2ch Digital Air Micrometer

DAG2200 Handling Instructions Manual

SKS CORPORATION

■ Request Prior to Utilization of Product

Please follow the following points in order to ensure the safe utilization of the product.

[Dangers]

① The product has a few hundred volts of power inside.
When installing, transferring, maintaining and inspecting the product and the connected devices/equipment, make sure to cut off all power sources and pull out the connection cables first before proceeding with the desired operation.

② The standard attached power cable is for 100V. Use the separately sold 250V power cable when the power supply exceeds 125V.

③ Do not step on or pull the power cable and the cables connecting equipment and machines. In addition, make sure to pull the power and connection cables at the plug to avoid damaging the cables. Never use damaged power and connection cables because doing so may cause electric shocks.

④ Make sure to set up the earth wire.
The breakdown of the product or electric leaks from the product may cause electrocution.

[Warning]

① This product is a precision device that performs measurements with the use of air. Please use clean air that is rid of dirt, water particles and oil.

② Do not insert any foreign materials (particularly materials that conduct electricity) into the product to avoid serious injuries brought about by electric shocks, fire and machine breakdown.

[Caution when using the product overseas]

When bringing the product overseas, make sure to check the local laws and regulations in the country where the product will be utilized. Please note that we shall not be held liable for defects occurring on the product when it is used overseas.

[About this Manual]

① This Manual was generated to ensure the safe use of the product. In the off-chance that there are doubts/problems on the product, oversights, and other matters that need to be clarified, please feel free to contact our sales department.

② Portions or the entire contents of this manual may not be used or reproduced without permission.

③ The specifications of the products, and the contents and external appearance of this manual may change without prior notice.

[About this Warranty]

This product is subject to warranty against defects in accordance with the following warranty-related regulations of our company:

① When the product has been broken or damaged due to the inappropriate handling of the customer, we reserve the right to demand payment needed in repairing the product even if the product is still within the warranty period.

② We reserve the right to decline the repair of products that have been remodeled or dismantled by the customer.

③ Products subject to repair are basically accepted at our service centers. In the event that our repairmen would need to travel to repair the product, we shall be charging the client with separate business travel expenses even if the product is still within the warranty period.

Table of Contents

Chapter 1 Introduction

Thank you for purchasing this 2-channel digital air micrometer (DAG2200).
This manual was designed for all types of people. Even people who will be using an air micrometer for the first time will find this manual extremely helpful when it comes to the utilization of the rich lineup of functions possessed by this product.
Please carefully read this manual before using the product.

1.1 Overview

- This product detects the fluctuations in the air pressure from the dimensions of the subject with the help of the pressure sensor, and then displays a digital evaluation of such via the dimension display, lamps and bar display.
- This product is a precision comparator (gauge).
  This measures objects with the measured master as the standard. Now further precision can be achieved through the periodic setting or coordination of the master.
- This product can judge if the measured value is OK or NG (no good).
  The judgment of the measured values can be quickly identified through the various colors in the main display and the judgment LED. In addition, the periodic master setting can be done through the panel keys.

1.2 Special Features

① The judgment results (OK or NG) of the measurement/calculation can be easily identified through the numbers, lamp color and bar display

② The measurement and calculation results can be switched with one push of a button

③ Master setting is easy

④ Peak measurement [Option]
- +PEAK, -PEAK, TIR (=+PEAK-(-PEAK)), TIR/2 (=+PEAK-(-PEAK))/2)
- Auto-measure start/stop function

⑤ A maximum of 99 ranks (OK range) can be judged [Option]

