OUT Measurement Setting

■ Flow of OUT measurement setting

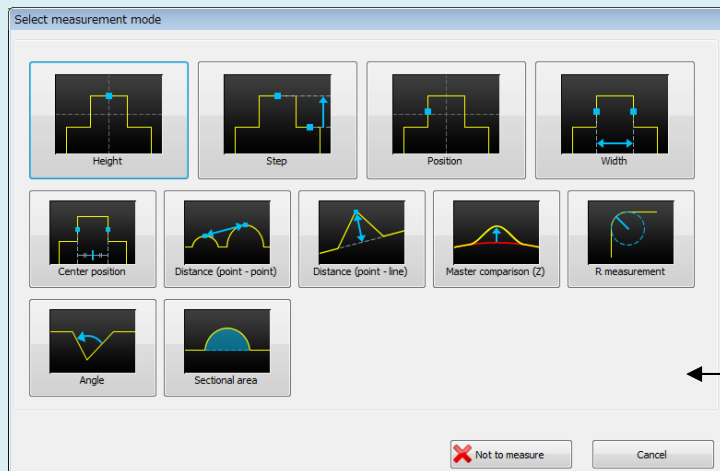1. Select the measurement mode (1) based on what to measure in the profile.

2. Specify the measurement target area (2) and measurement target (3).

3. Set such items as the measurement value filter, scaling, hold mode, and tolerance for the measurement value acquired (4).

2

1

Select measurement mode

|			
Height	Step	Position	Width
Center position	Distance (point - point)	Distance (point - line)	Master comparison (Z)
R measurement			
Angle	Sectional area		

Not to measure   Cancel

* Selectable measurement modes differ depending on the ON/OFF batch measurement, ON/OFF compression (time axis), and head installation conditions when 2 heads are used.

3

Edge	Peak	Bottom	Flexion point
Intsec (lines)	Contact (lin-ar)	Center of circle	
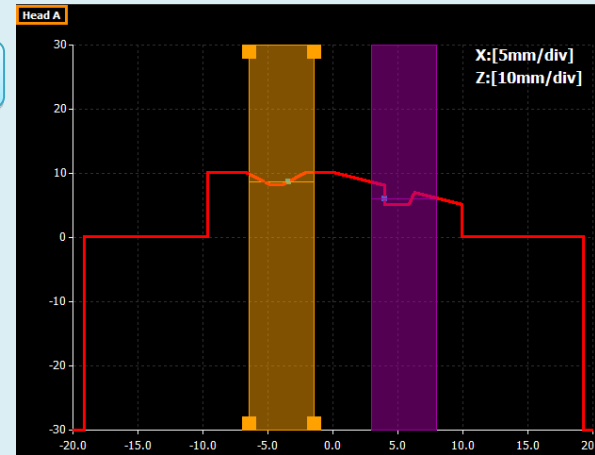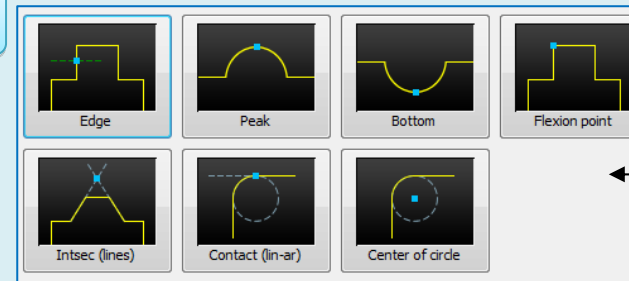
* Selectable measurement targets differ depending on the measurement mode.

4

Measurement | Process

Measurement process Set
- No. of hold measure val   1   times
- Measure value filter   Moving average
- Averaging times   16
-                              Scaling setting
- Offset   0.000   mm
- ZERO reference value   0.000   mm
- Hold mode   Normal
- Measurement period   Period setting

Tolerance setting
- Upper limit   25.000   mm
- Lower limit   -25.000   mm
- Hysteresis   0.000   mm

Terminal allocation
- ZERO terminal   ZERO1
- TIMING/RESET terminal   TIMING1/RESET1

OUT Measurement Setting

■ **Measurement target area**

Measurement targets are detected from profile data in this area.
There are two methods for specifying a measurement target area.

- Move the right/left edges of the area with the mouse cursor. (1)
- Enter X coordinates for the right/left edges of the area to set. (2)

* Measurement processing does not include invalid profile data/
  dead zone data.

