORRECTION screen

[Screen]



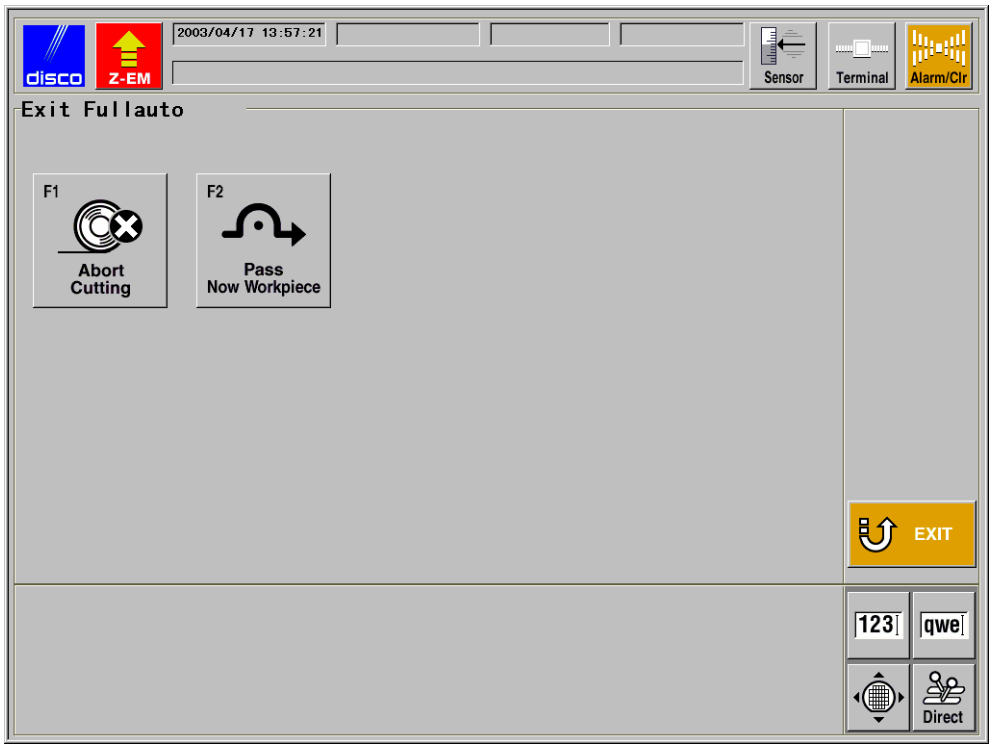
[Setting Item]

Item No.	Description
[1][2]	Moves the axes so that the cut line calculated based on the measurement result comes under the microscope. Pressing these buttons repeatedly can display the cut lines in sequence on the screen. Based on the measurement result, the [1] button indexes the Y-axis from front to rear side of the machine and the [2] button indexes from rear to front side. If alignment of this specification is not used, these buttons move as same as the Y-axis driving buttons.
[3]	Indicates the workpiece No. that the process was suspended. When the number of workpiece on the chuck table is one, “1” is displayed. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-2-2. EXIT FULL AUTO screen

EXIT FULL AUTO screen

[Screen]



[Function Button]

Press	To
F1	Cancels the processing of the workpiece mounted on the chuck table, and aborts the full automation.
F2	Cancels the processing of the current workpiece and continues the processing from the next workpiece mounted on the chuck table. If no next workpiece is left, the machine operates as same as aborting cutting.

4-3. Manual Operation Related Screens

Summary of this section

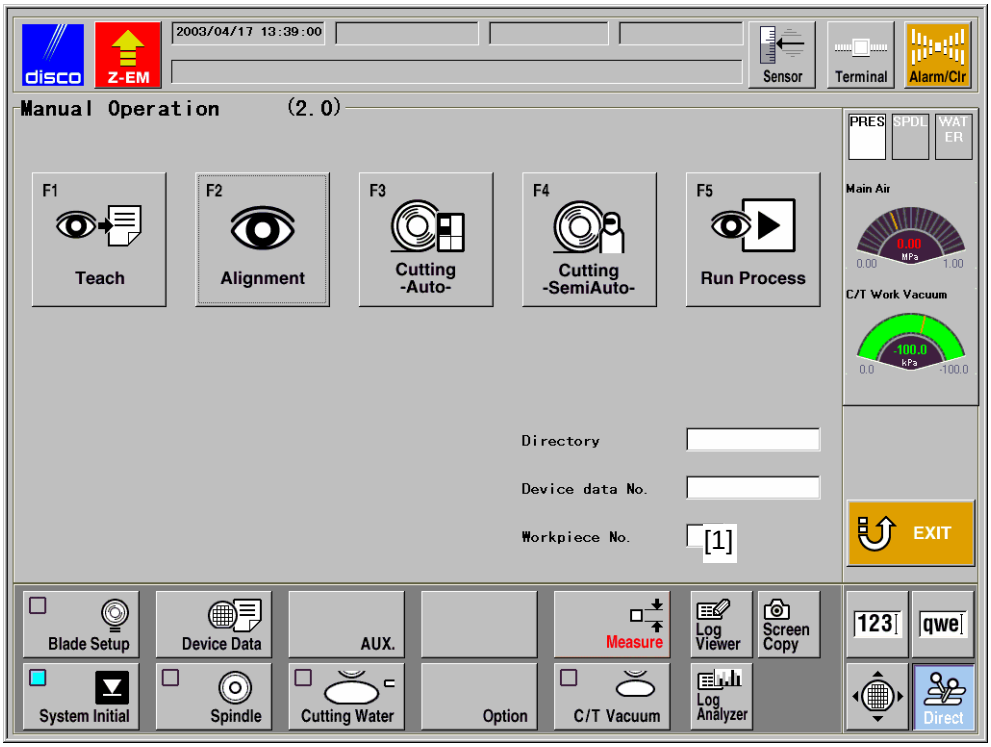
This section describes the items that have been different from or added to the standard specification on the screens relating manual operation.

Section No.	Title
4-3-1	MANUAL OPERATION screen [screen 2.0]
4-3-2	MANUAL ALIGNMENT screen [screen 2.2]
4-3-3	AUTO CUT screen [screen 2.3]
4-3-4	CUT STATUS screen
4-3-5	SEMI AUTOMATIC CUTTING screen [screen 2.4]
4-3-6	SINGLE CHANNEL ALIGNMENT screen [screen 2.4.4]

4-3-1. MANUAL OPERATION screen [screen 2.0]

MANUAL OPERATION screen [screen 2.0]

[Screen]



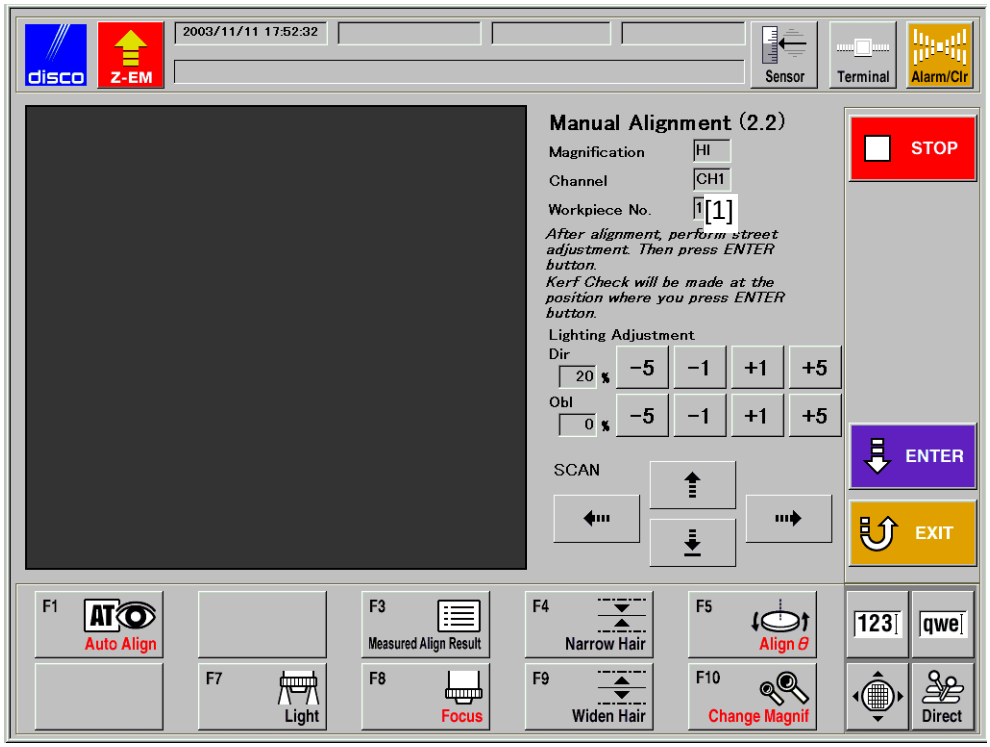
[Setting Item]

Item No.	Description
[1]	Specify the workpiece No. that the manual operation is to be performed. When the number of workpiece on the chuck table is one, specify “1”. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-3-2. MANUAL ALIGNMENT screen [screen 2.2]

MANUAL ALIGNMENT screen [screen 2.2]

[Screen]



[Setting Item]

Item No.	Description
[1]	Indicates the workpiece No. to be aligned. When the number of workpiece on the chuck table is one, “1” is displayed. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-3-3. AUTO CUT screen [screen 2.3]

AUTO CUT screen [screen 2.3]

[Screen]

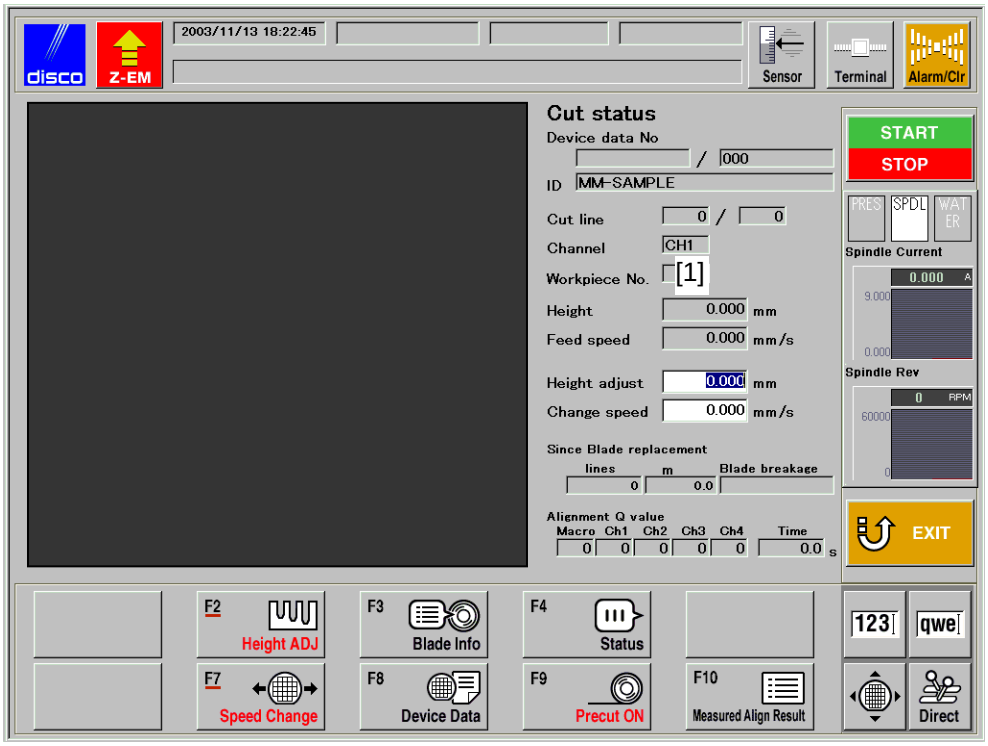
[Setting Item]

Item No.	Description
[1]	Specify the workpiece No. that the automatic cutting and the alignment operation are to be performed. When the number of workpiece on the chuck table is one, specify “1”. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].
[2][3]	Moves the axes so that the cut line calculated based on the measurement result comes under the microscope. Pressing these buttons repeatedly can display the cut lines in sequence on the screen. Based on the measurement result, the [2] button indexes the Y-axis from front to rear side of the machine and the [3] button indexes from rear to front side. If alignment of this specification is not used, these buttons move as same as the Y-axis driving buttons.

4-3-4. CUT STATUS screen

CUT STATUS screen

[Screen]



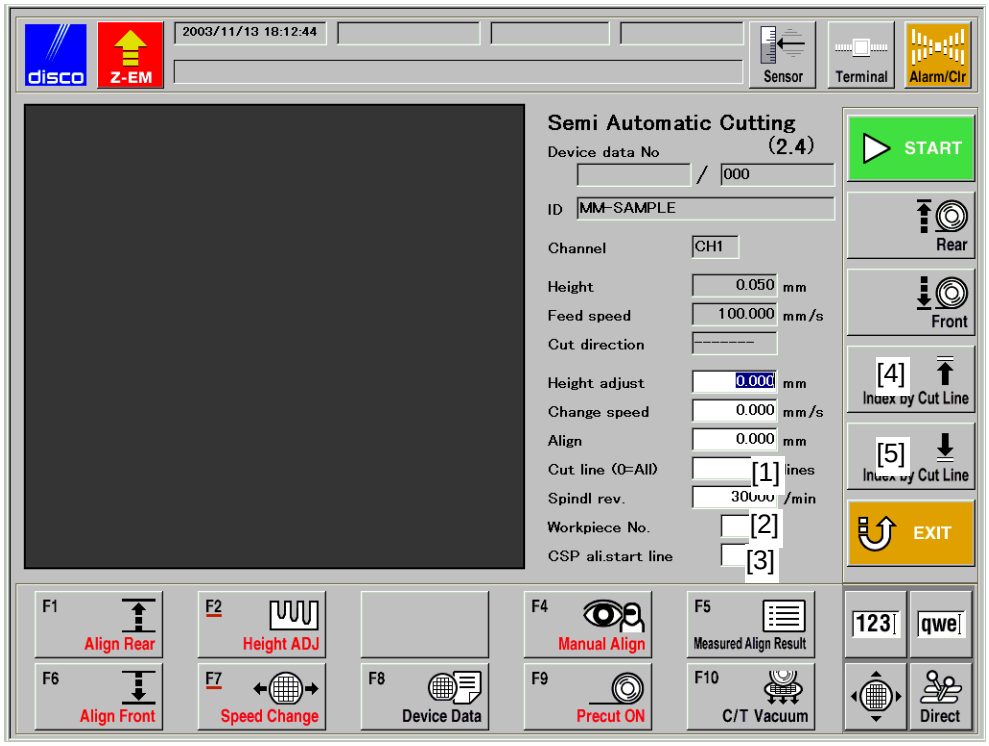
[Setting Item]

Item No.	Description
[1]	Indicates the workpiece No. currently processed. When the number of workpiece on the chuck table is one, “1” is displayed. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-3-5. SEMI AUTOMATIC CUTTING screen [screen 2.4]

SEMI AUTOMATIC CUTTING screen [screen 2.4]

[Screen]

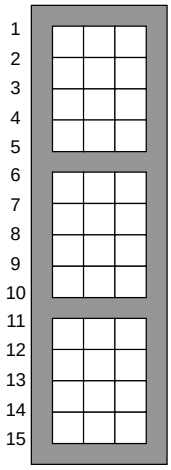


[Setting Item]

Item No.	Description
[1]	Specify the number of lines to be cut. The cut lines are always counted toward the machine front side from the CSP alignment start line, irrespective of the cutting direction.
[2]	Specify the workpiece No. that the semi-automatic cutting and the alignment operation are to be performed. When the number of workpiece on the chuck table is one, specify “1”. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].
[3]	Specify the line to start the manual (single channel) alignment. As for the line number, the line of the left rear of the machine is the line “1”, and continues the line “2” and “3” in sequence toward the front side of the machine.
[4][5]	Moves the axes so that the cut line calculated based on the measurement result comes under the microscope. Pressing these buttons repeatedly can display the cut lines in sequence on the screen. Based on the measurement result, the [4] button indexes the Y-axis from front to rear side of the machine and the [5] button indexes from rear to front side. If alignment of this specification is not used, these buttons move as same as the Y-axis driving buttons.

Sample settings for "CSP ali. start line" and "Cut line"

This section describes data settings for items, “CSP ali. start line” and “Cut line” by using an example of CSP workpiece below.



- The CSP alignment start line is counted from the left rear side of the machine.
  [Example]
  When “CSP ali. start line” is “3”;
  The manual alignment is started from line 3, and continued to the direction of line 15.

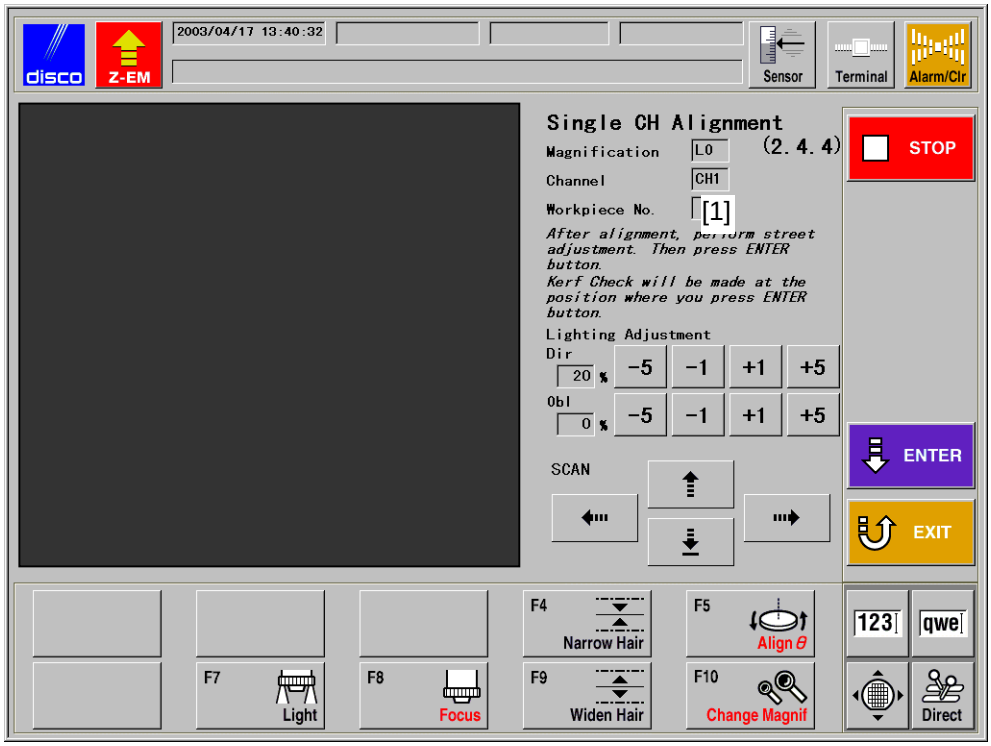
- The cut line is counted irrespective of the cutting direction.
  [Example]
  When “CSP ali. start line” is “3” and “Cut line” is “5”;
  In the front-direction cutting, the cutting starts from line 3, and continues to line 7.
  In the rear-direction cutting, the cutting starts from the 7, and continues to line 3.