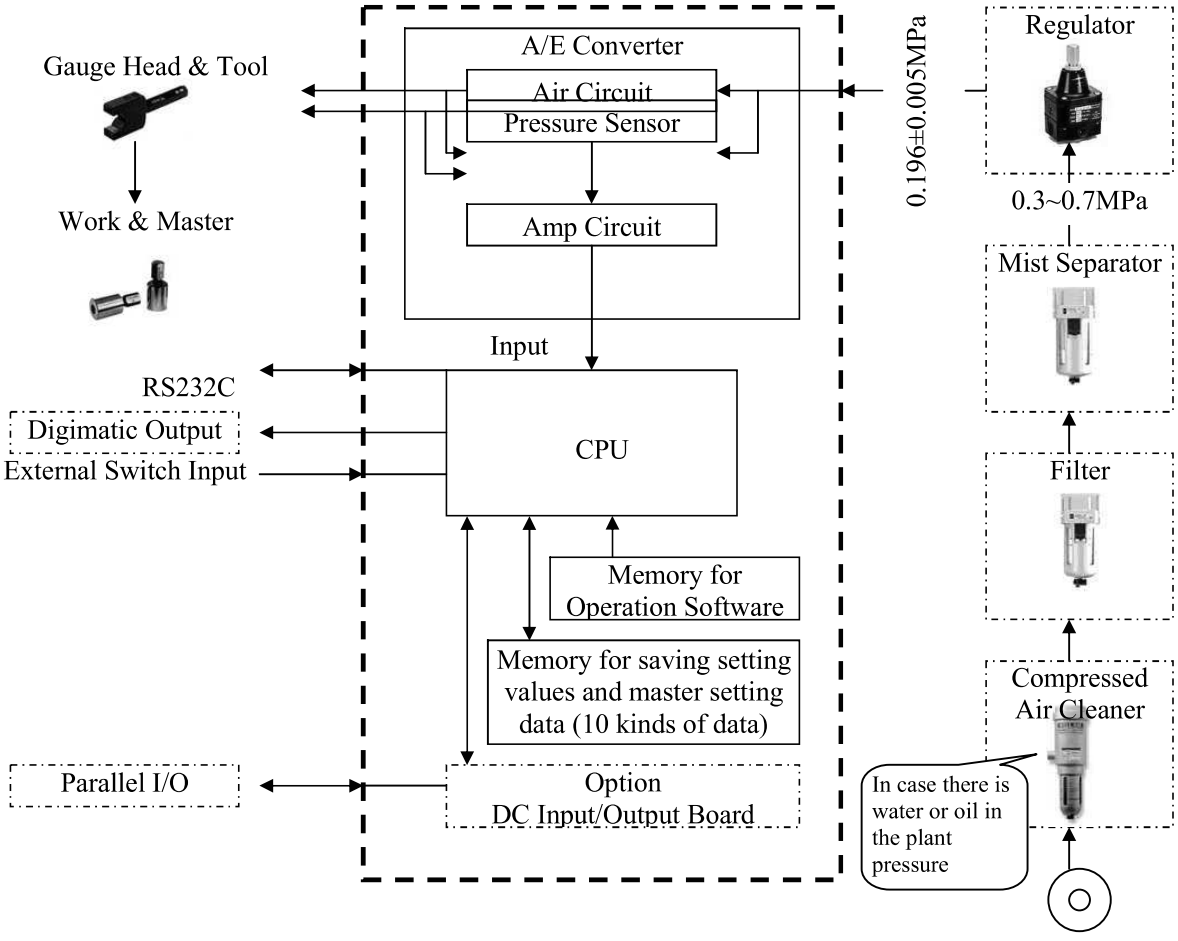
⑥ A rich lineup of external input/output functions
- Serial communication function
  RS232C enables data output of measurement and judgment results to a personal computer or printer [Standard]
- External switch input function [Standard]
  Measurement and master setting commands can be relayed through a foot switch or a push-button switch
- Digimatic output function [Option]
  Measured values can be printed out to a digimatic printer
- DC input/output function [Option]
  Judgment results can be relayed to the lamp, sequencer and so on, and the BCD output of measured values can also be done.

In addition, the measurement and master setting commands can be inputted from outside the unit.