■ **Line calculation area/Arc calculation area**

Derive a proximate line or arc from profile data within this area
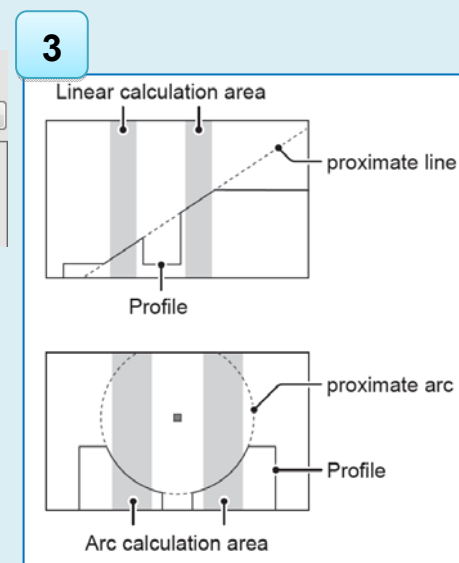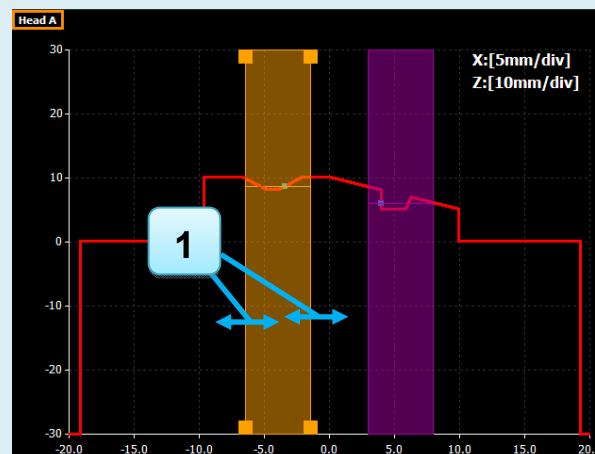by using the least squares method.
Derived proximate lines and arcs are used for such measurements as
intersection, angle, R, and sectional area.

Up to two calculation areas can be set.
Two areas are used when there is insufficient data to derive a stable
proximate line or arc due to such reasons as a divided profile shape (3).

Calculation areas can be set in the same way as measurement target areas.
* Proximate calculation does not include invalid profile data/dead zone data.

Head A

X:[5mm/div]
Z:[10mm/div]

1

2

Target head	Head A	
Measurement target	Peak	Setting...

Height measuring area
| Far left | 4.850 | mm |
| Far right | 9.850 | mm |

3

Linear calculation area

proximate line

Profile

proximate arc

Profile

Arc calculation area

OUT Measurement Setting

■ Measurement target

The following measurement targets are available: "edge, peak, bottom, average, knee, intersection (line-line), contact (line-arc), and center of circle".

* Selectable targets differ depending on the measurement mode.