- When the cut line is specified as “0”, the cutting is performed up to the final line.
  [Example]
  When “CSP ali. start line” is “5”, and “Cut line” is “0”;
  The cutting is performed from line 5 to line 15.
  In the front-direction cutting, the cutting starts from line 5, and continues to line 15.
  In the rear-direction cutting, the cutting starts from line 15 and continues to line 5.

4-3-6. SINGLE CHANNEL ALIGNMENT screen [screen 2.4.4]

SINGLE CHANNEL ALIGNMENT screen [screen 2.4.4]

[Screen]



[Setting Item]

Item No.	Description
[1]	Indicates the workpiece No. to be aligned. When the number of workpiece on the chuck table is one, “1” is displayed. When two or more workpieces are mounted on the chuck table, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

4-4. Device Data Related Screens

Summary of this section

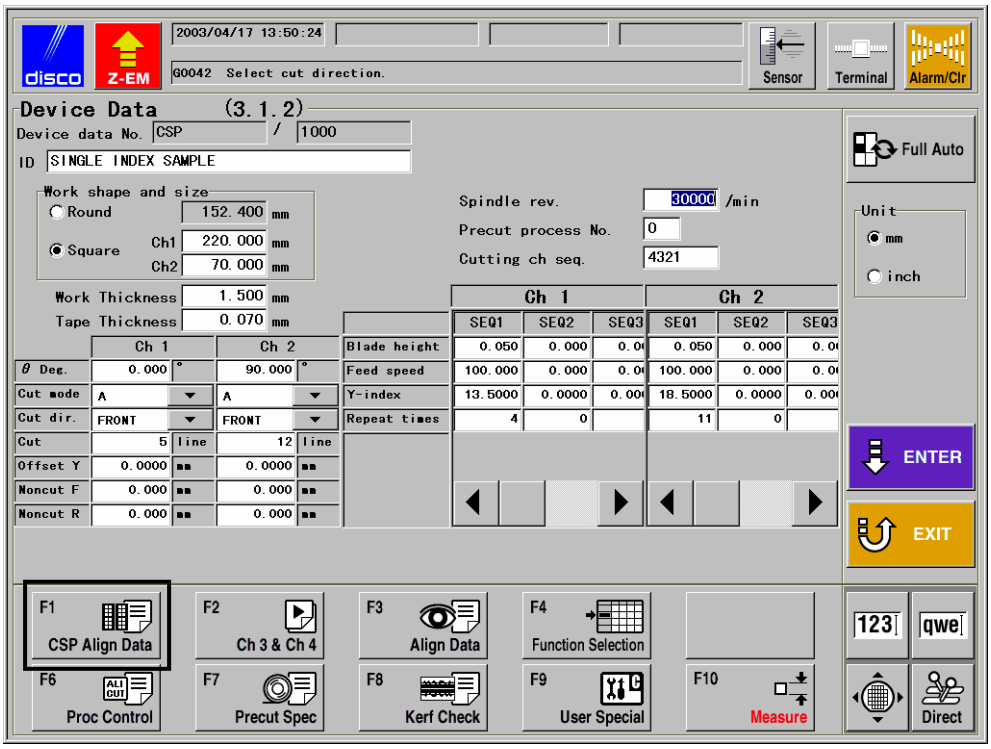
This section describes the items that have been different from or added to the standard specification on the device data-related screens called up from the DEVICE DATA screen [screen 3.1.2].

Section No.	Title
4-4-1	DEVICE DATA screen [screen 3.1.2]
4-4-2	PROCESS CONTROL TABLE screen [screen 3.1.6]
4-4-3	MEASURING ALIGNMENT DATA screen [screen 3.1.1]
4-4-4	LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2]
4-4-5	MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]
4-4-6	ALIGNMENT MEASUREMENT DATA screen

4-4-1. DEVICE DATA screen [screen 3.1.2]

DEVICE DATA screen [screen 3.1.2]

[Screen]



[Function Button]

Press	To
F1	Calls up the MEASURING ALIGNMENT DATA screen [screen 3.1.1].

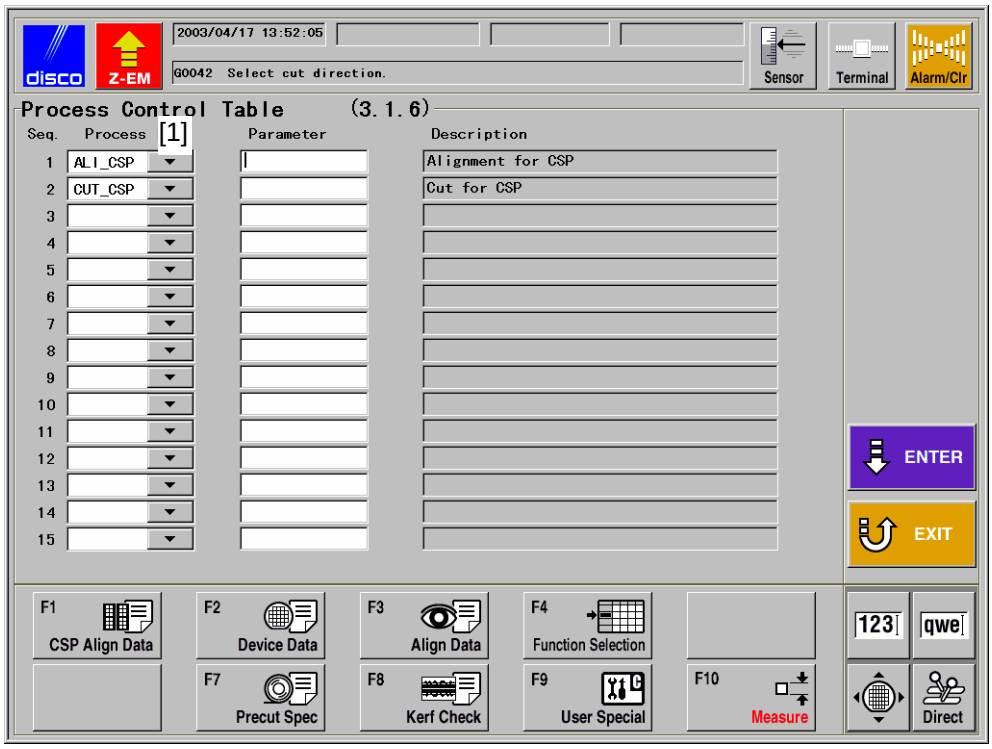
NOTICE

In this special specification, the machine does not conduct the chopper cutting, X/θ-axis offset function, while they can be set in the standard specification.

4-4-2. PROCESS CONTROL TABLE screen [screen 3.1.6]

PROCESS CONTROL TABLE screen [screen 3.1.6]

[Screen]



[Setting Item]

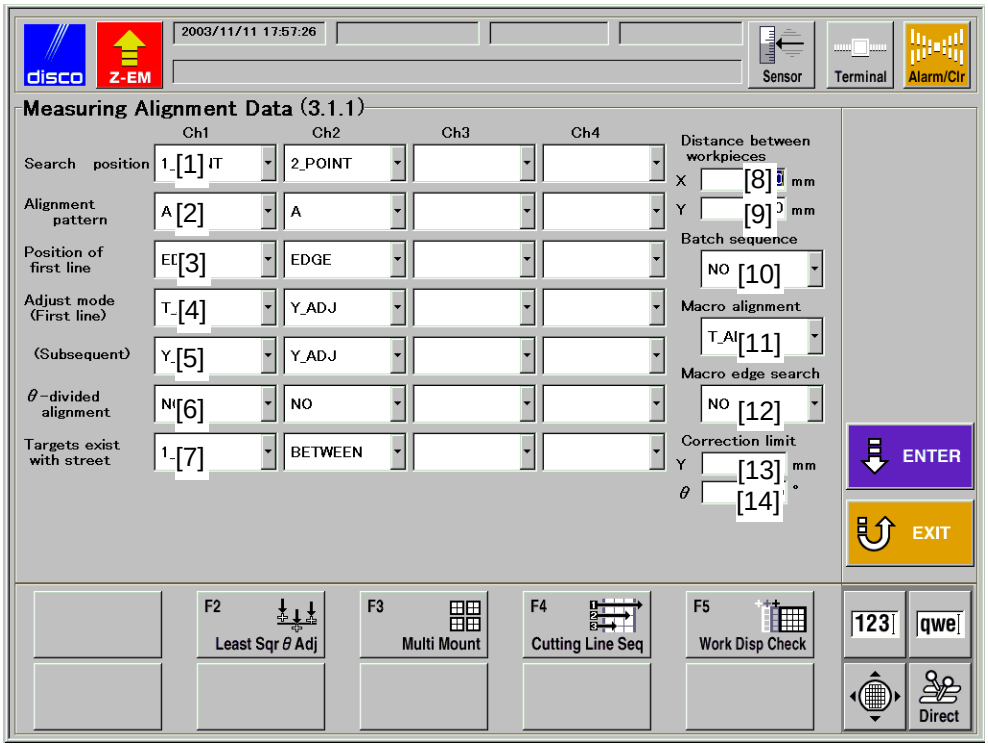
Item No.	Description	
[1]	The following items are added as the process ID (mode):	
	ALI_CSP	CSP alignment, that is, the alignment for this special specification.
	CUT_CSP	CSP cutting, that is, the cutting for this special specification.

4-4-3. MEASURING ALIGNMENT DATA screen [screen 3.1.1]

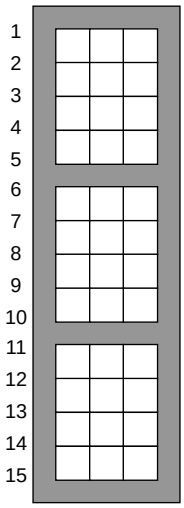
MEASURING ALIGNMENT DATA screen [screen 3.1.1]

To call up the MEASURING ALIGNMENT DATA screen [screen 3.1.1], press the <F1> button on the DEVICE DATA screen [screen 3.1.2].
This screen is used to specify the measuring function operation to ensure accurate cutting for the workpieces that are apt to stretch or shrink, such as CSP workpieces.

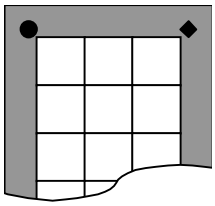
[Screen]



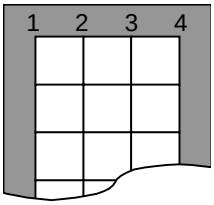
[Setting Item]

Item No.	Description	
[1]	Select whether or not to use the measuring alignment. If you use it, specify the position and the method. Using an example of CSP workpiece below, each selection is explained here.  	
	NO	Disables the measurement function. Alignment is made only on the line “1”. The machine executes cutting using the index value specified in the device data, based on the line 1.
	1_POINT	Alignment is made on the line “1”, “6” and “11”. The machine executes cutting using the index values specified in the device data, based on the alignment position of these lines.
	2_POINT	Alignment is made on the line “1” and “5”. The distance between these two lines obtained by alignment is divided equally by the number of lines. The machine registers this value as the cut line position for the line “1” to “5”. In the same manner, alignment and measurement are made for the lines “6” and “10”, and “11” and “15”. The distances between each two lines obtained by alignment are divided equally by the number of lines. The machine registers these values as the cut line positions for the lines “6” to“10”, and “11” to “15”.
	ALL	Alignment is made on all lines from “1” to “15”.

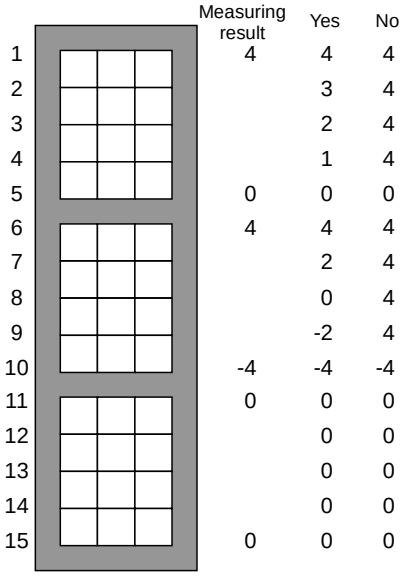
[Setting Item]

Item No.	Description	
[2]	Select a type of target pattern to be registered. When this item is changed from <A> to <AB>, be sure to perform teaching.	
	A	Registers one type of target for teaching and alignment on a single channel.
	AB	Enables to use different targets for teaching and alignment at right and left of the machine on a single channel. When θ adjustment is not performed with the micro target, the movement is the same as <A>. For the micro B target teach, see the section 5-2-2, [Micro B target teaching].  ●: A target ◆: B target
	EDGE	Conducts the θ adjustment at the workpiece edge, when there is no unique target on the workpiece. The target window shows a laterally parallel line, and it is necessary to make a contrast between above and below the line.

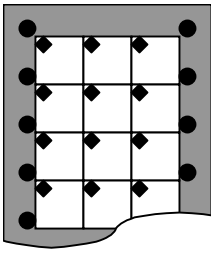
[Setting Item]

Item No.	Description	
[3]	Select the position to be taught and aligned first on each channel. When changing this item, be sure to perform teaching.	
	EDGE	Starts the alignment from the line on the left rear of a workpiece. The target and street position registered in teaching operation is recognized as the left rear line. This selection improves the throughput, because the machine does not have to search a left rear target of a workpiece, compared with when “CENTER” is selected. Normally select this “EDGE” option.
	CENTER	Starts the alignment from the line near the center of a workpiece. And automatically searches a left rear target. After recognizing the left rear target, the measurement alignment starts from the left rear line. The target and street position registered in teaching operation is recognized as the line near the center of the workpiece. Select this when executing the Y-direction alignment on each line after the θ adjustment near the center of the workpiece. In the manual alignment, the movement is the same as that of “EDGE”, irrespective of the setting here.
[4]	Select the alignment method for the first line. 	
	Y_ADJ	Conducts the Y-direction alignment with a single target (1) for one line. Does not conduct the θ adjustment.
	T_ADJ	Conducts the θ adjustment with two targets (1 and 4) for one line.
	T_ADJ2	Conducts the least square method θ adjustment with three or more targets (1 to 4) for one line. Data setting on the LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.1] is necessary.

[Setting Item]

Item No.	Description	
[5]	Select the alignment method for the second line and thereafter (when the first line position is “CENTER”, the left rear target and thereafter). The options for this item are the same as those for [4].	
[6]	Select the θ correction method. This option is effective only when the “2_POINT” is selected at the item [1], and “T_ADJ” or “T_ADJ2” is selected at the items [4] and [5]. In other cases, the movement is the same as that of ”NO”.  	
	YES	Corrects the θ deviation of the measured lines by dividing it by the number of cut lines. For example, in the above figure, the machine finds a deviation of -4° between the lines “1” and “5”. Therefore, it corrects the deviation by -1° on all the lines form “1” to “5”.
	NO	Corrects the θ deviation by applying the immediately preceding measured result. For example, in the above figure, the machine applies the measured result of 4° (immediately preceding measured result of the line 1) to the lines “2” to “4”.

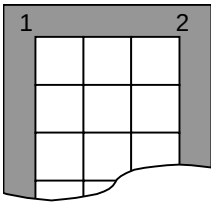
[Setting Item]

<table>
<tr><th>Item No.</th><th colspan="2">Description</th></tr>
<tr><td>[7]</td><td colspan="2">Select the position of the target for the cut lines.
Setting here changes the movement when the “2_POINT” is selected for item [1].
  </td></tr>
<tr><td></td><td>1_BY_1</td><td>Selects this when there are targets (• shown in the above figure) on all lines that alignment is made.</td></tr>
<tr><td></td><td>BETWEEN</td><td>Selects this when the number of the targets (♦ shown in the above figure) is one short of the cut lines, because the targets exist within the chip.</td></tr>
<tr><td>[8][9]</td><td colspan="2">Specify the distance between workpieces in the X- and Y-direction, when two or more workpieces are mounted on the chuck table.
When item, “Use coordinate data” on the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3] is checked (☑), setting for this item becomes invalid.
For the procedures for setting this item, see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].</td></tr>
</table>

[Setting Item]

Item No.	Description	
[10]	Select the process order when two or more workpieces are mounted on the chuck table.	
	YES	Performs cutting after finishing alignment for all workpieces placed on the chuck table. Carries out alignment and cutting at a time on the same channel of every workpiece, even if they are different ones. The operation flow is as follows: Alignment on the channel 1 of all workpieces ⇩ Alignment on the channel 2 of all workpieces ⇩ Cutting on the channel 2 of all workpieces ⇩ Cutting on the channel 1 of all workpieces
	NO	Carries out alignment and cutting by workpiece. The operation flow is as follows: Alignment for the first workpiece ⇩ Cutting for the first workpiece ⇩ Alignment for the second workpiece ⇩ Cutting for the second workpiece

[Setting Item]

Item No.	Description	
[11]	Select the method of macro alignment. 	
	NO	Does not carry out the macro alignment.
	Y_ADJ	Carries out the Y adjustment using one target (1). Does not perform the θ adjustment.
	T_ADJ	Carries out the θ adjustment using several targets (1 and 2).
	ABMacro	Carries out teaching and the θ adjustment using different types of targets at right and left of the machine. (Uses different patterns for 1 and 2.)
	EDGE(Y)	Carries out the Y adjustment using one edge target (1). Does not perform the θ adjustment.
	EDGE(T)	Carries out the θ adjustment using several edge targets (1 and 2).
[12]	Select whether or not to carry out the edge searching, a function to detect a macro target at the left rear of a workpiece. - It is recommended to select “YES” under the following conditions: 1: When you have to specify patterns lying close each other on a workpiece as macro targets. 2: When the adhered accuracy of the workpiece is poor.	
	YES	Carries out the edge search.
	NO	Does not carry out the edge search.
[13]	Specify the permissible deviation in the Y-direction in the micro target recognition. When the difference between the measurement result and “Y index” value specified on the SUB INDEX DATA screen [screen 3.1.5] exceeds the value designated here, an error occurs.	
[14]	Specify the permissible deviation in the θ -direction in the micro target recognition. When a correction by the angle greater than the value set here is needed after θ adjustment, an error occurs. This option is effective only when “T_ADJ” or “T_ADJ2” is selected at [4] or [5] item.	