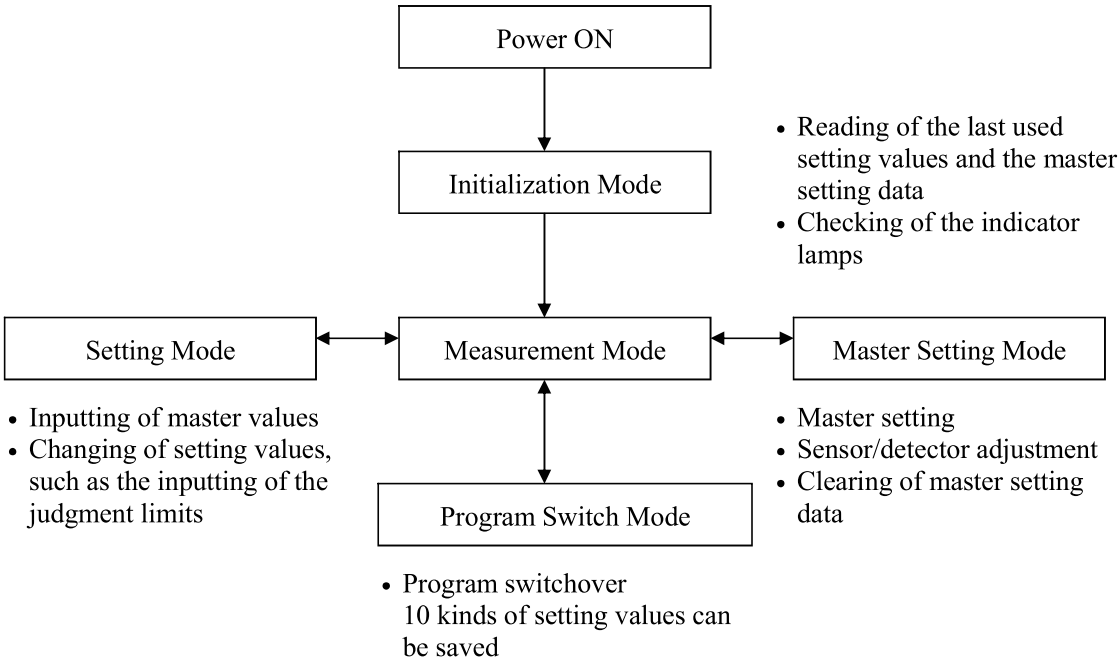
⑦ Compact
150 (width) x 180 (thickness) x 194 (height)
With regulator (optional) = 275 (thickness) mm (excluding the protruding parts)

1.3 Block Diagram

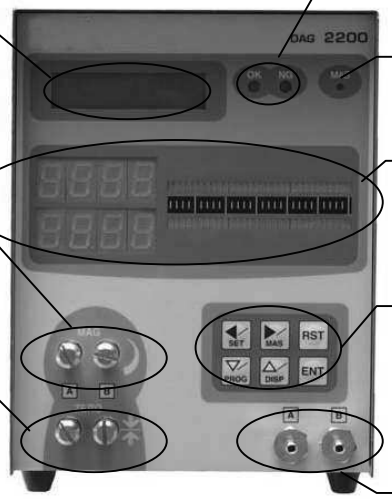
① Structural Drawing
The arrows illustrate the direction of the air and the electric signals
Those inside the [ ] are options.



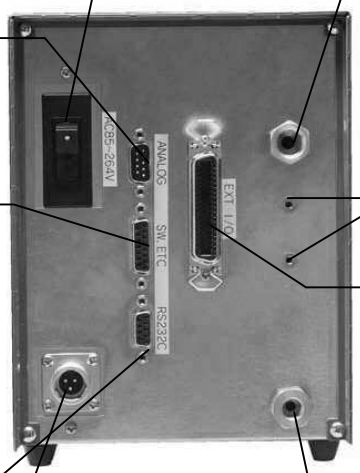
② Operation Flow
The following flowchart shows the process from the turning on of the power supply to the loading/running of the software.



Chapter 2 Names and Functions of Parts



- LCD Display
  Shows the bar display, measurement values, names of setting items, setting values, etc.
- Magnification (MAG) Adjustment Knob
  This is used when adjusting the sensitivity of the air circuit. But unless the measurement tools have been replaced, or there are errors in the master setting, etc., the product does not need to be adjusted/regulated.
- Zero Adjustment Knob
  This adjusts the zero setting of the air pressure. However, no adjustment is required unless the measurement tools have been replaced or there are errors in the master setting.
- Overall Judgment Lamp
  Displays the results of the overall judgment
- Master Setting Lamp
  Displays the master setting status
- Main Display
  Displays 4 digits of digital numbers and bar graphs in 3 colors
- Panel Switch
  Used when switching modes, selecting the setting items, inputting the setting values, etc.
- Measurement Nozzle Port
  Please connect the measurement device/tool