* When compression (time axis) is ON, the following measurement targets are available:
"peak, bottom, mean value, edge, P-P (Z), P-P (X)".
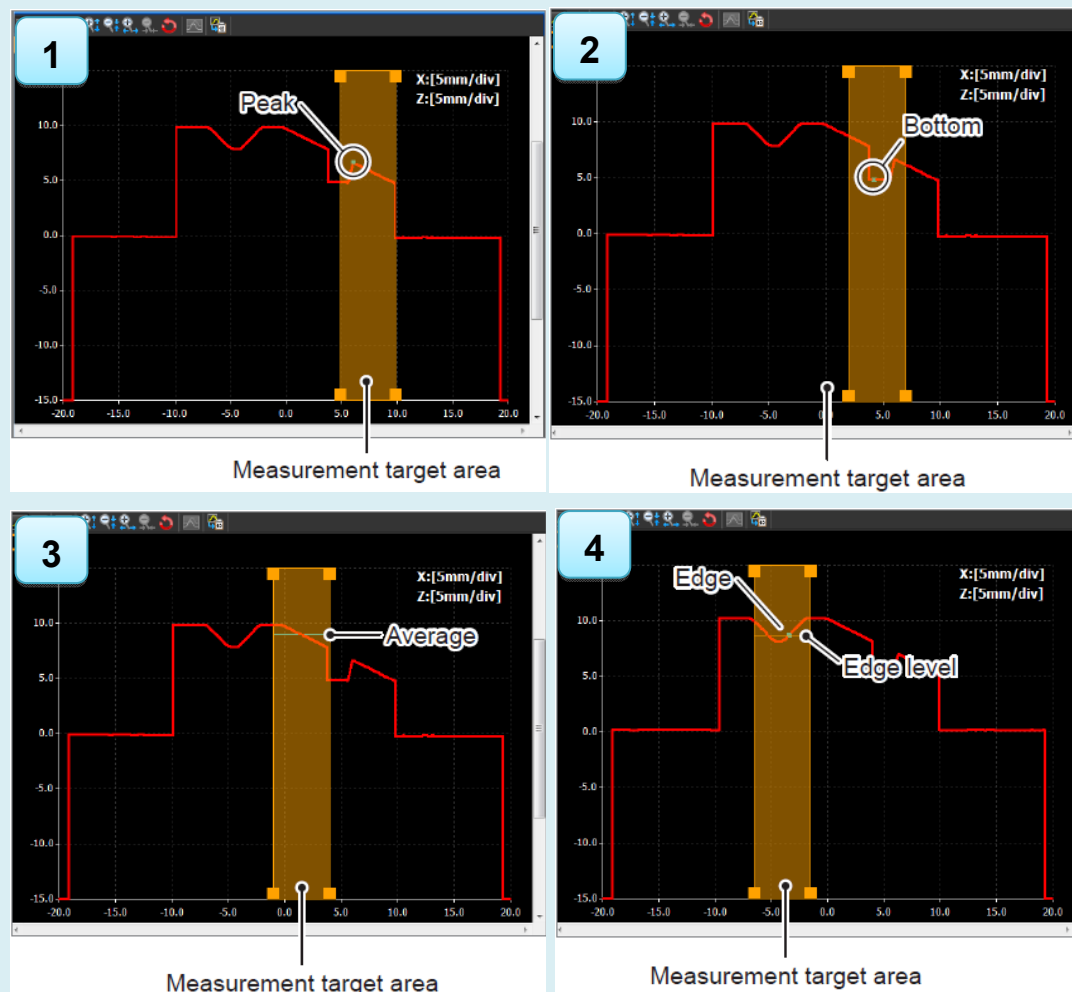
- When compression (time axis) is OFF

<Peak/Bottom> (1, 2)

Measures the maximum/minimum value of the profile in the measurement target area.

<Average> (3)

Measures the average value of the profile in the measurement target area.

<Edge> (4)

Measures the intersection (X coordinate) of the profile and edge level in the measurement target area.

1

Peak

X:[5mm/div]
Z:[5mm/div]

Measurement target area

2

Bottom

X:[5mm/div]
Z:[5mm/div]

Measurement target area

3

Average

X:[5mm/div]
Z:[5mm/div]

Measurement target area

4

Edge

Edge level

X:[5mm/div]
Z:[5mm/div]

Measurement target area

OUT Measurement Setting

<Knee>

Measures points at which the profile line bends.
Set the following items for this measurement.

[Sensitivity] (1)

A threshold value for determining to what extent to detect tilt
changes in the profile (the degree of bending).
When setting the sensitivity, a bending distribution of profile
data (sensitivity profile) is displayed. (2)
Set the sensitivity between 1 and 100, so that the sensitivity
profile of the point for detection exceeds the threshold value.

In the sensitivity profile, a peak rises greatly at points with a
greater degree of bending. Setting a peak detection threshold
value high prevents minor irregularities from being detected as
a knee and stably detects only clearly bent points.