[Function Button]

Press	To
F1	Unused
F2	Calls up the LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2].
F3	Calls up the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3].
F4	Calls up the CUTTING LINE ORDER DATA screen [screen 3.1.1.4].
F5	Calls up the WORKPIECE DISPLACEMENT CHECK DATA screen [screen 3.1.1.5].
F6	Unused
F7	Unused
F8	Unused
F9	Unused
F10	Unused

4-4-4. LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2]

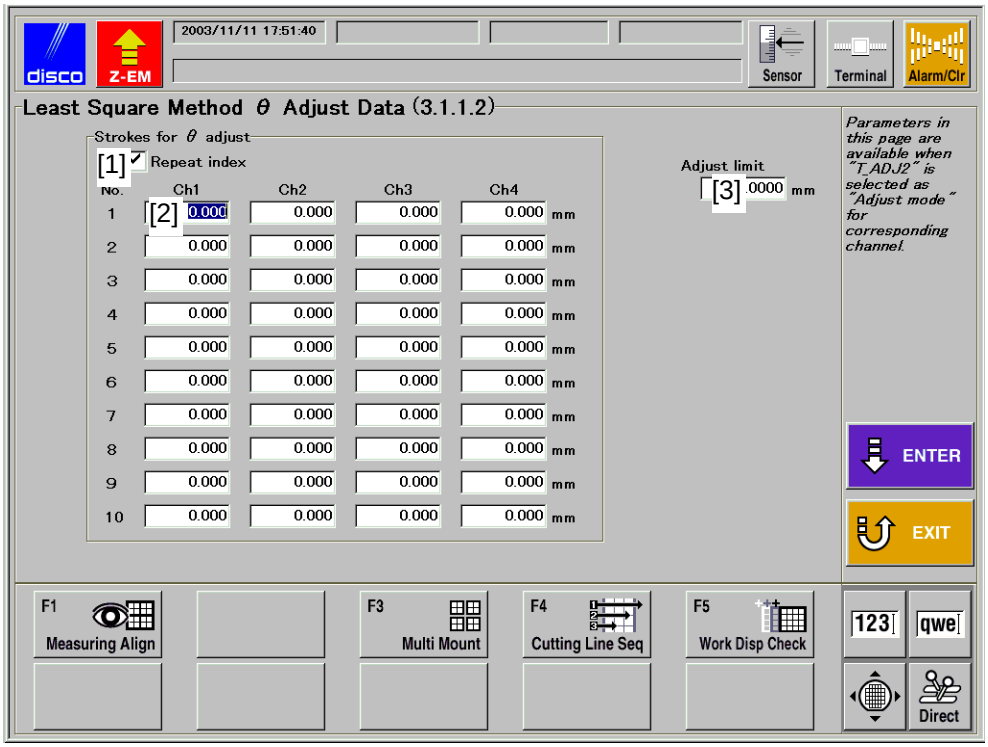
LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2]

To call up the LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2], press the <F2> button on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
This screen is used to specify the distance between targets, only when “T_ADJ2” is selected at the column of "Adjust mode (First line)" and "Adjust mode (subsequent)" on the MEASURING ALIGNMENT DATA screen [screen 3.1.1]. Otherwise, any data specified here becomes invalid. Note that the number of targets that can be recognized in a single line is 21 or less.

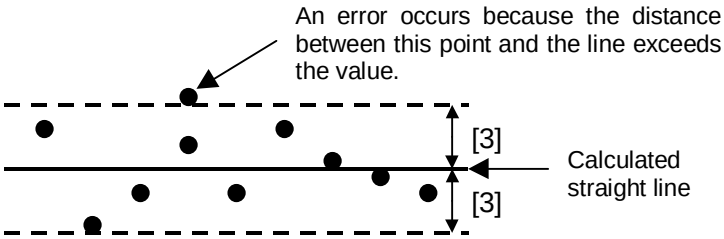
NOTICE

In the manual alignment operation and the error-point entry, θ adjustment between two points (both edges on a workpiece) only is valid. Accordingly, setting on this screen will be invalid.

[Screen]



[Setting Item]

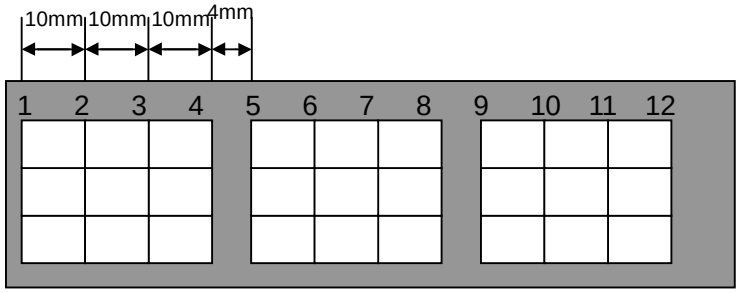
Item No.	Description	
[1]	Specify whether or not to repeat the stroke for θ adjust defined in the item [2].	
	☑	The machine repeats the stroke for θ adjust until it reaches the value of "θ adj. Swing distance" defined in the ALIGNMENT SPECIAL DATA screen [screen 3.1.3.3]. The machine only repeats the stroke using up to 21 targets, even if it still does not reach the "θ adj. swing distance".
	☐	The machine does not repeat the stroke for θ adjust.
[2]	Specify the distance used for θ adjust stroke. The stroke for θ adjust is repeated in sequence from No. 1 to that before "0" is registered. When item [1] is checked (☑), the machine repeats the stroke from No. 1 to the workpiece edge.	
[3]	When performing the θ adjustment using the least square method, the machine calculates a straight line based on the positions of each θ adjustment point. If there is any point that deviates from the straight line by more than the value specified at [3], an error occurs. 	

[Function Button]

Press	To
F1	Calls up the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
F2	Unused
F3	Calls up the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3].
F4	Calls up the CUTTING LINE ORDER DATA screen [screen 3.1.1.4].
F5	Calls up the WORKPIECE DISPLACEMENT CHECK DATA screen [screen 3.1.1.5].
F6	Unused
F7	Unused
F8	Unused
F9	Unused
F10	Unused

Sample setting of the θ adjustment swing stroke

This section describes sample setting of the θ adjustment swing distance and repeat index using the least square method by an example of CSP workpiece shown below.



It is supposed that there are targets to be used for the θ adjustment using the least square method on the positions of 1 to 12. The "θ adj. swing distance" defined in the ALIGNMENT SPECIAL DATA screen [screen 3.1.3.3] is the distance between 1 and 12 (98 mm).

For the "stroke for θ adjust", the following distances are specified;

No.1: 10 mm
No.2: 10 mm
No.3: 10 mm
No.4: 4 mm
No.5 and thereafter: 0 mm

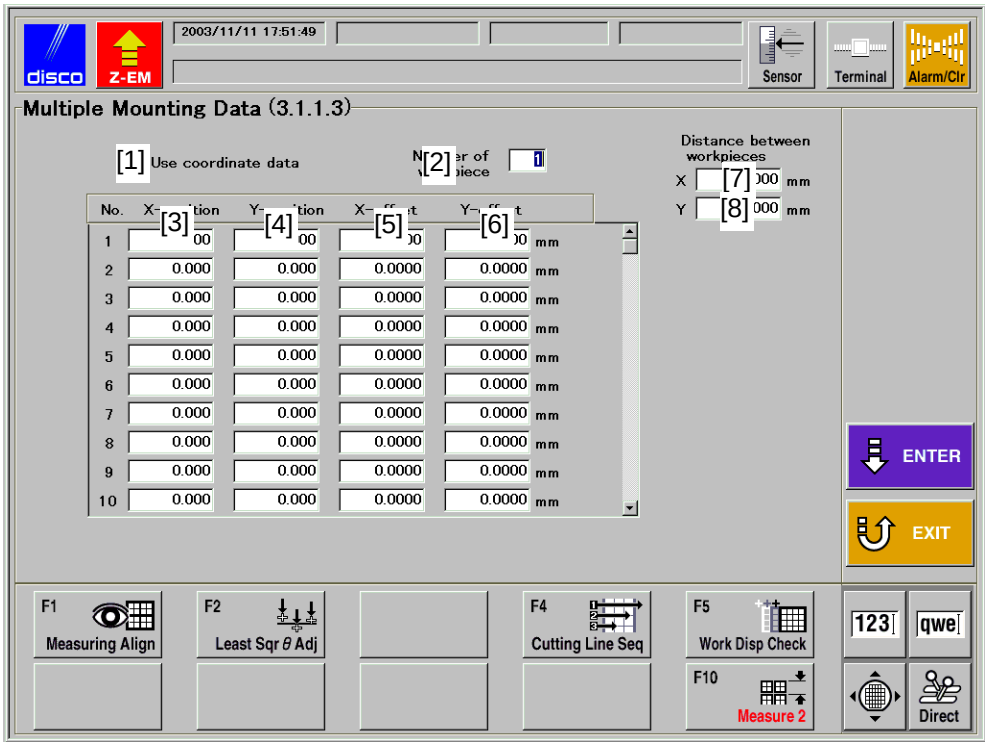
Condition	Movement
When "Repeat index" is checked ☑	The machine repeats the strokes from No. 1 to No. 4, until it reaches the value of "θ adj. Swing distance" defined in the ALIGNMENT SPECIAL DATA screen [screen 3.1.3.3]. On the above example, the θ adjustment using the least square method is performed using the targets from 1 to 12.
When "Repeat index" is not checked ☐	The machine carries out the θ adjustment using the least square method with the stroke from No. 1 to No. 4. On the above example, the θ adjustment using the least square method is performed using the targets from 1 to 5.

4-4-5. MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]

MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]

To call up the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3], press the <F3> button on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
This screen is used to register the workpiece mounting position within the chuck table. The workpiece No. is also determined on this screen.

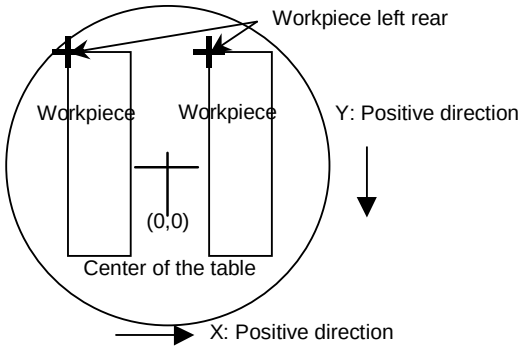
[Screen]

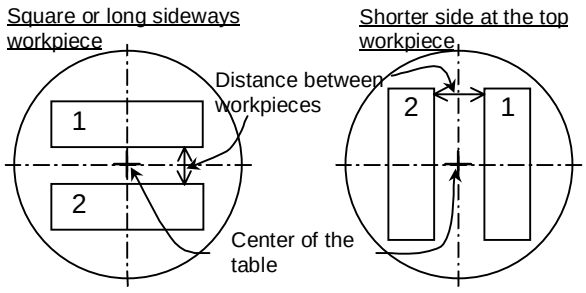
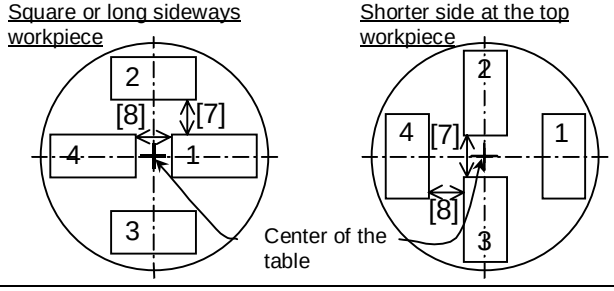


[Setting Item]

Item No.	Description	
[1]	Select whether or not to use the coordinate data (the item [3] to [6] on this screen) for the data setting of multiple mounting data.	
	☑	Specify the multiple mounting data using the coordinate data.
	☐	Not using the coordinate data specified on this screen, specify the workpiece mounting position by using the distance between workpieces (the items [7] and [8] on this screen, or the same item of the MEASURING ALIGNMENT DATA screen [screen 3.1.1]).
[2]	Specify the number of workpieces to be placed on the chuck table. You can place up to 9 workpieces.	

[Setting Item]

<table>
<tr><th>Item No.</th><th colspan="2">Description</th></tr>
<tr><td>[3][4]</td><td colspan="2">Specify the left rear of a workpiece as the relative position that makes the center of the table as the zero point.
 

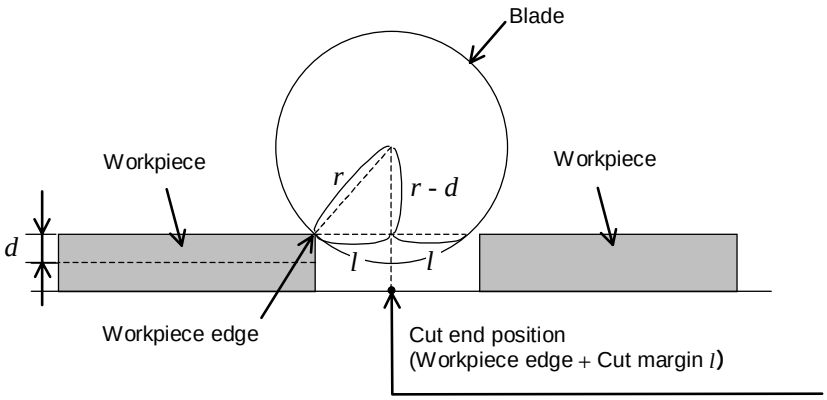
Specify the number of workpieces up to that defined in the item [2] for each workpiece No.</td></tr>
<tr><td>[5][6]</td><td colspan="2">Specify the deviation of workplace position from the value of [3] and [4], when temporarily changing the workpiece location.</td></tr>
<tr><td rowspan="3">[7][8]</td><td colspan="2">Specify the distance between workpieces. This activates only when the item [1] is not checked (☐). This item is effective when the number of workpiece placed on the chuck table is one, two or four.</td></tr>
<tr><td>One workpiece</td><td>Enter “0” to the both items [7] and [8].
Place the workpiece center on the chuck table center.</td></tr>
<tr><td>Two workpieces (The number “1” and “2” in the figure are workpiece No.)</td><td>Specify the distance between workpieces in either of item [7] or [8], and “0” in another. Place the workpieces symmetrically about the center of the table.
 
</td></tr>
<tr><td>Four workpieces (The number “1” to “4” in the figure is workpiece No.)</td><td>Specify the distance between workpieces in item [7] and [8]. Place the workpieces symmetrically about the center of the table.
 
</td></tr>
</table>

[Function Button]

Press	To
F1	Calls up the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
F2	Calls up the LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2].
F3	Unused
F4	Calls up the CUTTING LINE ORDER DATA screen [screen 3.1.1.4].
F5	Calls up the WORKPIECE DISPLACEMENT CHECK DATA screen [screen 3.1.1.5].
F6	Unused
F7	Unused
F8	Unused
F9	Unused
F10	Calls up the MEASURE 2 screen [screen 5.5].

Cautions when setting the multiple mounting data

When two or more workpieces are mounted on the chuck table, it is necessary to make the workpiece distance wide so that the blade will not touch the next workpiece.



If the blade diameter is set as *r* and the cutting depth as *d*, the minimum allowance for cutting *l* can be obtained by the following formula:

$$l = \sqrt{2rd - d^2} \quad \text{--- Formula 1}$$

Therefore, the distance between workpieces, *x* equals *21*. Considering the possible errors in setting workpieces *e*, however, it is desirable to have a wider space between workpieces.
Then,

$$x \geqq 2l + e \quad \text{---------- Formula 2}$$

[Calculation of the distance between workpieces]

When the blade OD is 2 inch (or 3 inch) and the cutting depth is 1.0 mm (or 1.5 mm), the cutting margin and the distance between workpieces are obtained as shown in the below table:

Blade OD	2 inch (55.56 mm)		
Cutting Depth	1.0 mm	1.5 mm	2.0 mm
Cutting Margin *1	8.0 mm	10.0 mm	11.0 mm
Distance between workpieces *2	17.0 mm	21.0 mm	23.0 mm

Blade OD	3 inch (80.0 mm)		
Cutting Depth	1.0 mm	1.5 mm	2.0 mm
Cutting Margin *1	9.0 mm	11.0 mm	13.0 mm
Distance between workpieces *2	19.0 mm	23.0 mm	27.0 mm

*1. The cutting allowance is obtained by the formula 1 and by discarding all digits to the right of the decimal point.

*2. The distance between workpieces is obtained by the formula 2 and by adding 1.0 mm as an error in workpiece placement.

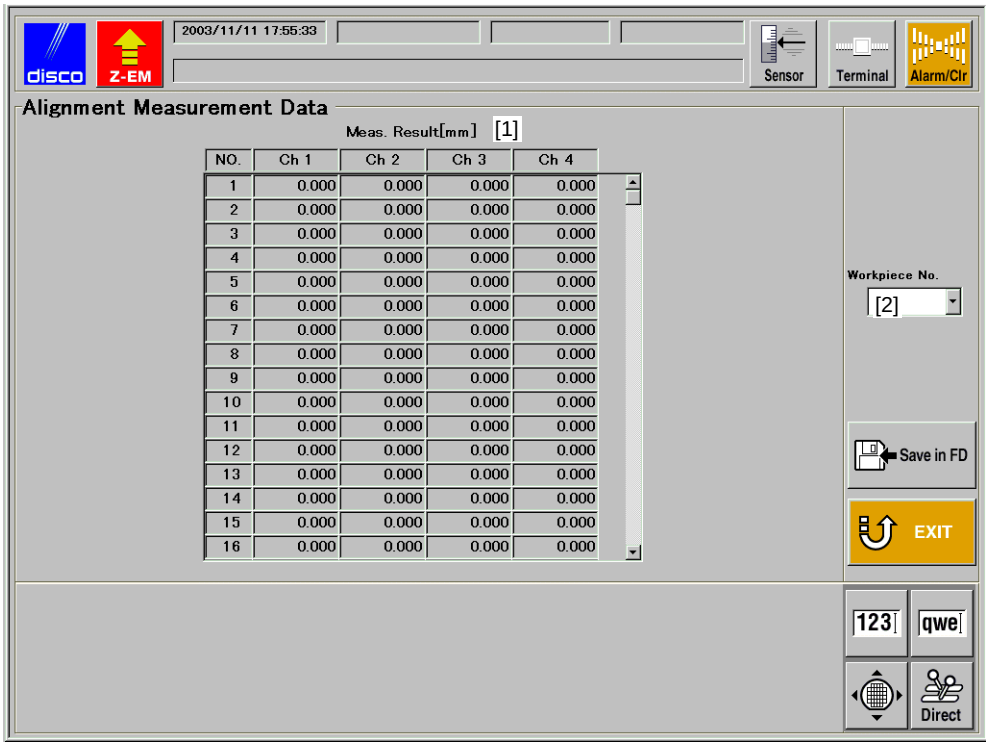
4-4-6. ALIGNMENT MEASUREMENT DATA screen

ALIGNMENT MEASUREMENT DATA screen

The ALIGNMENT MEASUREMENT DATA screen displays the measurement results of Y-index of each channel. You can call up this screen from the following screens:

Screen	Button
FULL AUTOMATION screen [screen 1.0]	F1
FULL AUTOMATION microscope screen [screen 1.3]	F10
MANUAL ALIGNMENT screen [screen 2.2]	F3
AUTO CUT screen [screen 2.3]	F5
SEMI AUTOMATIC CUTTING screen [screen 2.4]	F5
CUT STATUS screen	F10
STOP CORRECTION 2 screen	F3

[Screen]



[Setting Item]

Item No.	Descriptions
[1]	Displays the measurement results for the workpiece specified in [2] column.
[2]	Select workpiece No. whose measurement results are to be displayed on this screen.
Save in FD	Saves the measurement results into a floppy disk. Insert a writable disk into the floppy disk drive and press this button. The results for all the channels of the workpiece selected in [2] column. Directory: Root directory File name: "mesdat.csv" Data format: CSV format Lines shows the line number and the column shows the channels.