- Power Supply Switch
- Air Pressure Input
  Please supply the unit with 0.196±0.005MPa of clean air. A precision regulator and filter are available as options
- Analog Input/Output Connector (Optional)
  Please inquire with the manufacturer on the utilization of this
- Switch Input Connector
  This is the connector for the measurement command and master setting input through an external push-button. Foot switch and push-button switch are available as options. Only foot switches and push-button switches can be used.
- RS232C Connector
  Serial communication connector for connecting the unit to a computer or printer
- Regulator Bracket Attachment (M3)
- DC Input/Output Connector (Optional)
  This is the connector used to connect lamps, PLC, etc. It has two types—judgment output and BCD output. The measurement command and master setting inputs can be done through this
- Silencer Attachment Portion
- Power Supply Connector (Input)
  Though AC85~264V can be used, please use the accompanying cable within the AC85~125V range.

Chapter 3 Procedure Prior to Startup

3.1 Installation

Place the unit and the measurement devices in a stable place that can sufficiently hold heavy articles

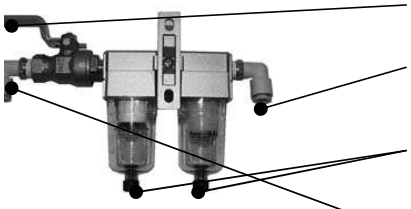
3.2 Preparations

(1) Air Piping

Install the piping for the air that will be used in measurement.
Make sure to supply the unit with clean air that is rid of dirt, water and oil particles.
Please have high-performance filters ready in case the air environment requires them.

Caution When connecting the hose in the coupler, make sure that there are no air leaks.

Connection of the Filter (Optional)



① Turn OFF the cock.

② Connect the hose (outside diameter: ø8, inside diameter ø6) in the filter regulator.

③ Fix the screws of the drain in such a way that they are facing down.

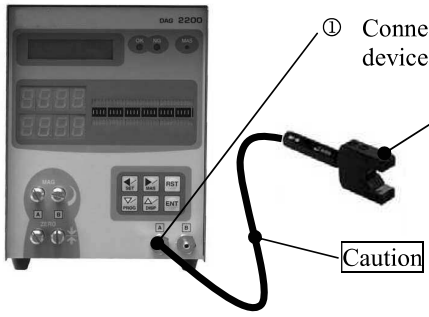
④ Supply the unit with compressed air (0.3~0.7 MPa).

(2) Connection of Power Supply Cable

① Switch OFF the power supply (switch to the O position).

② Connect the power supply cable in the power supply connector (input). Please use the accompanying power cable within the AC85~125V range.

(3) Connection of Measurement Devices

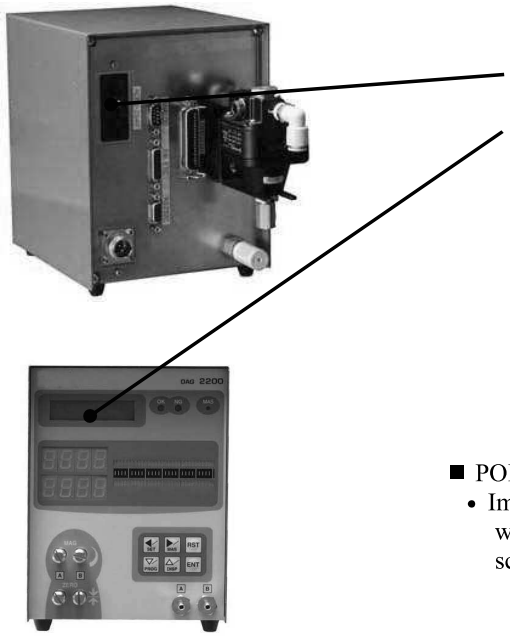


① Connect the gauge head and the measurement devices in the measurement nozzle port.

Gauge Head
(PO- and POT-types)

Caution The length of the hose affects its flexibility.

3.3 Startup



① Turn OFF the power supply switch (press –).

② The LCD Display will show the software version, optional information, etc.

③ The unit will read the last used setting values..

④ Check the light of the screen (visually).

⑤ Start the measurement mode (master request screen).