* Only mounds are detected at changing points of "invalid data"
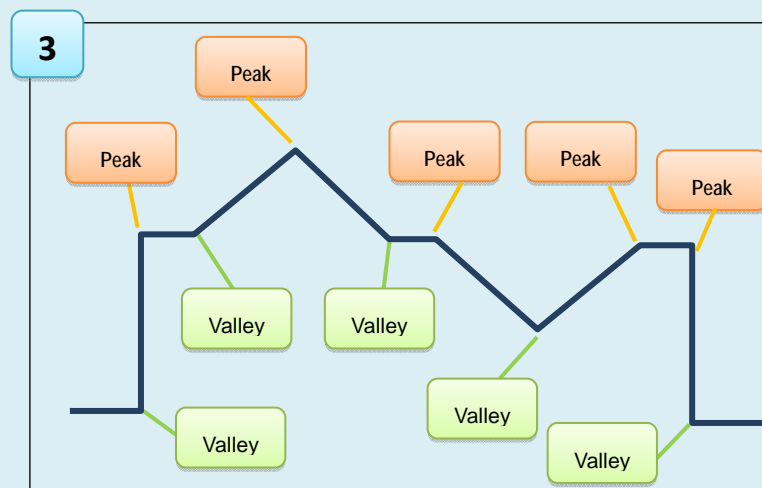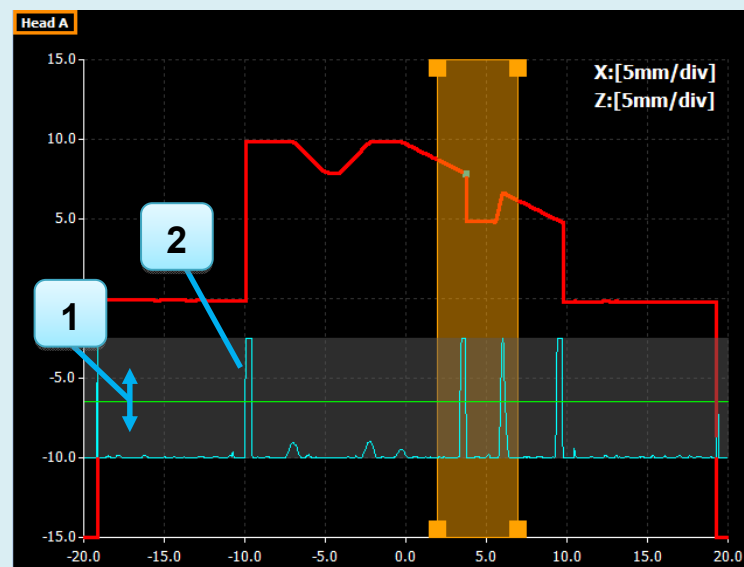<=> "valid data" or "dead zone data" <=> "valid data".

[Knee shape] (3)

Peak: A knee at which the profile tilt shifts to drop
Valley: A knee at which the profile tilt shifts to rise

[Detect direction/Detection No.]

Set what number knee from a specified direction to generate a measurement
result among knees detected in the measurement target area.
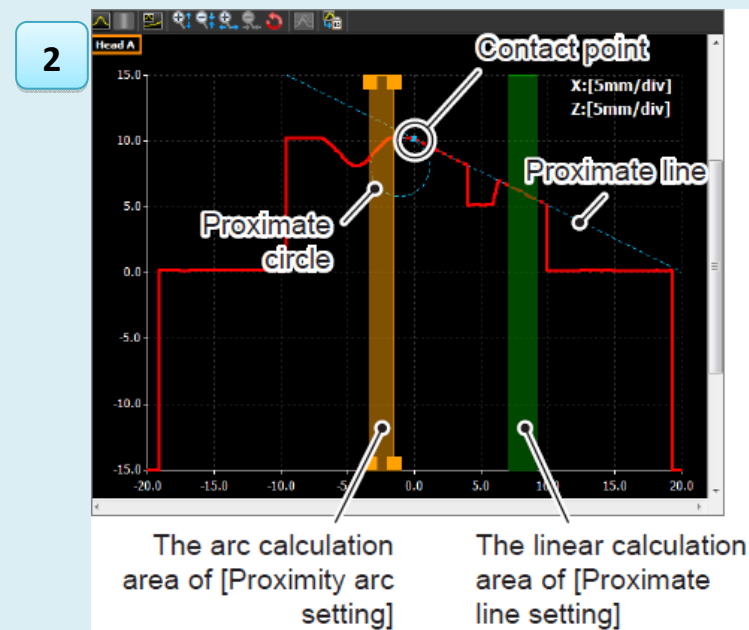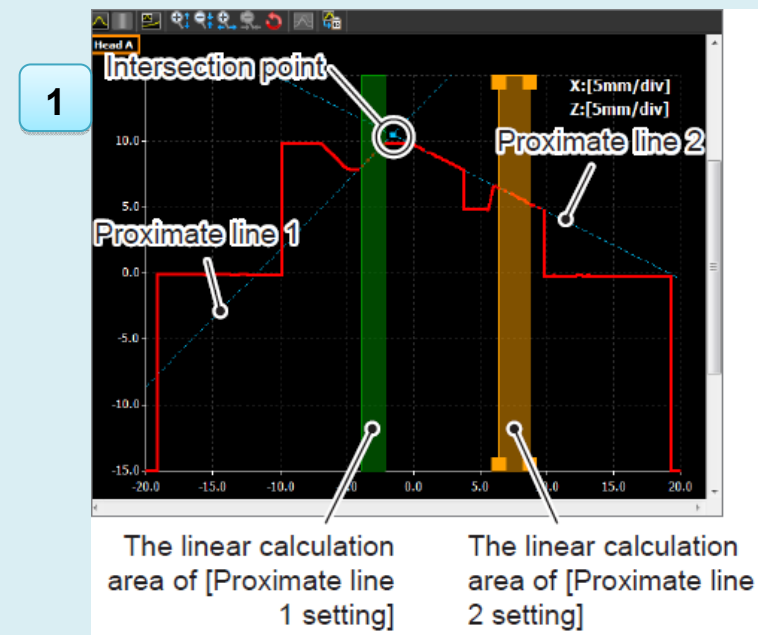
OUT Measurement Setting