4-5. Error Recovery Related Screens

Summary of this section

This section describes the items on the error recovery screens that are different from or added to from/to the standard specification, which is displayed when an error occurs during alignment operation.

Section No.	Title
4-5-1	ERROR RECOVERY (ALIGNMENT) screen
4-5-2	ERROR POINT TEACH screen
4-5-3	MODIFICATION OF ALIGNMENT START POSITION screen

4-5-1. ERROR RECOVERY (ALIGNMENT) screen

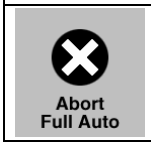
Error message

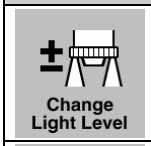
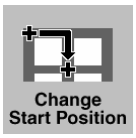
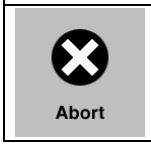
The recovery screens that are displayed when an error occurs during alignment operation using this special specification differ depending on the error occurrence situations.

For the combination of error occurrence and the displayed screens, see section 3-1-1, [Remedies for alignment].

ERROR RECOVERY (ALIGNMENT) screen

Recovery selection and the number of the function buttons (e.g. <F1>) differ depending on the displayed recovery screen. For the combination of number and the contents of the function buttons and the displayed screens, see section 3-1-1, [Remedies for alignment].

Button	Function and selection criteria
	Retries alignment for the current channel on the current workpiece. When the error cause is simple (e.g., improper focus) and auto alignment operation for the current channel on the current workpiece can easily be resumed by a retrial.
	Calls up the MANUAL ALIGNMENT screen and carries out manual alignment for the current channel on the current workpiece. Pressing the <F1: Auto Align.> button on the MANUAL ALIGNMENT screen carries out auto alignment for the current channel on the current workpiece. Select this button when such an error as improper recognition of the captured image (that is, not the error that occurs to a defective lot, but those occurs on the workpiece currently mounted) occurs.
	Retries alignment for all the workpieces mounted on the chuck table from the beginning when "YES" is selected for "Batch sequence" on the MEASURING ALIGNMENT DATA screen [screen 3.1.1]. If "NO" is selected, the machine retries the alignment operation from the workpiece where an error occurs.
	Aborts the full automation.

Button	Function and selection criteria
	Calls up the LIGHTING ADJUSTMENT screen. Select this button when adjusting the light intensity before a retrial of the alignment operation.
	Cancels the processing for the current workpiece and resumes that for the next workpiece. Select this button when the current workpiece cannot be aligned.
	Calls up the ERROR POINT TEACH screen. Select this button when a target is stained or when accuracy of the workpiece is not favorable. Registers a target or a street at the point where the error occurs. After registration, the alignment operation continues.
	Calls up the MODIFICATION OF ALIGNMENT START POSITION screen and specifies the position where to start the macro target searching. Select this button when accuracy of workpiece mounting is not favorable and the like. Specify the position where to start the alignment operation and then press the <RETRY - ALIGNMENT-> button to resume the alignment operation.
	Aborts the auto alignment operation.

4-5-2. ERROR POINT TEACH screen

ERROR POINT TEACH screen

To call up the ERROR POINT TEACH screen, press the 

button on the ERROR RECOVERY (ALIGNMENT) screen.

This is a screen to register the target or the street position for the error occurring target.

When registering the target position on this screen;

- When an error occurs during macro alignment.
- When an error occurs during the micro alignment operation for the first line with a condition that the “Adjust mode (First line)” is set to “CENTER” on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].

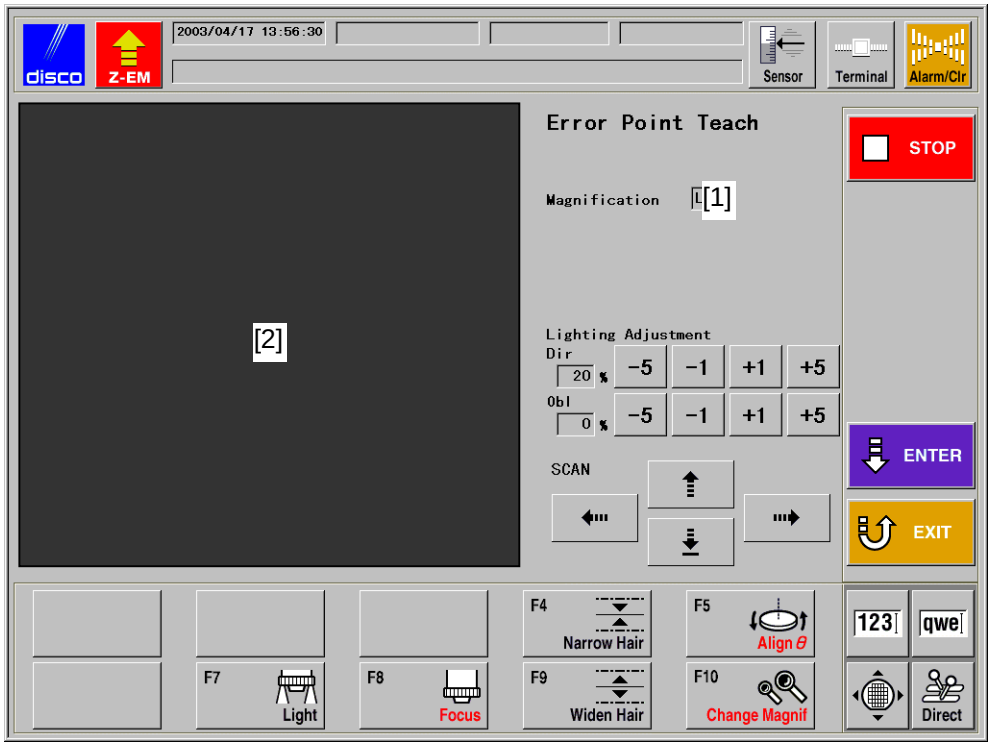
  -> A target window is displayed on the screen. Register the target at the center of the screen.

When registering the street position on this screen;

- In cases other than the above.

  -> Hairlines are displayed on the screen.

[Screen]



[Setting Item]

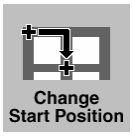
Item No.	Description
[1]	Indicates the current magnification of the microscope.
[2]	Displays a target window or hairlines and the microscope image.

[Function Button]

Press	To	
F1	Unused	
F2	Unused	
F3	Unused	
F4	Narrows the width of hairlines on the screen. * This button appears when hairlines are displayed on the screen.	
F5	Selects the θ-angle adjustment operation scanning the X-axis automatically. When pressing the <F5> button for more than one second, the automatic θ adjustment operation is performed.	
F6	Unused	
F7	Calls up the LIGHTING ADJUSTMENT screen. You can adjust the light intensity variously depending on the way of pressing the <F7> button.	
	Press it once.	Calls up the LIGHTING ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic light intensity adjustment of direct light.
	Press it for one second or more, then once more.	Carries out the automatic light intensity adjustment of oblique light.
	Press it for one second or more, then twice more.	Carries out the automatic light intensity adjustment of direct and oblique light.
F8	Calls up the FOCUS ADJUSTMENT screen. You can adjust the microscope focus variously depending on the way of pressing the <F8> button.	
	Press it once.	Calls up the FOCUS ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic focusing.
F9	Widens the width of hairlines on the screen. * This button appears when hairlines are displayed on the screen.	
F10	Switches the microscope magnification between high and low.	

4-5-3. MODIFICATION OF ALIGNMENT START POSITION screen

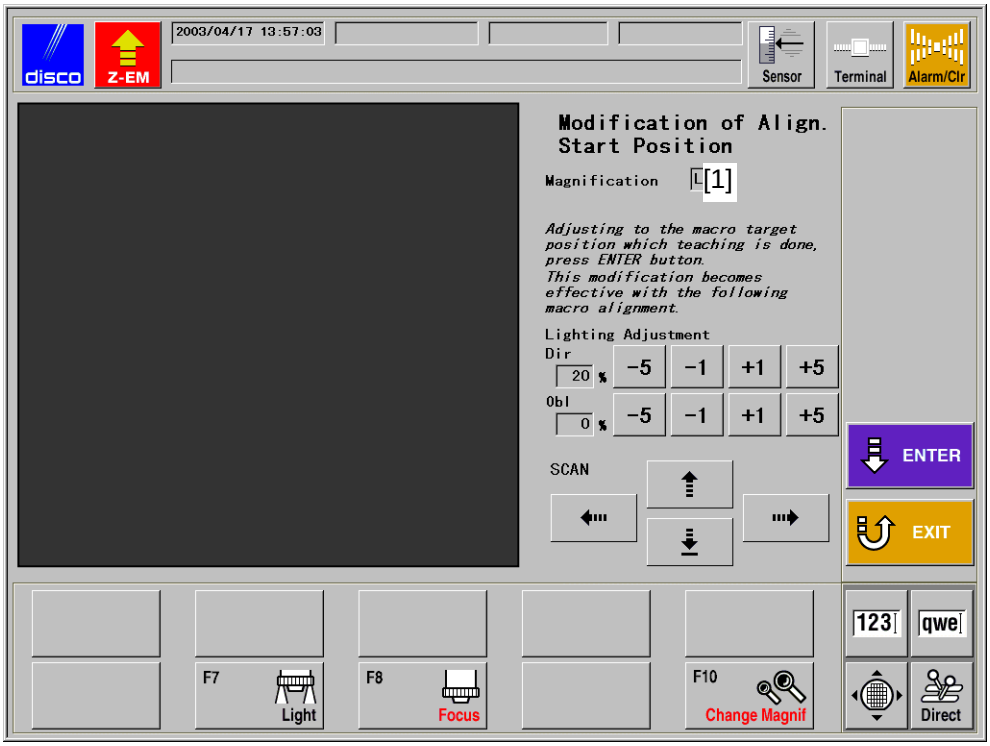
MODIFICATION OF ALIGNMENT START POSITION screen

To call up the MODIFICATION OF ALIGNMENT START POSITION screen, press the 

button on the ERROR RECOVERY (ALIGNMENT) screen.

This is a screen for registering the position where to start macro target searching. The position registered on this screen is valid only for the next macro alignment.

[Screen]



[Setting Item]

Item No.	Description
[1]	Indicates the current magnification of the microscope.

[Function Button]

Press	To	
F1	Unused	
F2	Unused	
F3	Unused	
F4	Unused	
F5	Unused	
F6	Unused	
F7	Calls up the LIGHTING ADJUSTMENT screen. You can adjust the light intensity variously depending on the way of pressing the <F7> button.	
	Press it once.	Calls up the LIGHTING ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic light intensity adjustment of direct light.
	Press it for one second or more, then once more.	Carries out the automatic light intensity adjustment of oblique light.
	Press it for one second or more, then twice more.	Carries out the automatic light intensity adjustment of direct and oblique light.
F8	Calls up the FOCUS ADJUSTMENT screen. You can adjust the microscope focus variously depending on the way of pressing the <F8> button.	
	Press it once.	Calls up the FOCUS ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic focusing.
F9	Unused	
F10	Switches the microscope magnification between high and low.	

4-6. Alignment Related Screens

Summary of this section

This section describes the items that have been different from or added to the standard specification on the screens relating the alignment operation.

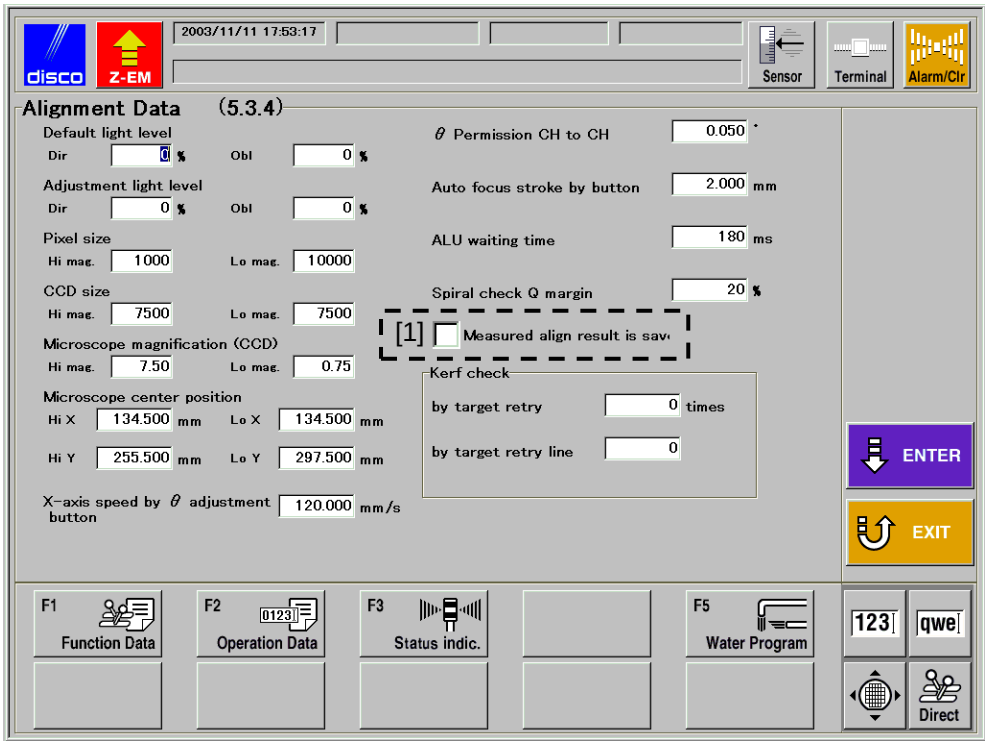
Section No.	Title
4-6-1	ALIGNMENT DATA screen [screen 5.3.4]

4-6-1. ALIGNMENT DATA screen [screen 5.3.4]

ALIGNMENT DATA screen [screen 5.3.4]

This screen is used to specify and modify the machine alignment data.

[Screen]

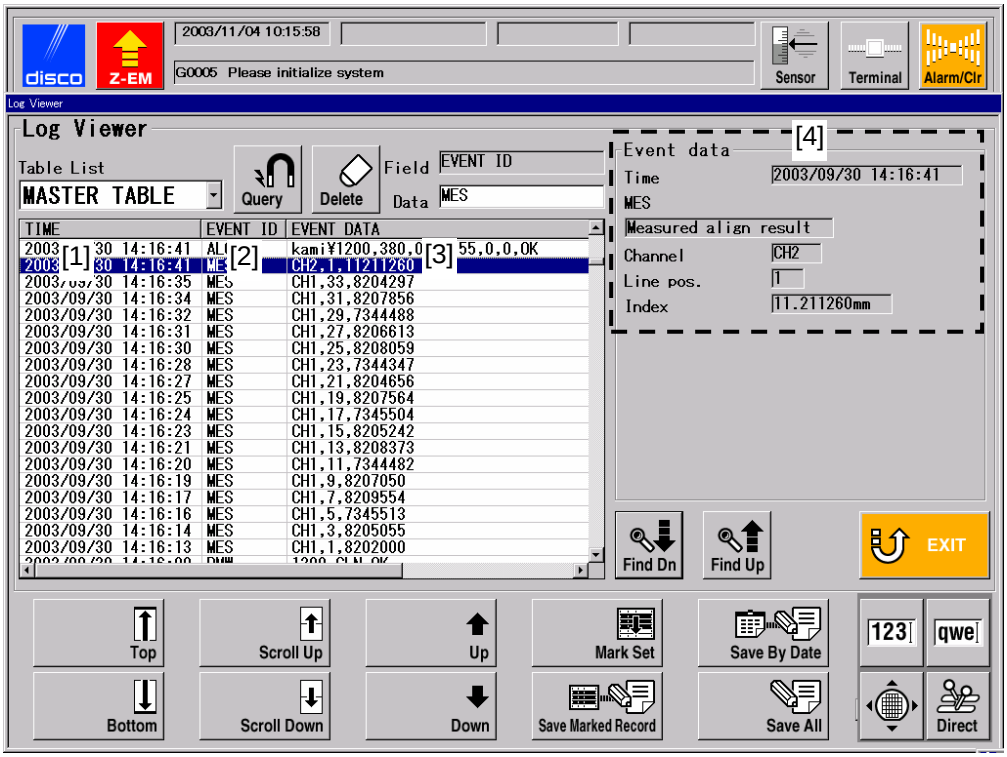


[Setting Item]

Item No.	Description	
[1]	Specify whether or not to save the measurement results into the log data. For the log format, see the next page.	
	☑	Saves the measurement results into the log data.
	☐	Does not save the measurement results into the log data.

The measurement result is saved in the log data. The results of the remnant areas and for 1-POINT , however, are not saved because the die area is cut based on the index specified in the device data in case of 1-POINT.
The log data can be displayed by pressing the <Log Viewer> button on the direct operation keyboard.

[Screen]



[Setting Item]

Item No.	Descriptions
[1]	Indicates the date and time of measurement.
[2]	Indicates the event ID. - For example, "MES" is displayed for the measurement result.
[3]	Indicates the event data. The details are shown in [4] column.
[4]	Indicates the measurement results. In case of the measurement result (MES), the following three items are shown except for the date: - Channel (Measured channel) - Line pos. (The first line measured) - Index (Measurement results in mm).