■ POINT

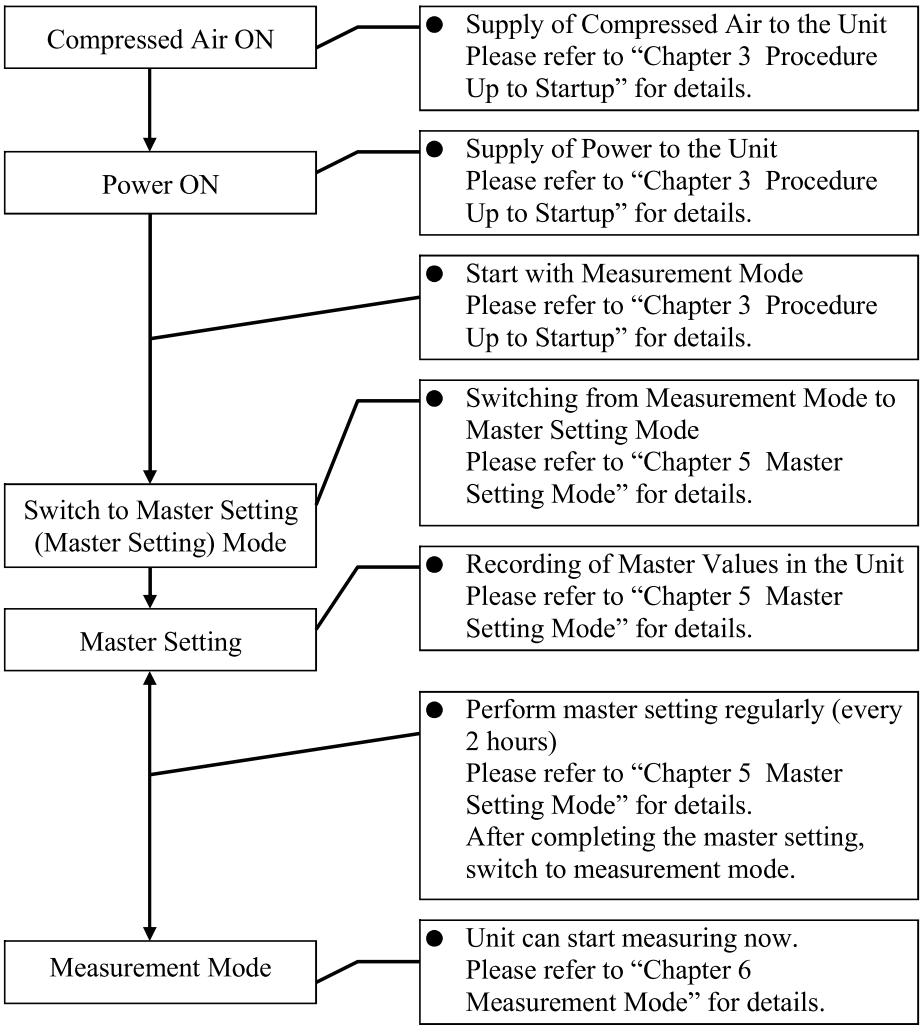
- Immediately after turning on the unit, it will start with the Measurement mode (master request screen).

Chapter 4 Procedure Up to Measurement

This chapter contains the procedures up to measurement in each condition.