<Intersection (line - line)> (1)

Measures the intersection of two proximate lines calculated from a profile
in the proximate line area.

<Contact (line - arc)> (2)

Measures a contact point of a proximate line and a proximate arc calculated from
a profile in a specified area.
A contact point refers to the perpendicular foot drawn from the center of the proximate
arc to the proximate line.

* "ALARM" (= measurement value alarm status) is output when
  a calculated contact point is a considerable distance from the proximate arc.

The linear calculation area of [Proximate line 1 setting]

The linear calculation area of [Proximate line 2 setting]

The arc calculation area of [Proximity arc setting]

The linear calculation area of [Proximate line setting]

OUT Measurement Setting

- When compression (time axis) is ON

Profile data compressed in the time-axis direction is divided into
"upper profile data" and "lower profile data".

<Peak> (1)

Measures the maximum data in the upper profile data within
the measurement target area.

<Bottom> (2)

Measures the minimum data in the lower profile data within
the measurement target area.
* In both measurements, a point on the smallest X coordinate is
  adopted when more than one (max. or min. value) are detected in the area.

<Mean value> (3)

Measures the average value from all data of "upper profile data"
and "lower profile data" in the measurement target area.

<Edge> (4)

Measures the intersection (X coordinate) of profile data and the edge
level within the measurement target area. Specify which to use between the upper and lower profile data.

<P-P (Z)> (5)

The difference in height between the results of "Peak" and "Bottom" above in the measurement target area.
This is used in "Deflection" measurement mode.

<P-P (X)> (6)

The difference in position (X coordinate) between "Edge" of the upper profile and "Edge" of the lower profile in the measurement target area.
This is used in "Deflection" measurement mode.
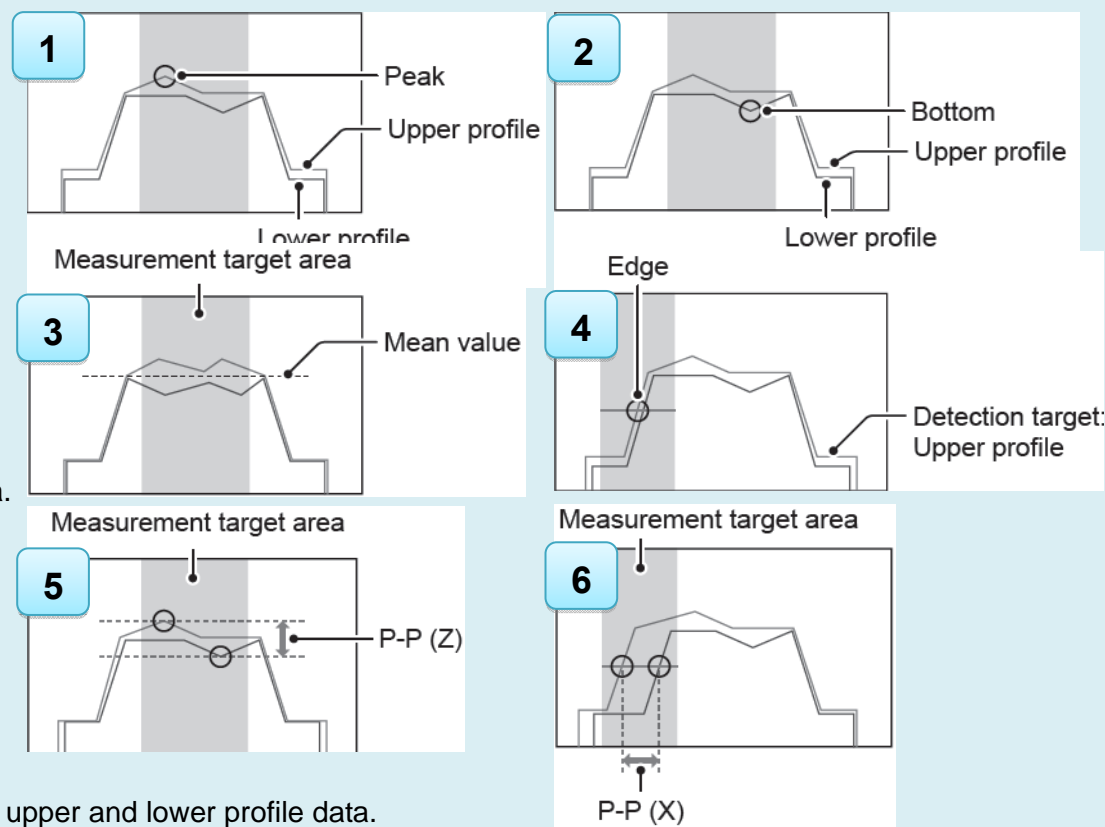
OUT Measurement Setting