4-7. Setup Related Screens

Summary of this section

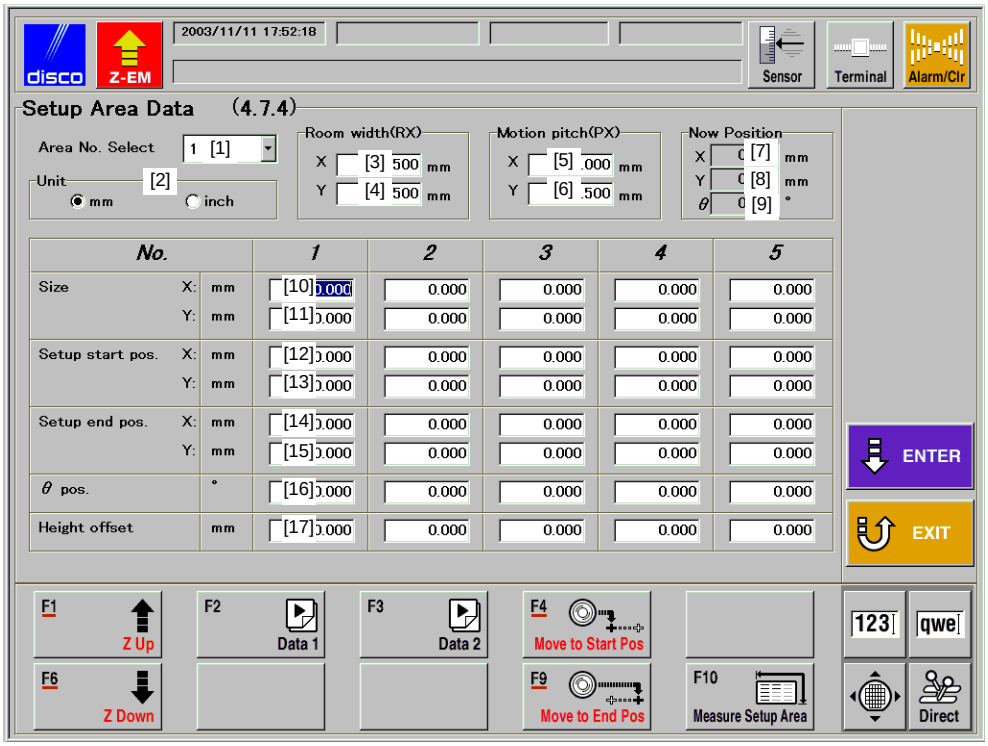
This section describes the items that have been different from or added to the standard specification on the screens relating the setup operation.

Section No.	Title
4-7-1	SETUP AREA DATA screen [screen 4.7.4]

4-7-1. SETUP AREA DATA screen [screen 4.7.4]

SETUP AREA DATA screen [screen 4.7.4]

[Screen]



[Setting Item]

Item No.	Descriptions
[1]	Select the data No. of the setup area for setup using a square chuck table. - For the position of the square chuck table, set data at the columns [10] through [17].
[2]	Select the unit (inch/mm).
[3][4]	Specify the margin width in X- and Y-direction for the size of square chuck table set at [10] and [11]. Setup is not carried out in the designated area.
[5][6]	If you want to change the setup point by every setup, specify the travel pitch of the setup point.
[7]	Indicates the distance from the origin position of the X-axis as its current position.
[8]	Indicates the distance from the origin position of the Y-axis as its current position.
[9]	Indicates the angle from the origin position of the θ -axis as its current position.
[10][11]	Specify the size of the square chuck table.

[Setting Item]

Item No.	Descriptions
[12][13]	Specify the setup start position. If you register the [Upper left position] on the SETUP AREA MEASURE screen which is called up by <F10> button, that position is automatically registered.
[14][15]	Specify the setup end position. If you register the [Lower right position] on the SETUP AREA MEASURE screen which is called up by <F10> button, that position is automatically registered.
[16]	Specify the angle of θ -axis for setup. If you register the setup position using the SETUP AREA MEASURE screen which is called up by <F10> button, that position is automatically registered.
[17]	Specify an adequate value when you want to carry out setup at the position other than the chuck table. Enter a correction value when there is a gap between the height of the setup position and workpiece suction side. - When you change this value, you have to perform a setup again. - See [Explanatory illustration of setup area data setting] in section B-4-2 of the Operation Manual.

[Function Button]

Press	To
F1	Move up the Z-axis.
F2	Call up the SETUP DATA 1 screen [screen 4.7].
F3	Call up the SETUP DATA 2 screen [screen 4.7.3].
F4	Move the blade position to the setup start position specified at [12] and [13].
F5	Unused
F6	Move down the Z-axis to near the chuck table.
F7	Unused
F8	Unused
F9	Move the blade position to the setup end position specified at [14] and [15].
F10	Call up the SETUP AREA MEASURE screen.

5. DATA MAINTENANCE

Summary of this section

This section explains example settings of the device data for cutting with this special specification, and operator maintenance and notice specific to this special specification.

Section No.	Title	Contents
5-1	Example of Device Data Setting	Describes setting examples and notice for the device data entry when using this special specification.
5-2	Teaching	Describes the teaching procedure and notice when using this special specification.
5-3	Workpiece Position Measurement Function (MEASURE 2)	Explains the function to measure a workpiece position placed on the chuck table.

5-1. Example of Device Data Setting

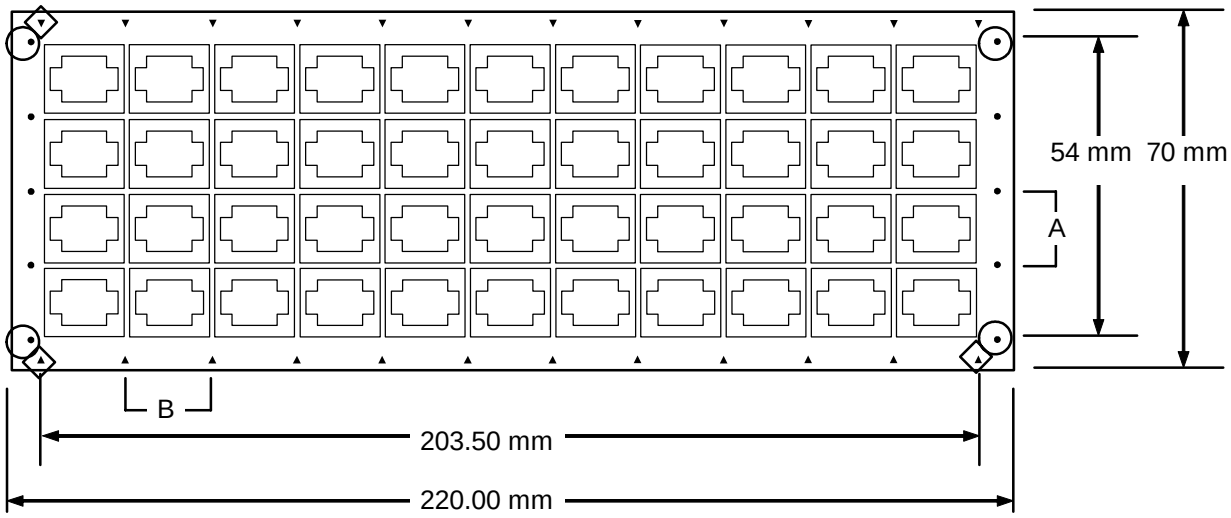
Summary of this section

This section describes the device data setting example and notice when using this special specification, giving an example of CSP workpiece.
For the contents of the DEVICE DATA screen and the procedure for calling it up, see the Data Maintenance Manual and section 4-4, [Device Data Related Screens] of this manual etc.
For the procedure for setting the LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2], see section 4-4-4, [LEAST SQUARE METHOD θ ADJUST DATA screen [screen 3.1.1.2]].
And for that of the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3], see section 4-4-5, [MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]].

Section No.	Title	Contents
5-1-1	Single index	Describes the data setting example for single-index workpiece.
5-1-2	Multiple index	Describes the data setting example for multiple-index workpiece.
5-1-3	Clean cutting and depth-step cutting	Describes the data setting example for clean cutting and depth-step cutting.
5-1-4	Notice for device data entry	Describes the notice for device data entry specific to this special specification.

5-1-1. Single index

Outline of workpiece



○: CH1 alignment position
◇: CH2 alignment position

Index	CH1	:	13.5 mm (A)
	CH2	:	18.5 mm (B)
Workpiece thickness		:	1.5 mm

Cutting condition

The cutting condition example of each channel is shown below:

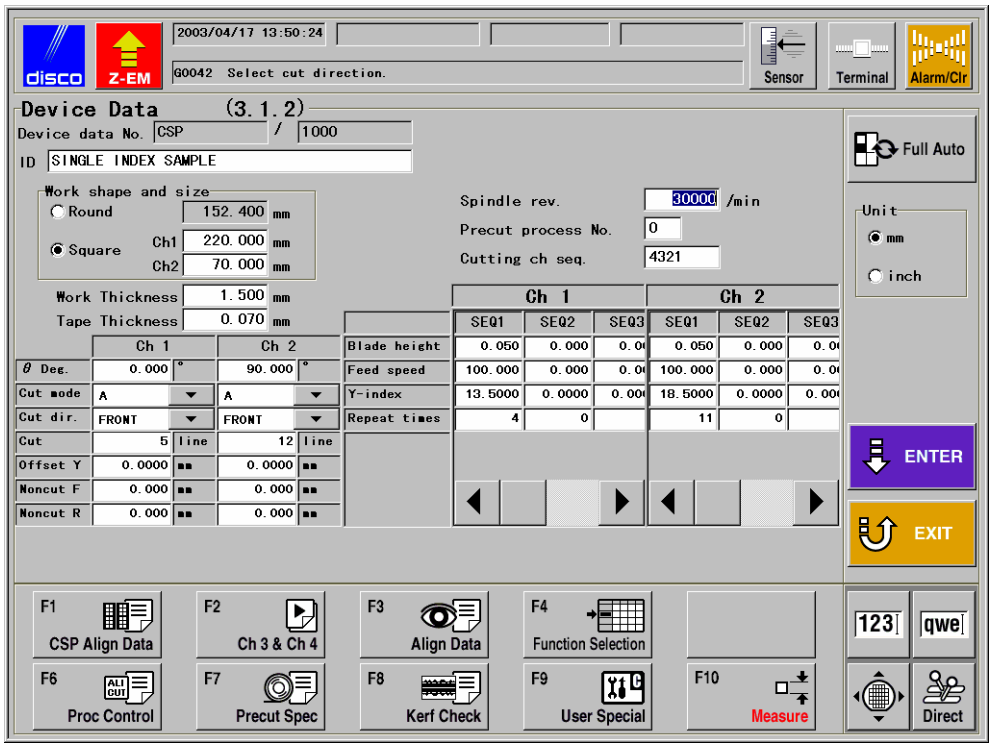
	Item	Setting Value
CH1	Cut direction	FRONT
	Cut lines	5 lines
	Blade height	0.050 mm
	Feed speed	100.000 mm/s
	Index	13.500 mm
CH2	Cut direction	FRONT
	Cut lines	12 lines
	Blade height	0.050 mm
	Feed speed	150.000 mm/s
	Index	18.500 mm

Alignment condition

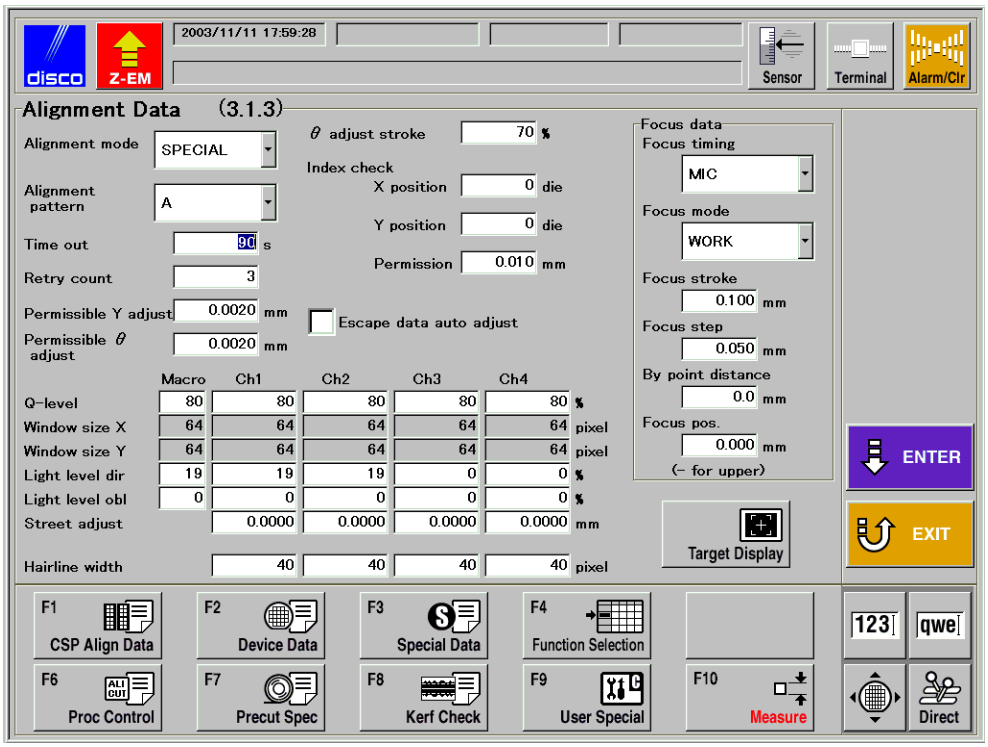
The alignment condition example of each channel is shown below:

	Item	Setting Value
CH1	Search position	2_POINT
	Alignment pattern	A
	Position of first line	EDGE
	Adjust mode (First line)	T_ADJ
	Adjust mode (Subsequent)	T_ADJ
	θ-divided alignment	YES
	Targets exist with street	1_BY_1
CH2	Search position	NO
	Alignment pattern	AB
	Position of first line	EDGE
	Adjust mode (First line)	T_ADJ
	Adjust mode (Subsequent)	Y_ADJ
	θ-divided alignment	NO
	Targets exist with street	1_BY_1

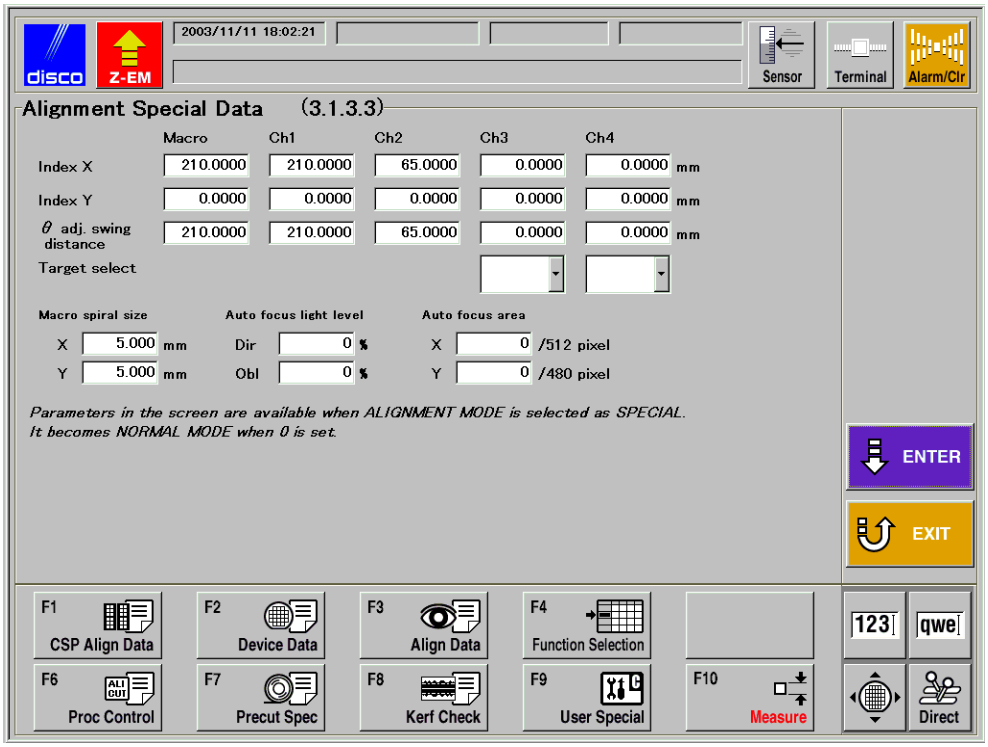
DEVICE DATA screen [screen 3.1.2]



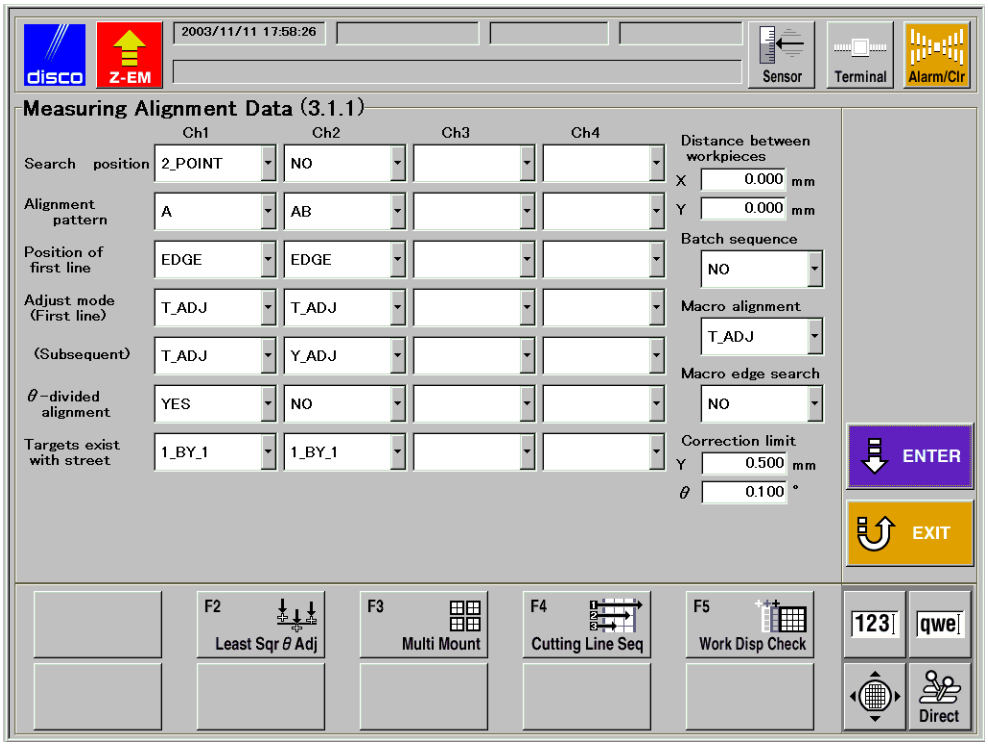
ALIGNMENT DATA screen [screen 3.1.3]