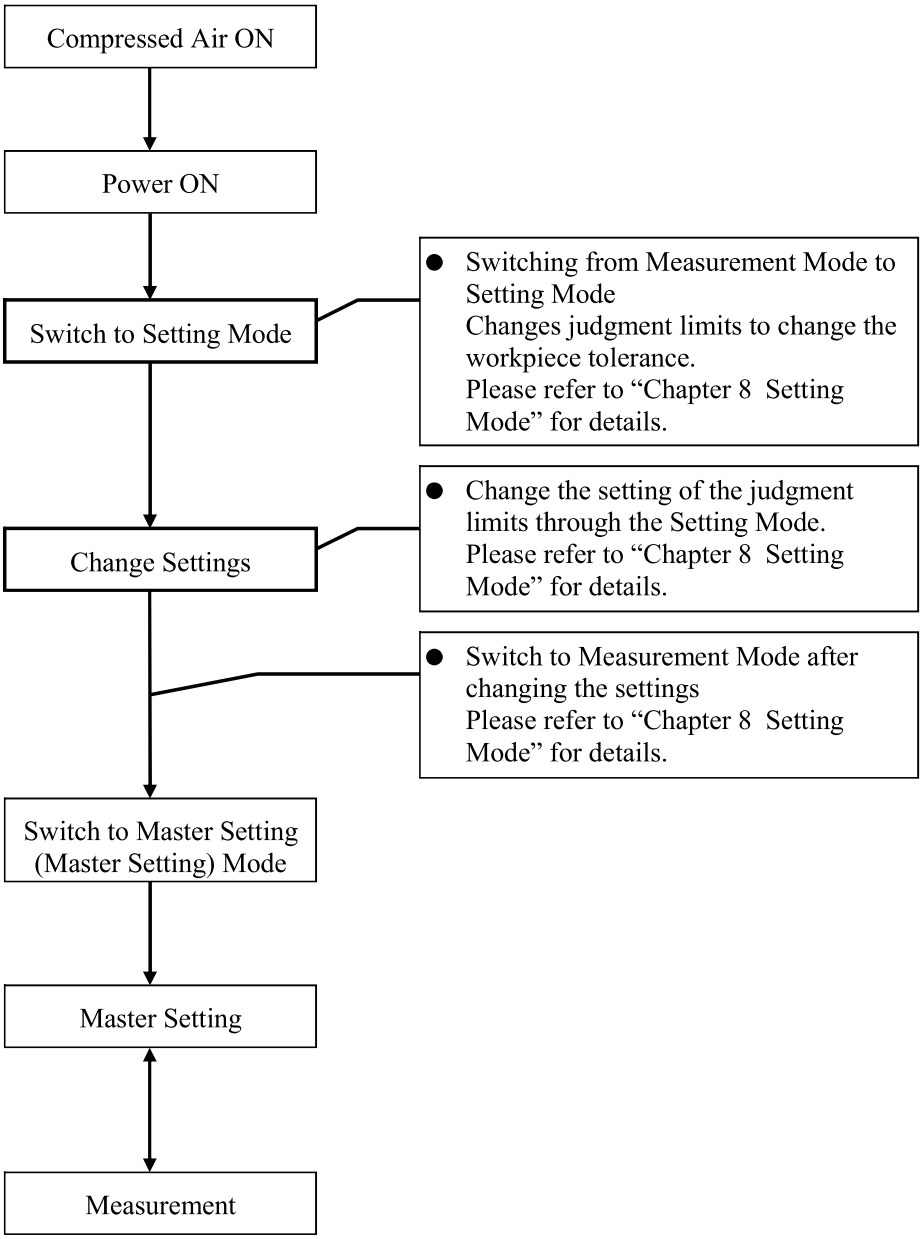
4.1 Normal Condition

The following is the procedure up to measurement under normal conditions (Piping/wiring to the unit, connection of measurement devices, inputting of the master values, judgment limits and other setting values, and sensor regulation have been completed).