■ Position correction selection (1)

Set whether each area traces position correction.
Either position correction 1 or 2 can be selected if position correction has been set in two areas.
Target areas can be measured correctly because the areas trace each workpiece even when misalignment/tilt changes occur independently on two workpieces.

Measurement	Process

OUT name OUT1

Measurement setting

Measure mode Height ▼ Mode sel.

Measurement mode detail

■ Measurement target   Pos. cor. select   **1**

Average   Pos. cor. ▼

Setting

Minimum display unit   0.001mm ▼

Height: 9.474 mm

<< OUT16	OUT2 >>	Return

🌐 OUT Measurement Setting

■ **Measurement mode**

Besides basic measurement modes such as height, step, position, width, center position, angle, the following modes can be selected.

<Distance> (1)

"Point – Point"
Measures the linear distance between two points in a profile.

"Point – Line"
Measures the perpendicular length from a point to a line.

* In both measurements, the measurement values are positive.

<Master comparison (Z)> (2)

Calculates the difference between a measured profile and master profile (compares the Z coordinates on the same X coordinate to calculate the absolute value of the difference between the Z coordinates) in the measurement target area to output the maximum value as a measured value. A measured value has a positive symbol if the measured profile is above the master profile and has a negative symbol if the measured profile is below the master profile. This is used for such purposes as shape judgment.

1

Peak
Proximate line

2

Master profile
Measurement profile
Measured value
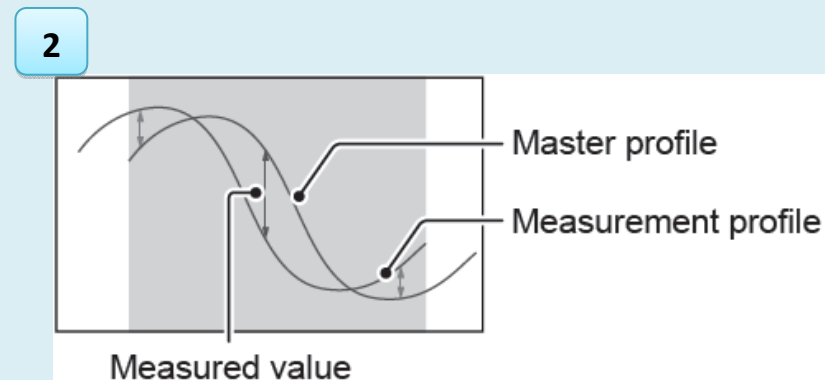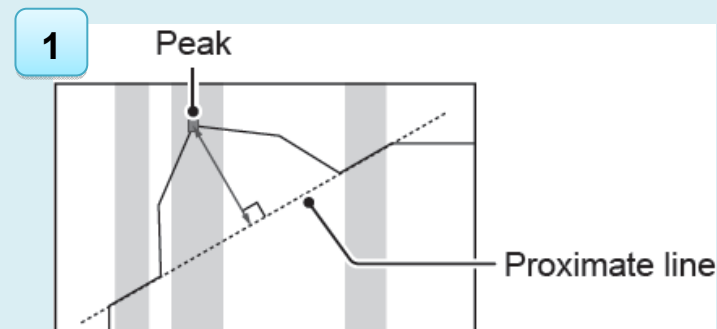
🌐 OUT Measurement Setting