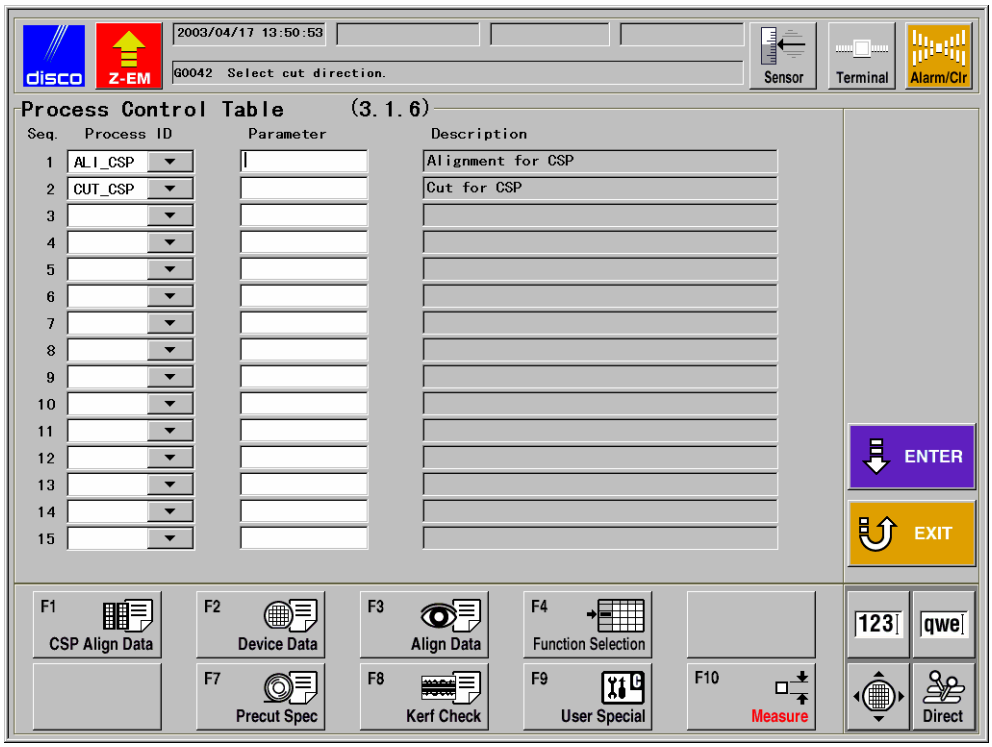
ALIGNMENT SPECIAL DATA screen [screen 3.1.3.3]



MEASURING ALIGNMENT DATA screen [screen 3.1.1]

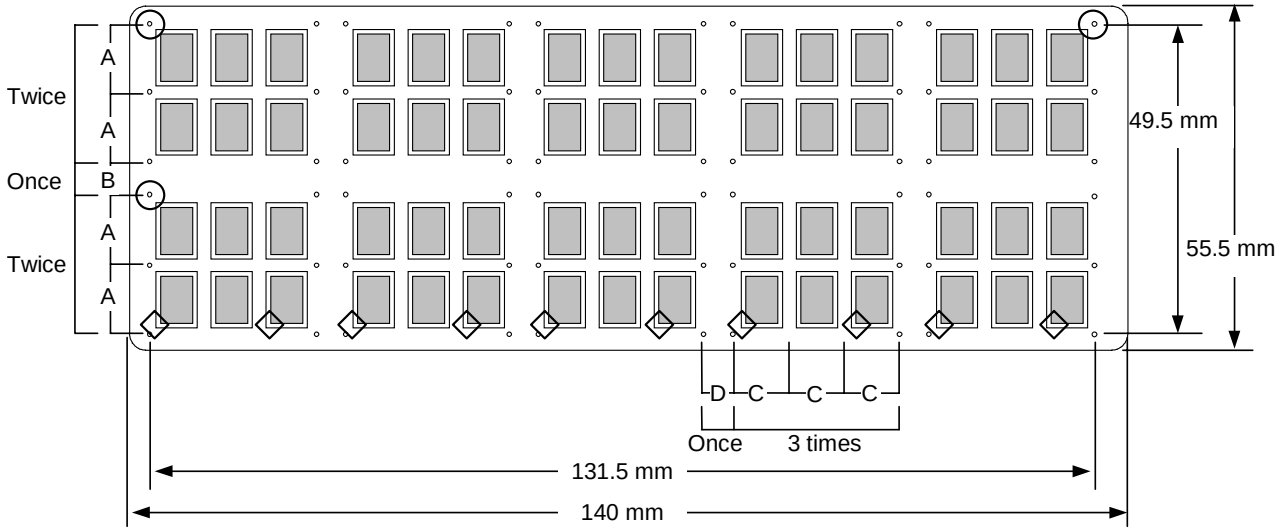


PROCESS CONTROL TABLE screen [screen 3.1.6]



5-1-2. Multiple index

Cutting data explanation



○: CH1 alignment position
◇: CH2 alignment position

Index	CH1	:	11.0 mm x 2
		:	5.5 mm x 1
	CH2	:	7.3 mm x 3
		:	5.5 mm x 1
Workpiece thickness		:	1.0 mm

Cutting condition

The cutting condition example of each channel is shown below:

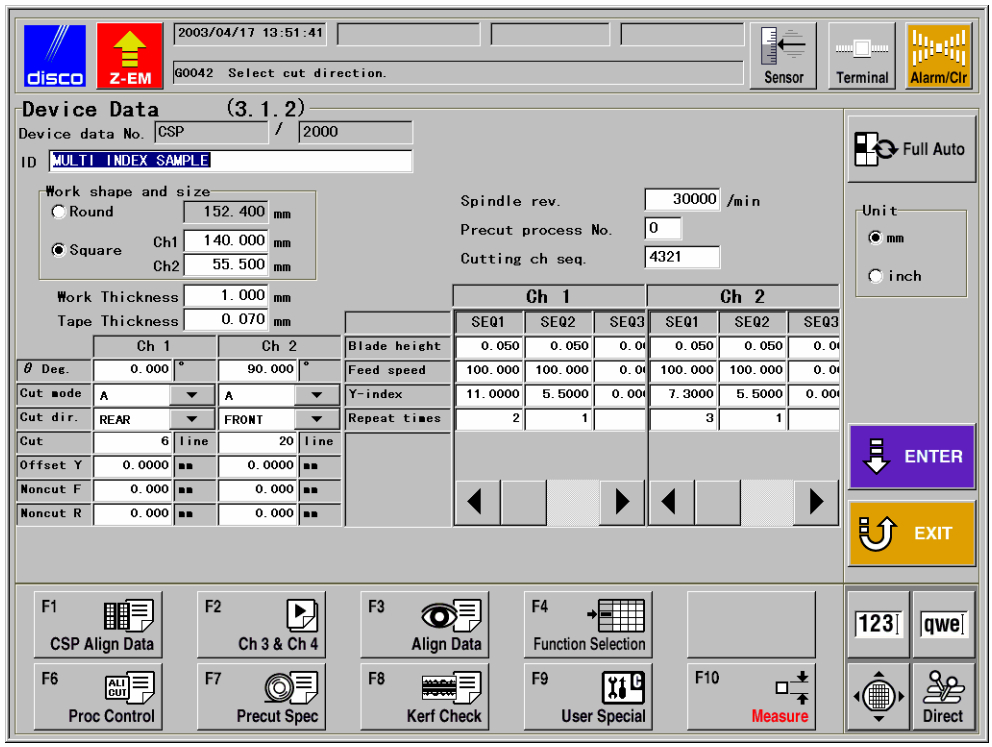
	Item	Setting Value
CH1	Cut direction	REAR
	Cut lines	6 lines
	Blade height	0.050 mm
	Feed speed	50.000 mm/s
	Index	27.500 mm (11.500 mm x 2 + 5.5000 mm)
CH2	Cut direction	FRONT
	Cut lines	20 lines
	Blade height	0.050 mm
	Feed speed	50.000 mm/s
	Index	27.400 mm (7.300 mm x 3 + 5.500 mm)

Alignment condition

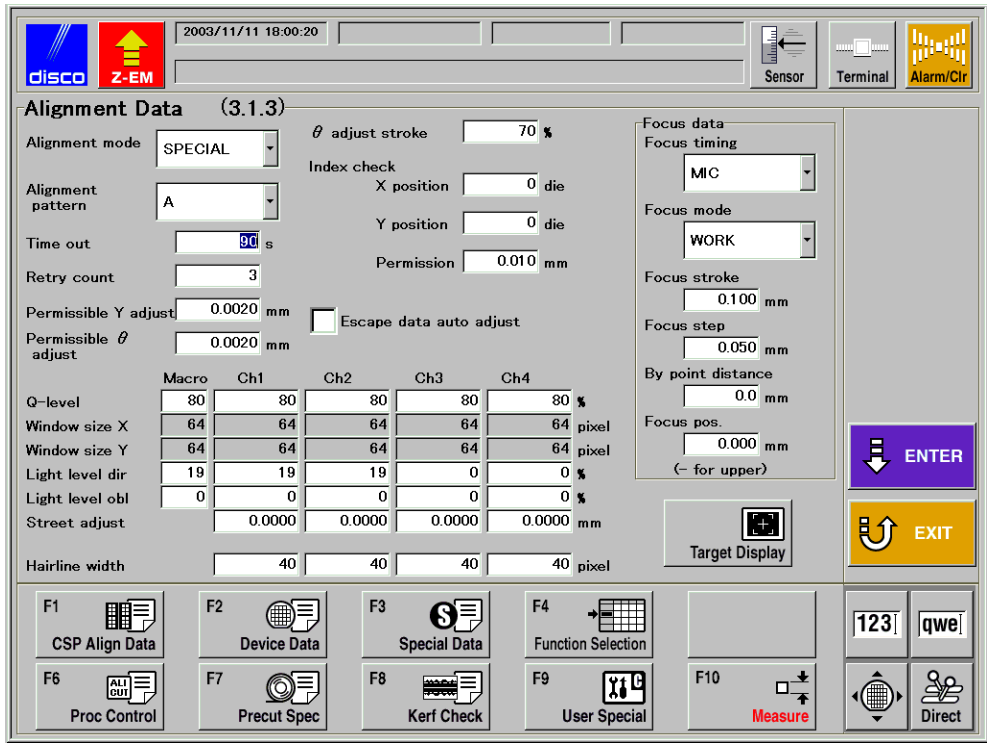
The alignment condition example of each channel is shown below:

	Item	Setting Value
CH1	Search position	1_POINT
	Alignment pattern	A
	Position of first line	EDGE
	Adjust mode (First line)	T_ADJ
	Adjust mode (Subsequent)	Y_ADJ
	θ-divided alignment	NO
	Targets exist with street	1_BY_1
CH2	Search position	2_POINT
	Alignment pattern	A
	Position of first line	EDGE
	Adjust mode (First line)	Y_ADJ
	Adjust mode (Subsequent)	Y_ADJ
	θ-divided alignment	NO
	Targets exist with street	BETWEEN

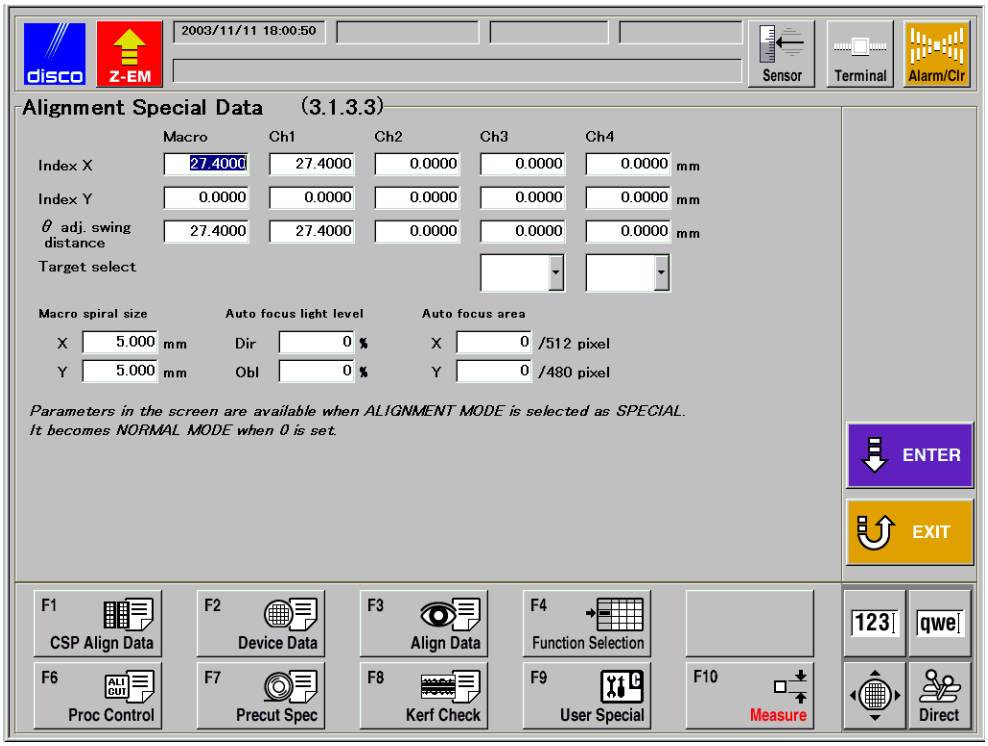
DEVICE DATA screen [screen 3.1.2]



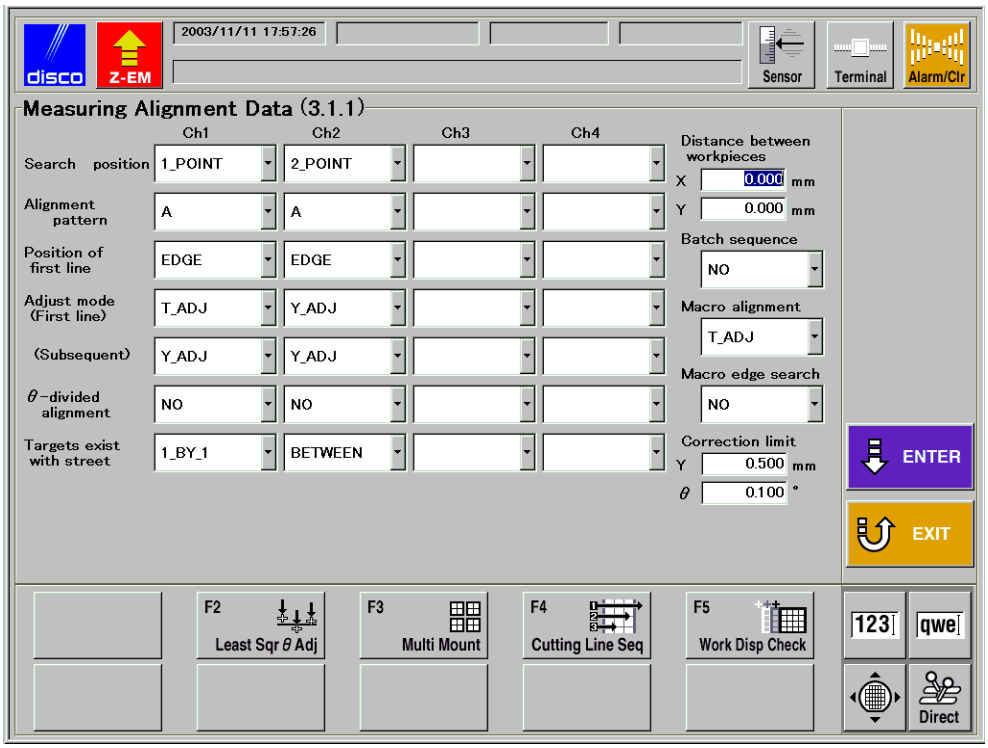
ALIGNMENT DATA screen [screen 3.1.3]



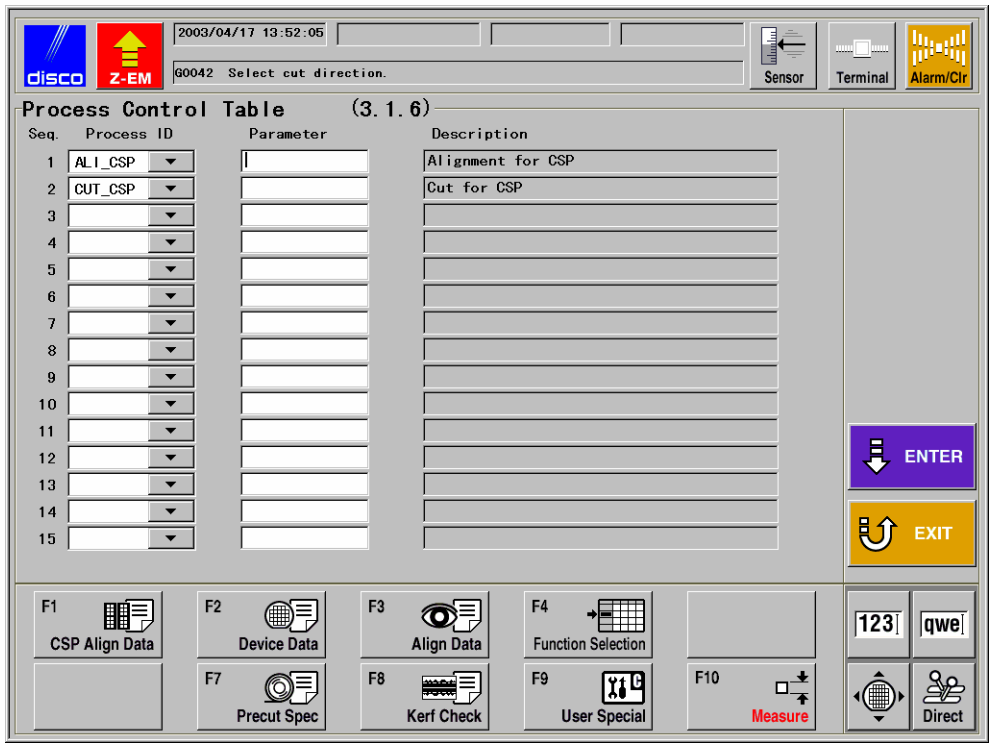
ALIGNMENT SPECIAL DATA screen [screen 3.1.3.3]