4.2 Changing Workpiece Tolerance (Judgment Limits)

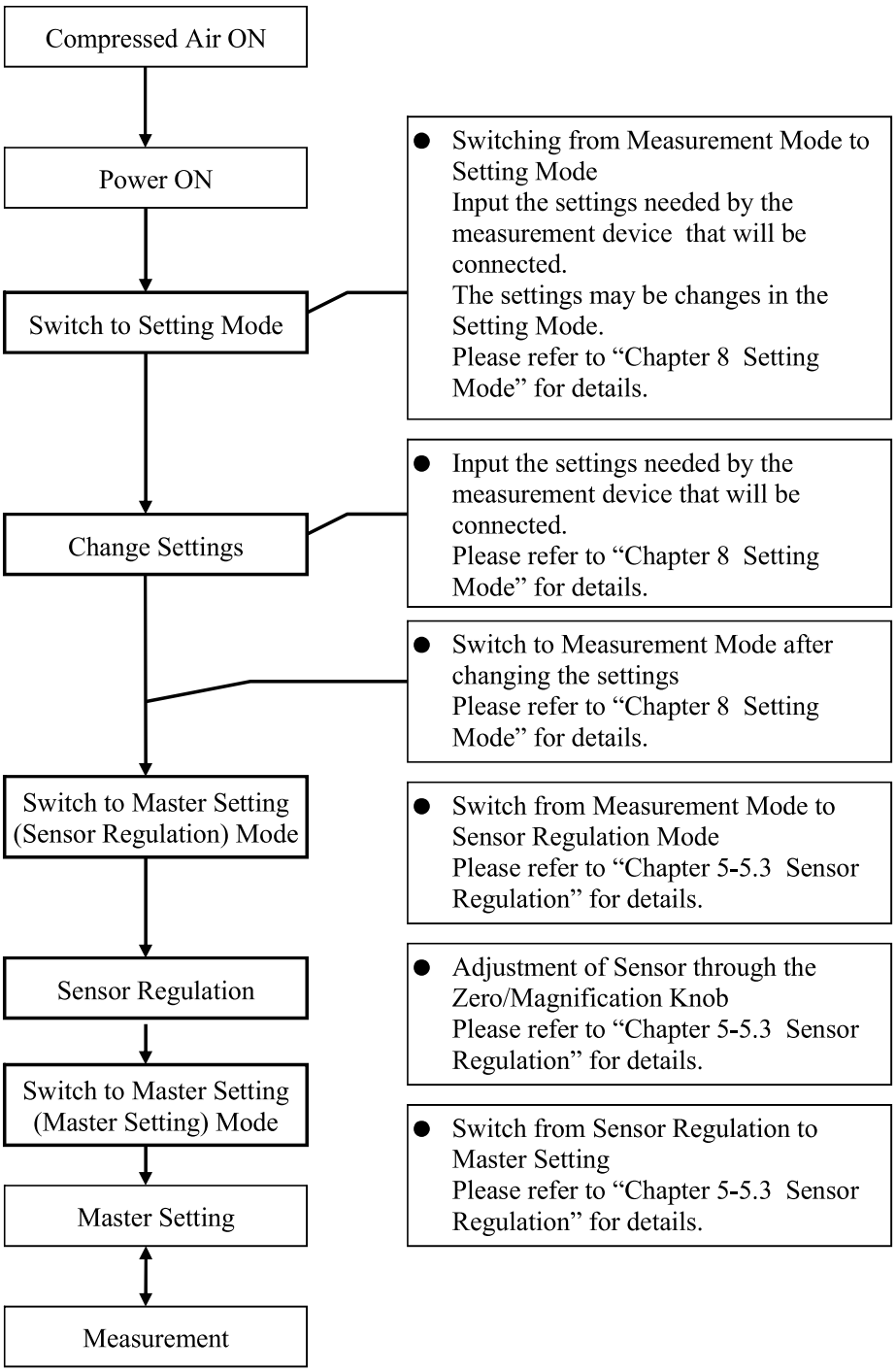
The following illustrates the procedure up to measurement when the tolerance of the workpiece has changed.