\<Sectional area\> (3)

"Reference for 1 line", "Reference for 2 lines":
Measures the area enclosed by a measured profile, measurement target area frame
and proximate line derived from the proximate line area in the measurement target area.
An area with a measured profile above the proximate line is treated as positive and
that with a profile below the proximate line is treated as negative.
This is used for such purposes as shape judgment.

"Master reference":
Measures the area enclosed by a measured profile, measurement target area frame,
and master profile in the measurement target area. An area with a measured profile
above the master profile is treated as positive and that with a profile below the master
profile is treated as negative. This is used for such purposes as shape judgment.

\<R measurement\>

Measures the radius of the proximate circle acquired from the proximate arc area.
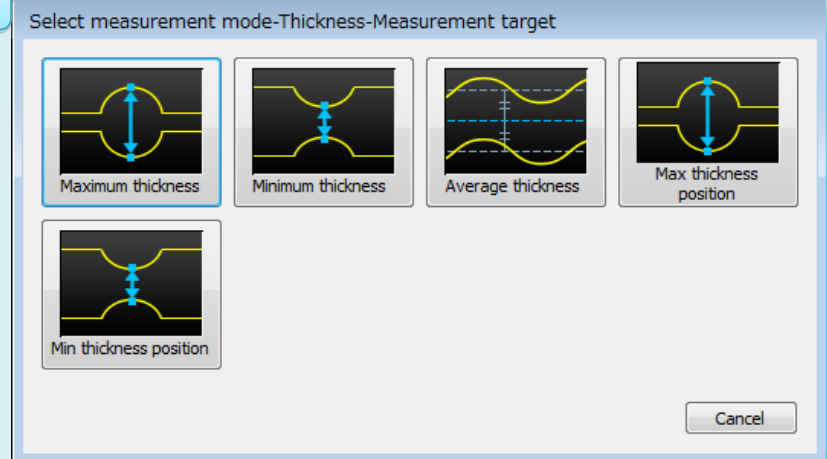
\<Thickness\> (4)

In thickness mode, the measurement target is a profile
derived by subtracting head B profile from head A profile
(= "A - B profile") as shown in the figure to the right.
Five types of measurements are available in thickness mode;
maximum thickness, minimum thickness, average thickness,
maximum thickness position and minimum thickness position.
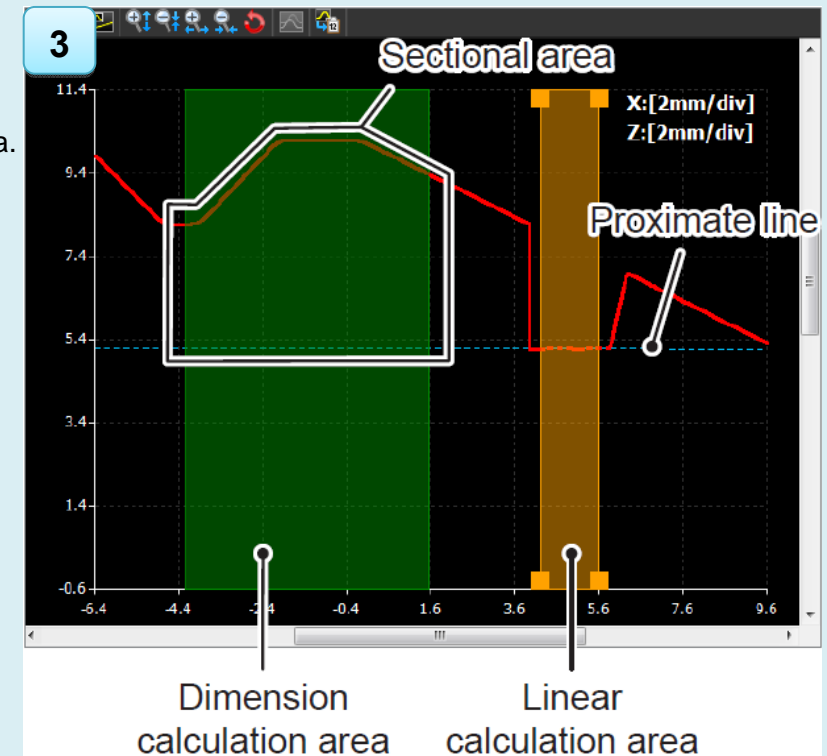
OUT Measurement Setting

■ Simple 3D measurement mode (1)

3D measurement can be performed easily on a specified area by setting the "measuring area" on the height image display window.
* The position correction function is not available in simple 3D measurement.