MEASURING ALIGNMENT DATA screen [screen 3.1.1]



PROCESS CONTROL TABLE screen [screen 3.1.6]



5-1-3. Clean cutting and depth-step cutting

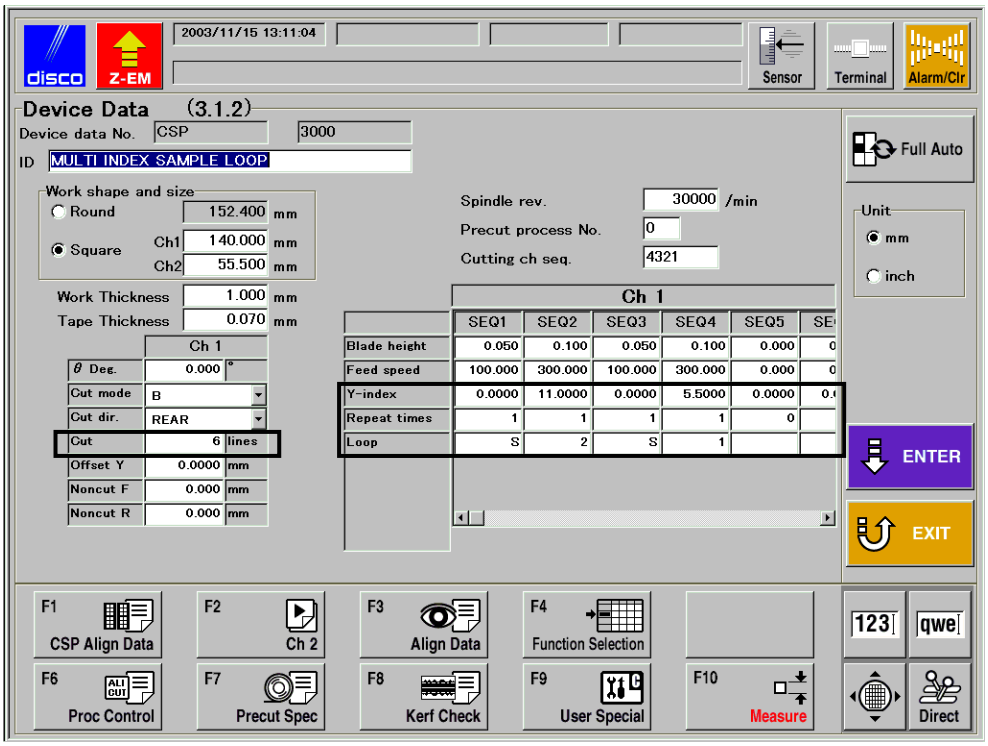
Outline

Clean cutting is a way of cutting that the X-axis returns on the line cut with a higher or the same blade height using the B cutting mode. In this case, the movement for return is not counted as a cut line. The loop function enables the data setting for the clean cutting.

On the CSP workpieces, depth-step cutting and the loop function. When the loop function is used, a way of data setting for measurement alignment differs a little. The next section explains an example data setting for depth-step cutting and the loop function, using the data shown in section 5-1-2, [Multiple index]. Other data than the figure below is the same as of section 5-1-2.

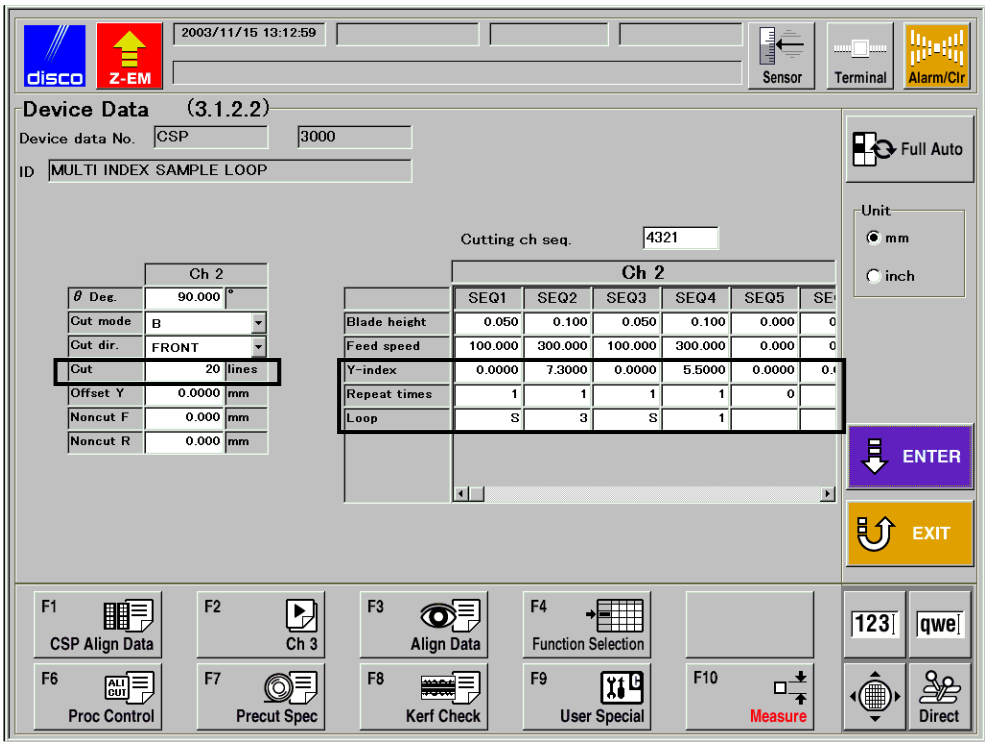
Data setting for the loop function - CH1 (DEVICE DATA screen [screen 3.1.2])

The screen below shows an example data for clean cutting.

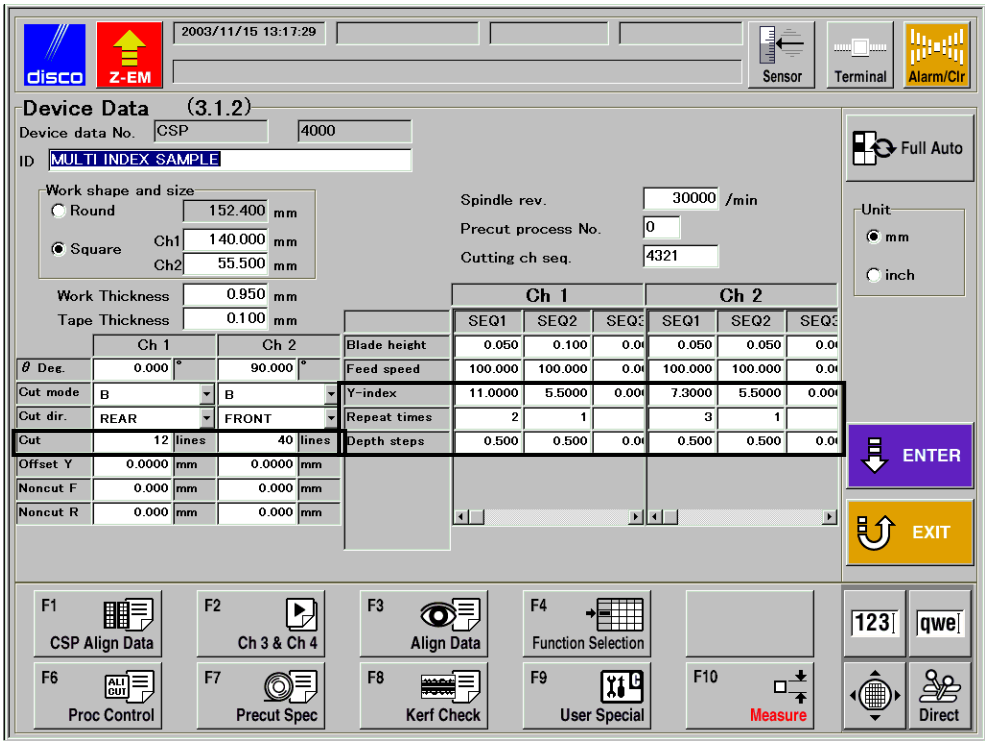


If "2_POINT" is selected for the "Search position" column on the MEASURING ALIGNMENT DATA screen [screen 3.1.2], measurement is performed according to the value set in the "Repeat times" column. In case that the loop function is used, however, the range between "S" and a value" in the "Loop" columns is regarded as an index. Therefore, measurement is performed based on the value set in the "Loop" columns.
If "ALL" is selected for the "Search position" column, measurement will not be done on the position where "0" is set for the "Y-index" column.

Data setting for the loop function - CH2 (DEVICE DATA screen [screen 3.1.2])



The screen below shows an example data for depth-step cutting.



In case of depth-step cutting, the number of cut lines should be entered in the device data. In the above screen, there are six cut lines in CH1, therefore, the value in the "Cut" column is "12" due to return cutting use.

The measurement positions are the same as the case that the depth-cutting is not used. The number of depth-step cutting is regarded as a measurement line, not using the value specified in the "Cut" column.

5-1-4. Notice for device data entry

Notice for device data entry

This section explains the points different from the standard machine regarding device data entry and notice for entry.

Summary of this section

Section No.	Title
5-1-4-1	Notice 1 - Kerf check timing
5-1-4-2	Notice 2 - Alignment direction and cutting direction
5-1-4-3	Notice 3 - Invalid alignment data

5-1-4-1. Notice 1 - Kerf check timing

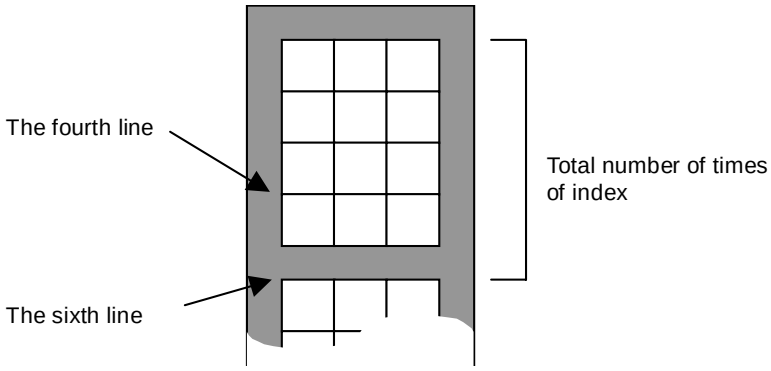
Notice 1

In this special specification, regardless of the multi index use, the kerf check will be done on the lines where the kerf check is to be done. (Cutting will not continue until the cutting for each index terminates.)

Therefore, when using workpieces that do not have targets on every line, target check may not be done normally depending on the kerf-check timing.

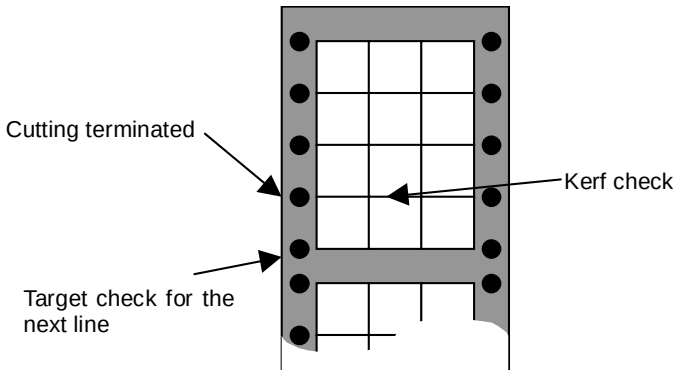
Sample of notice 1

The condition for this explanation is that “KERF_TARGET” is selected for the item “Check mode” on the KERF CHECK DATA screen [screen 3.1.8], and that cutting is conducted subsequently from the workpiece rear shown below.
Cutting starts, and now, it is the time for kerf check on the fourth line.
The fourth line is in the middle of sub index, but in this special specification, kerf check will be done. (In the standard specification, kerf check will be done after the sixth line is cut.)



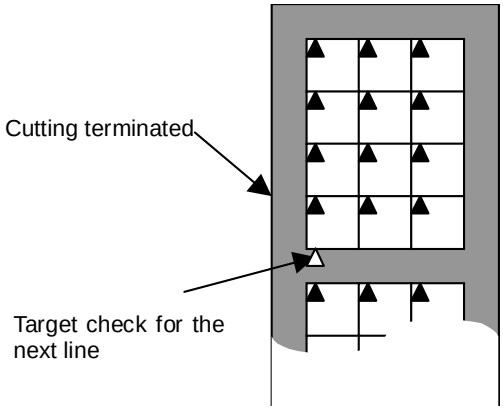
[When every line has the target;]

After the fourth line is cut, target check for the fifth line will be done. And then, kerf check for the fourth line will be done.



[When not every line has the target;]

After the fourth line is cut, target check for the fifth line will be done. As the target for the fifth line does not exist, however, an error occurs.
If “KERF” is selected for item, “Check mode” on the KERF CHECK DATA screen [screen 3.1.8], the kerf check will normally be done, and the target check will not be done.



5-1-4-2. Notice 2 - Alignment direction and cutting direction

Notice 2

The cutting direction can be specified on the DEVICE DATA screen [screen 3.1.2, etc.]. However, the CSP alignment direction is always fixed to “FRONT (from the rear to the front of the machine).”

Therefore, when placing a workpiece onto the chuck table, set it so that the first line of each channel comes to the rear side of the machine.

Even in this special specification, items, “Offset Y” on the DEVICE DATA screen [screen 3.1.2, etc.] is subject to the specified “Cut direction”, and “Noncut F/R” is subject to the specified Y-axis direction. This is the same as the standard specification.

5-1-4-3. Notice 3 - Invalid alignment data

Notice 3

When using this special specification, the following items are invalid on the ALIGNMENT DATA screen [screen 3.1.3]:

- "Alignment pattern"
  Specify the pattern for each channel on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].

- "Y adjust permission" and "θ adjust permission"
  Substitute the value in item “Correction limit (Y/θ)” on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].

- "Index check (X position/Y position/Permission)"
  These items are invalid in this specification because street adjustment is not performed in the final stage of micro alignment.

5-2. Teaching

Summary of this section

This section explains the different or added teaching operations from/to the standard specification.

Section No.	Title	Contents
5-2-1	Macro B target teaching	Explains the additional operations for this special specification.
5-2-2	Micro B target teaching	Explains the additional operations for this special specification.
5-2-3	Notice for teaching	Shows the notices and restrictions on teaching specific to this special specification.

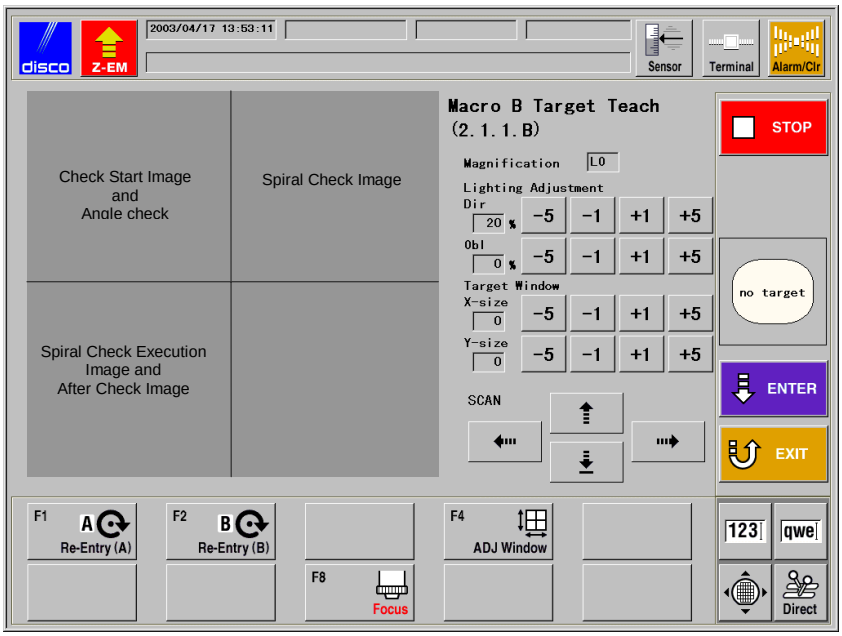
5-2-1. Macro B target teaching

About macro B target teaching

This is the operation that is additionally necessary when “ABMacro” is selected for item, “Macro alignment” on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
After the usual macro target teaching (macro A target teaching) operation is finished, register the right-side target (B target) for θ alignment.

Procedures for macro B target teaching

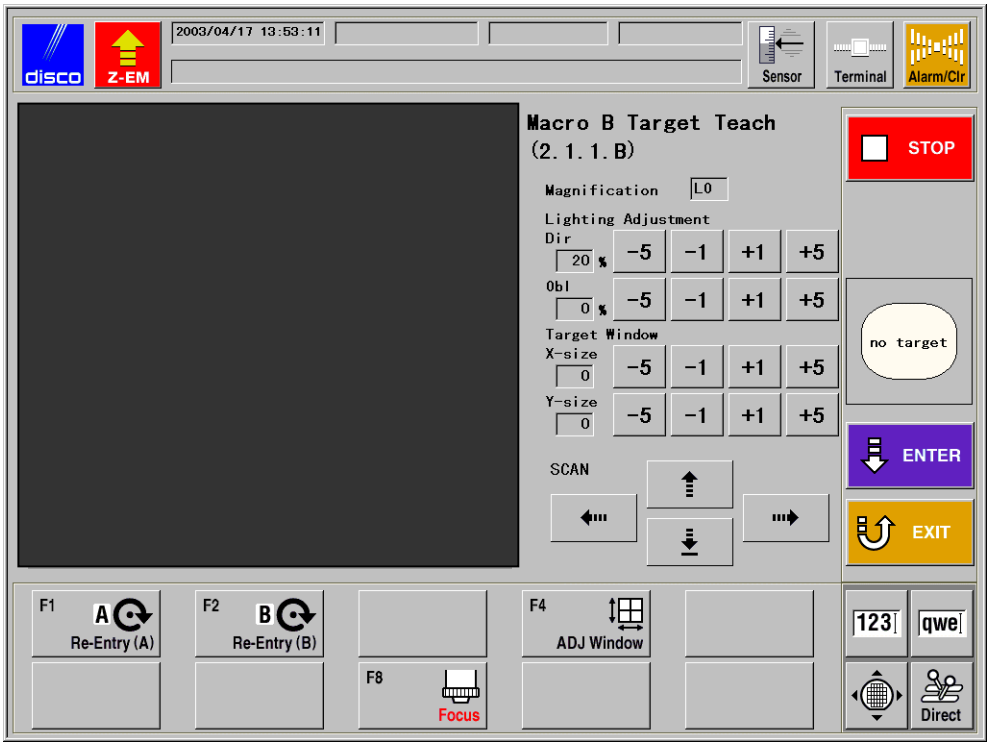
After the macro target teaching (macro A target teaching) is finished, the axes move automatically so that the right-side macro target for θ alignment comes under the microscope. After that, operations for macro B target teaching are additionally necessary.