Height (simple 3D set)　　Step (simple 3D set)　　Position (simple 3D set)

- Measurement target

<Average>

Measures the average value of all profile data within the measurement area.

<Peak/Bottom>

Measures the maximum value/minimum value of all profile data within the measurement area.

<P-P>

Measures the value of the "maximum value – minimum value" of all profile data within the measurement area.

- Measurement mode

Height (simple 3D set)

Measures the Z coordinate detected in the measurement area.

Step (simple 3D set)

Measures the difference between two Z coordinates detected in the measurement area.

Position (simple 3D set)

Measures the X and Y coordinates of data detected in the measurement area.

The Y coordinate is calculated using the formula "(profile number from batch measurement start - 1) x pitch between triggers".

* Without setting a pitch between triggers, the measurement value on the Y coordinate becomes "ALARM" (= measurement value alarm status).
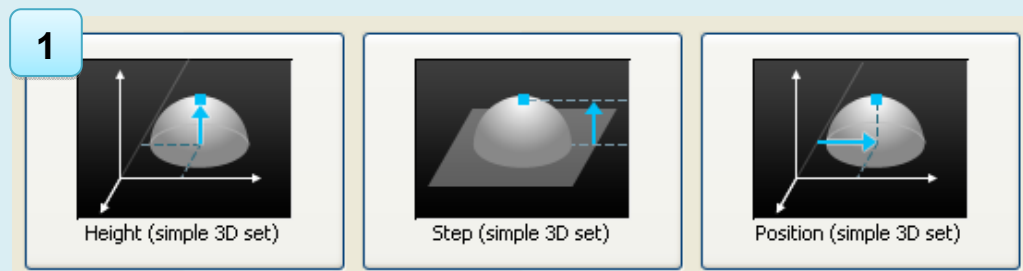
🌐 OUT Measurement Setting

■ **No. of measurement value hold**

A status in which the position correction has failed or the measurement value
cannot be calculated is called the "measurement value alarm status".
Specify how many samplings of the last normal value will be held in the "measurement value alarm status".

* When 999 times is set, the normal value will be held until the next normal value is measured.

■ **ZERO reference value**

Entering ZERO from the terminal or LJ-Navigator2
shifts the current measurement value to zero instantly.
In addition, a shifted value will be substituted for the auto zero reference
value and subtracted from each measurement value that follows.
In this setting, the auto zero reference value can be entered directly.

■ **Measurement period**

Set the measurement period for such measurements as peak hold (when
batch measurement is OFF) and average (when batch measurement is ON).

- When batch measurement is ON

<Measuring area setting>
  The area set on the height image display window is the measurement period.

<OUT reference>
  The same measurement period as referred OUT specified in reference OUT.

⚙ OUT Measurement Setting

<Threshold (edge)>
　Starts measurement at a point where the internal measurement value exceeds
　the edge level and continues for the period of data points specified.
<Threshold (level)>
　Measures for a period during which an internal measurement value is above or below the upper or lower limit set.
　All points exceeding the upper or lower limit in a batch will be measured.

　* The measurement value is updated in each batch, not measurement period.
　* The internal measurement value is a measurement value before the hold mode, such as peak hold, and is processed on each OUT.

- When batch measurement is OFF
<Terminal/Command>
　Controls the measurement period with the [TIM] button of the LJ-Navigator2/[TIM] button on the display monitor
　/[TIMING] key on the console/terminal [TIMING].

<OUT reference>
　The same measurement period as referred OUT specified in reference OUT.

<Threshold (edge)>
　Starts measurement at a point where the internal measurement value exceeds
　the edge level and continues for the period of data points specified.

<Threshold (level)>
　Measures for a period during which the internal measurement value is above or below the upper or lower limit set.

* The measurement value is updated at the end of the measurement period.