Step No.	Procedure
1	Adjust the focus on the FOCUS ADJUSTMENT screen.
2	Select a unique target pattern. - The Y-axis cannot be moved here. - The θ alignment cannot be performed here. Therefore, conduct the θ alignment precisely when the macro A target teaching.
3	Press the <ENTER> button. - After the spiral check operation, the machine starts the index check operation.
4	The check results performed in step 3 are displayed on the screen.  When the results of the spiral/index checks are favorable, press the <ENTER> button. - The magnification of the microscope automatically changes to micro (high-magnification). - The machine proceeds to the micro target teaching operation.

MACRO B TARGET TEACH screen [screen 2.1.1.B]

To call up the MACRO B TARGET TEACH screen [screen 2.1.1.B], press the <ENTER> button on the MARCO TARGET TEACH screen [screen 2.1.1] after the macro A target teaching operation is finished.

[Screen]



[Function Button]

Press	To	
F1	Returns to the MACRO TARGET TEACH screen [screen 2.1.1] to perform the macro A target teaching operation again.	
F2	Performs the macro B target teaching operation again.	
F3	Unused	
F4	Calls up the TARGET WINDOW ADJUSTMENT screen.	
F5	Unused	
F6	Unused	
F7	Unused	
F8	Calls up the FOCUS ADJUSTMENT screen. You can adjust the microscope focus variously depending on the way of pressing the <F8> button.	
	Press it once.	Calls up the FOCUS ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic focusing.
F9	Unused	
F10	Unused	

[<ENTER> Button]

Press	To
ENTER	Starts the target teaching operation (including the spiral/index checks). Proceeds to the next screen. Press this button according to the guidance message.

5-2-2. Micro B target teaching

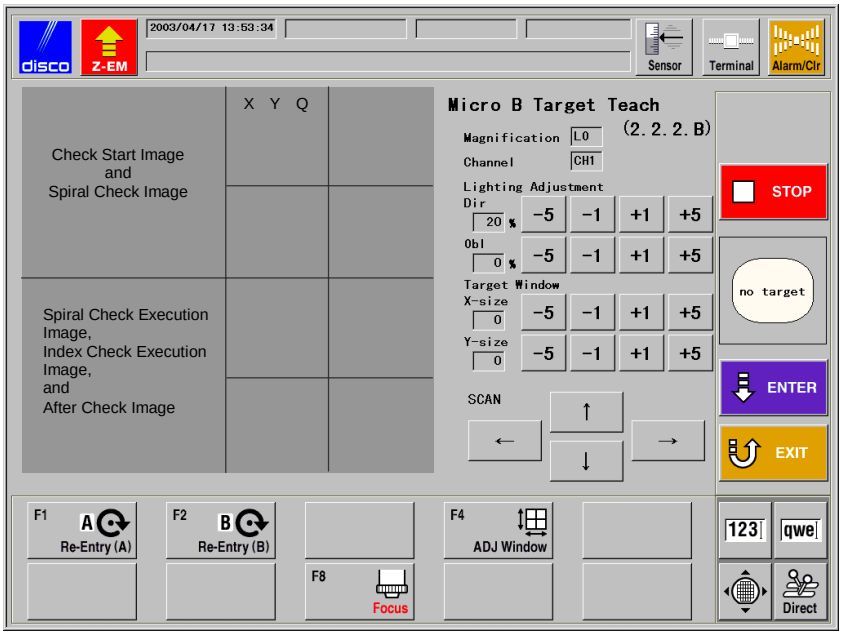
About micro B target teaching

This is the operation that is additionally necessary when “AB” is selected for item, “Alignment pattern” on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].
After the usual micro target teaching (micro target A teaching) operation is finished, the right-side target (B target) for θ alignment will be registered.

Procedures for micro B target teaching

After the micro target teaching (micro A target teaching) is finished, the axes move automatically so that the right-side micro target for θ alignment comes under the microscope. After that, the operations for micro B target teaching are additionally necessary.

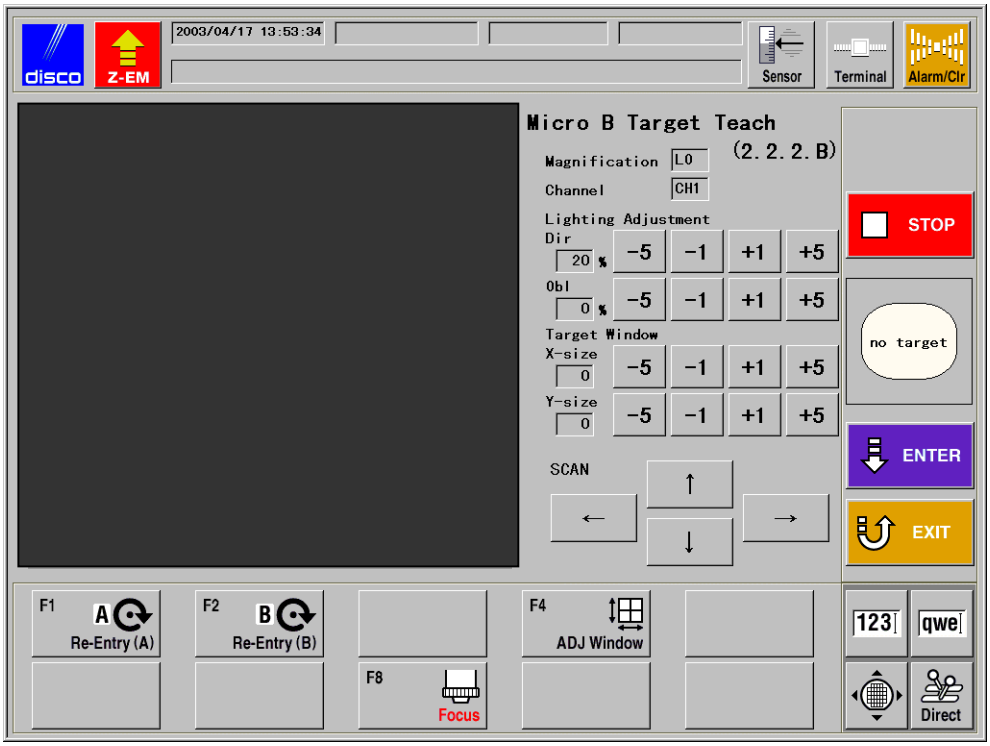
Step No.	Procedure
1	Adjust the focus on the FOCUS ADJUSTMENT screen.
2	Select a unique target pattern that has many Y-direction elements. - The Y-axis cannot be moved here. - The θ alignment cannot be performed here. Therefore, conduct the θ alignment precisely when the micro A target teaching.
3	Press the <ENTER> button. - After the spiral check operation, the machine starts the index check operation.

Step No.	Procedure
4	The check results performed in step 3 are displayed on the screen.  When the results of the spiral/index checks are favorable, press the <ENTER> button. - The MICRO STREET ADJUST screen [screen 2.1.3] is automatically displayed. - The machine proceeds to the micro street adjustment operation for the current channel.

MICRO B TARGET TEACH screen [screen 2.2.2.B]

To call up the MICRO B TARGET TEACH screen [screen 2.2.2.B], press the <ENTER> button on the MICRO TARGET TEACH screen [screen 2.1.2] after the micro A target teaching operation is finished.

[Screen]



[Function Button]

Press	To	
F1	Returns to the MICRO TARGET TEACH screen [screen 2.1.2] to perform the micro A target teaching operation for the current channel again.	
F2	Performs the micro B target teaching operation for the current channel again.	
F3	Unused	
F4	Calls up the TARGET WINDOW ADJUSTMENT screen.	
F5	Unused	
F6	Unused	
F7	Unused	
F8	Calls up the FOCUS ADJUSTMENT screen. You can adjust the microscope focus variously depending on the way of pressing the <F8> button.	
	Press it once.	Calls up the FOCUS ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic focusing.
F9	Unused	
F10	Unused	

[<ENTER> Button]

Press	To
ENTER	Starts the target teaching operation (including the spiral/index checks). Proceeds to the next screen. Press this button according to the guidance message.

5-2-3. Notice for teaching

Notice for teaching

This section describes the notices and restrictions specific to this special specification.

Macro target teaching

There is no restriction about macro target teaching. However, it is recommended to perform macro target teaching at the position close to where the CH1 micro target teaching will be performed in order to shorten the time for alignment.

Micro target teaching

Perform the target teaching and street adjustment on the line specified in “Adjust mode (First line)” on the MEASURING ALIGNMENT DATA screen [screen 3.1.1].

[When “Adjust mode (First line)” is set to “EDGE”;]

Be sure to use the rearmost street and corresponding target.

[When “Adjust mode (First line)” is set to “CENTER”;]

Use the street and target that are located near the center of the workpiece in the Y-direction. The target far apart from the center is acceptable, but the time for alignment will be prolonged.
Be sure to perform street adjustment on the street corresponding to the entered target. (For example, do not perform street adjustment at the rear side of the workpiece when performing target teaching in the center of the workpiece.)

Whichever mode is selected, to secure accuracy, it is recommended to conduct the target teaching near the street. This is because the measured result is not reflected to the distance between the target and the street, as measuring alignment is done based on the target position.

5-3. Workpiece Position Measurement Function (MEASURE 2)

About workpiece position measurement function

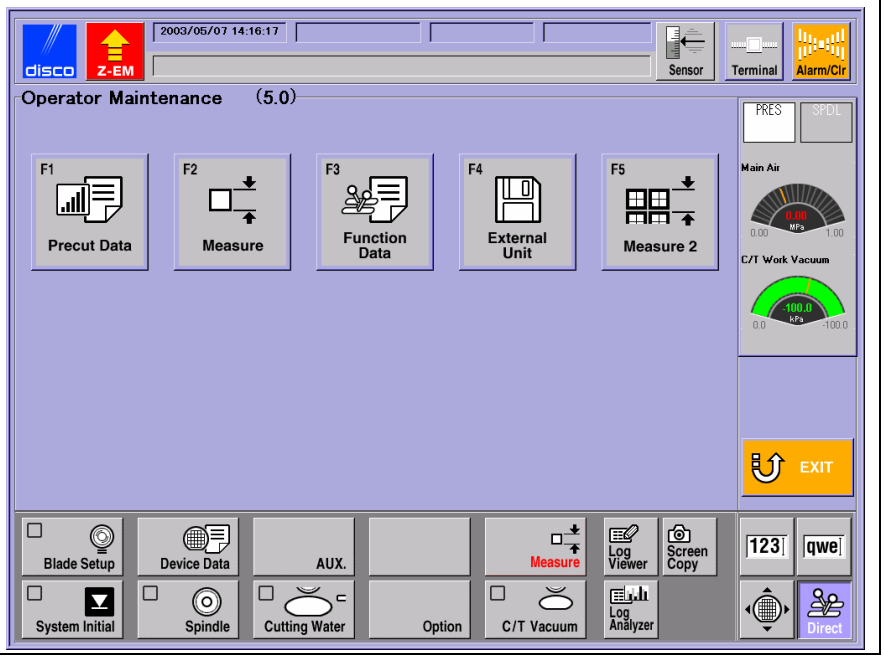
This is a function to measure the workpiece positions, which are entered on the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3].
This function figures out the workpiece mounting positions and the distance from the center of the chuck table.

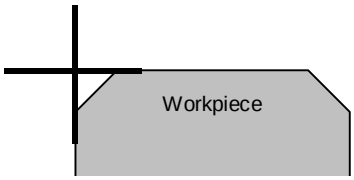
Safety items for workpiece position measurement function

WARNING

When the workpiece is to be removed during measurement operation, if your fingers or hands brought close to any moving part, they may be caught or cut off.
Check to ensure that all axes stop and then remove the workpiece.

Procedures for measuring the workpiece positions

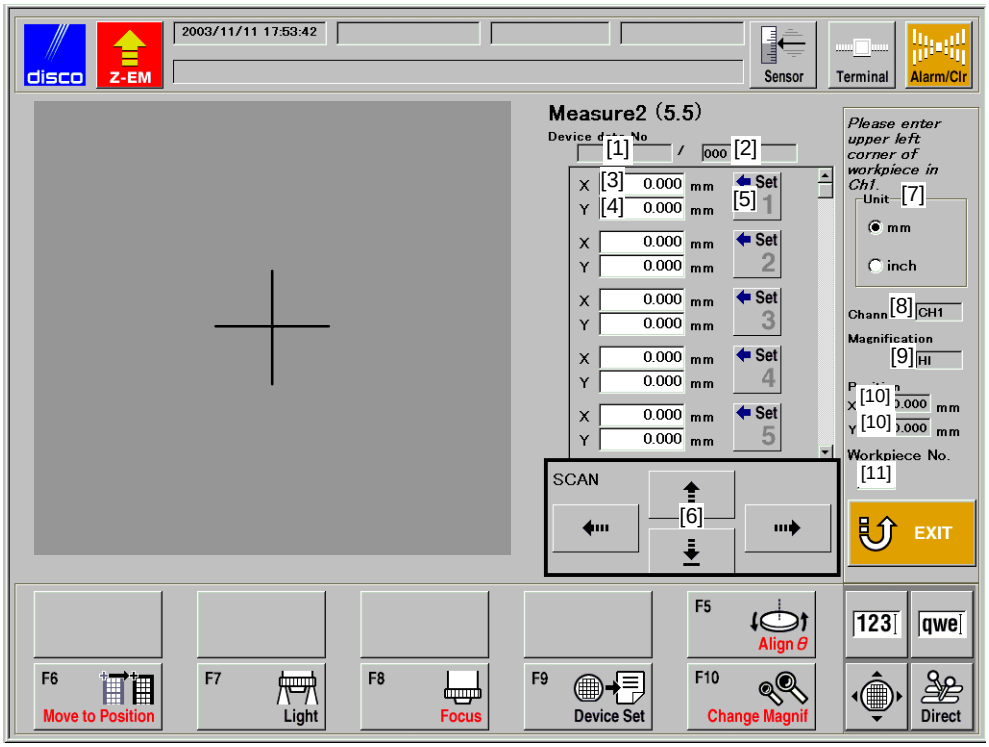
Step No.	Procedure
1	Place the workpiece onto the chuck table.
2	Confirm that the chuck table vacuum system is turned on. If not, turn it on by pressing the <C/T VAC> button on the operation panel.
3	Press the <F5> button on the OPERATOR MAINTENANCE screen [screen 5.0]. 

Step No.	Procedure
3 (Cont'd)	- The <F5> button is added on the OPERATOR MAINTENANCE screen [screen 5.0]. - The chuck table moves to the position under the microscope. - The MEASURE 2 screen [screen 5.5] is called up. - If the <EXIT> button is pressed on the MEASURE 2 screen [screen 5.5], the registered data will be invalid and the display returns to the OPERATOR MAINTENANCE screen [screen 5.0].
4	If necessary, press the <F7> button to adjust the light intensity, or press the <F8> button to adjust focus. - For lighting/focus adjustment, see the Data Maintenance Manual.
5	Execute the θ alignment by pressing the <F5> button. - See the Operation Manual for θ alignment operation.
6	Move the X- and Y-axes with the axis control buttons so that the workpiece upper left corner comes to the intersection of the cross joint on the screen. - If the workpiece has no corner, place it on the screen as shown in the figure below. 
7	Press the <SET*> button. - "*" means numbers from 1 to 9. Press the <SET1> button for the workpiece No.1, and <SET2> for No.2. - The current X/Y positions (relative positions from the center of the chuck table) are entered into [8] and [9].
8	Repeat steps 6 and 7 for each workpiece.

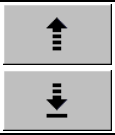
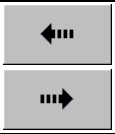
MEASURE 2 screen [screen 5.5]

The MEASURE 2 screen [screen 5.5] is used to measure the workpiece position by using the microscope images and cross-line.
This screen is displayed by pressing the <F5> button on the OPERATOR MAINTENANCE screen [screen 5.0], or pressing the <F10> button on the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3].

[Screen]



[Setting Item]

Item No.	Description
[1]	Indicates the directory of the device data.
[2]	Indicates the device data No.
[3][4]	When you press the <Set> button of [5], the coordinates of the axis that are displayed at [10] are indicated at [3] and [4] as finalized data.
[5]	After determining the measurement points by moving the axes with axis operation button, press this <Set> button of [5]. Then, the coordinates of the axis that are displayed at [10] are indicated at [3] and [4] as finalized data.
[6]	Moves the axis to the direction of the arrow.
	 The Y-axis (microscope) moves back and forth. The image moves up and down.
	 The chuck table moves to the left and right. The image also moves to the left and right.
[7]	Select the unit (inch/mm).

[Setting Item]

Item No.	Description
[8]	Indicates the current channel.
[9]	Indicates the current magnification of the microscope.
[10]	Indicates the current axis positions.
[11]	Specify the No. to which you want to move the axis and microscope image. These Nos. are specified in the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3]. To execute movement, press the <F6> button.

[Function Button]

Press	To	
F1	Unused	
F2	Unused	
F3	Unused	
F4	Unused	
F5	Performs automatic X-axis scanning and selects θ-angle adjustment. This does not initiate automatic θ alignment function execution.	
F6	Moves the workpiece to the position of the No. specified as "Workpiece No.".	
F7	Calls up the LIGHTING ADJUSTMENT screen. You can adjust the light intensity variously depending on the way of pressing the <F7> button.	
	Press it once.	Calls up the LIGHTING ADJUSTMENT screen.
	Press it for one second or more.	Carries out the automatic light intensity adjustment of direct light.
	Press it for one second or more, then once more.	Carries out the automatic light intensity adjustment of oblique light.
	Press it for one second or more, then twice more.	Carries out the automatic light intensity adjustment of direct and oblique light.
F8	Calls up the FOCUS ADJUSTMENT screen. You can adjust the microscope focus variously depending on the way of pressing the <F8> button.	
	Press it once	Calls up the FOCUS ADJUSTMENT screen.
	Press it for one second or more	Carries out the automatic focusing.
F9	Register the values set at [3] and [4] to the device data displayed at [1] and [2]. The registered data are displayed in the MULTIPLE MOUNTING DATA screen [screen 3.1.1.3].	
F10	Switches the microscope magnification (high/low).	