4.3 When Connecting Measurement Devices for the First Time

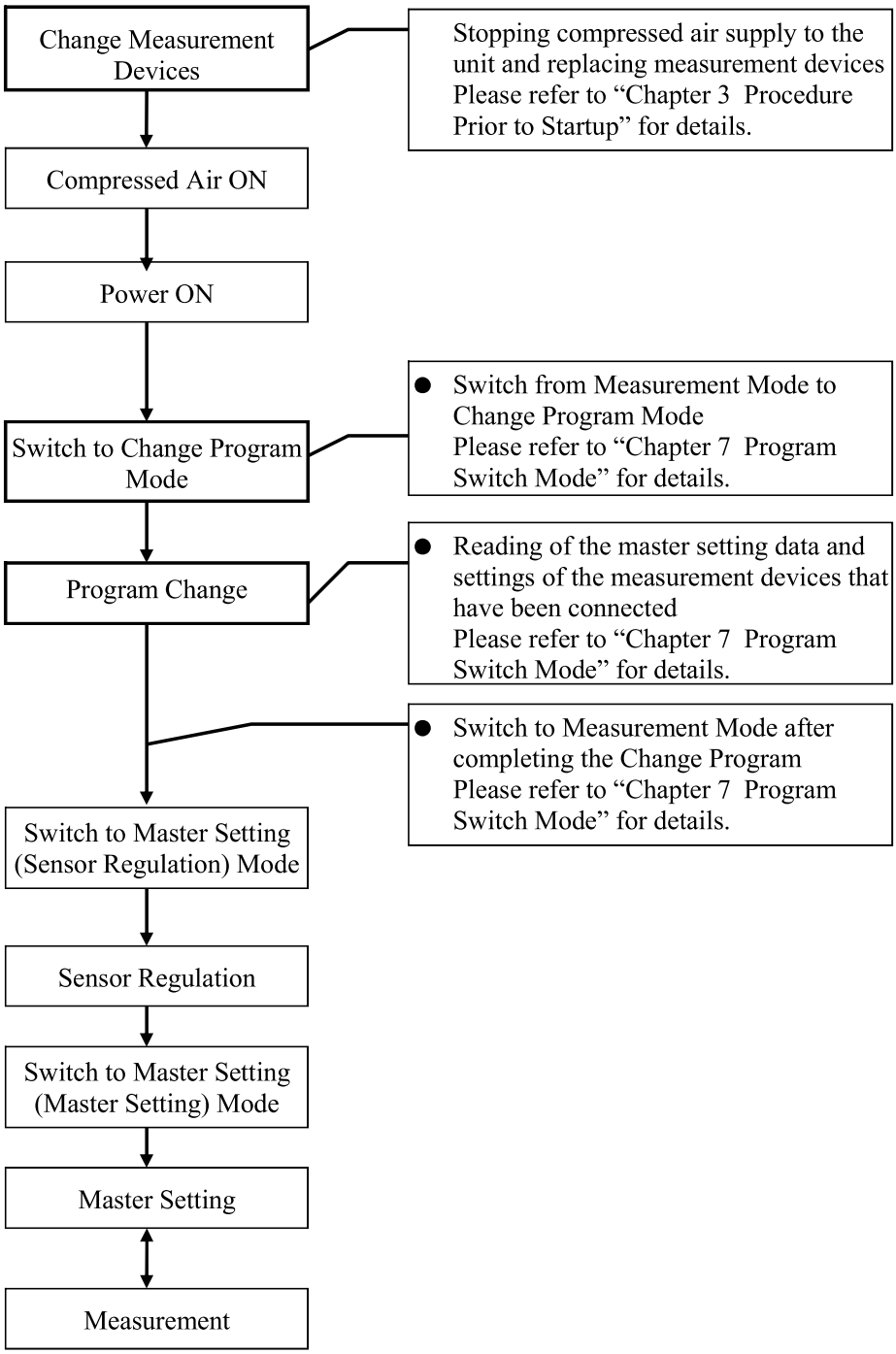
The following illustrates the procedure up to measurement when a measurement device will be connected to the unit for the first time.

Caution: Regulating the sensors/detectors may not be necessary in some measurement devices.



4.4 When Connecting Several Measurement Devices

The following illustrates the procedure up to measurement when several measurement devices will be connected to a single unit.
In case the inputting of the settings needed by the measurement devices has not been completed, please refer to "Chapter 3-3.3 When Connecting Measurement Devices for the First Time."



Chapter 5 Master Setting Mode

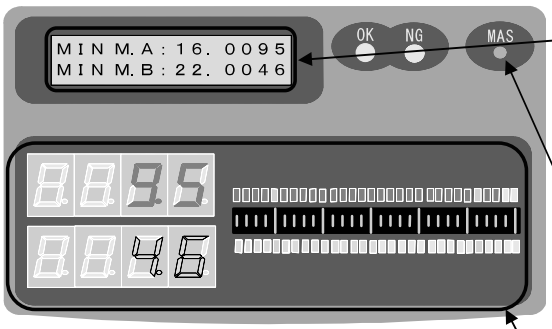
This product is a comparator, so master setting (correction of the measurement values) through the master is required.
In addition, the measurement functions of the device can be made more precise by performing regular master settings.

There are 2 master (Minimum and Maximum Master) setting methods (Zero and Magnification/Sensitivity Correction) in this product.

Caution

- After performing master setting, if the zero/magnification knob was moved or operated, make sure to redo master setting.
- In case the master setting lamp is red and blinking and the LCD display shows “Master Request”, then there is an error in the master setting. Conduct master setting again.
- Check if there are foreign materials in the master and the measurement devices. Foreign materials could have bad effects in the correction process and could cause incorrect measurements.

5.1 Minimum Master Setting

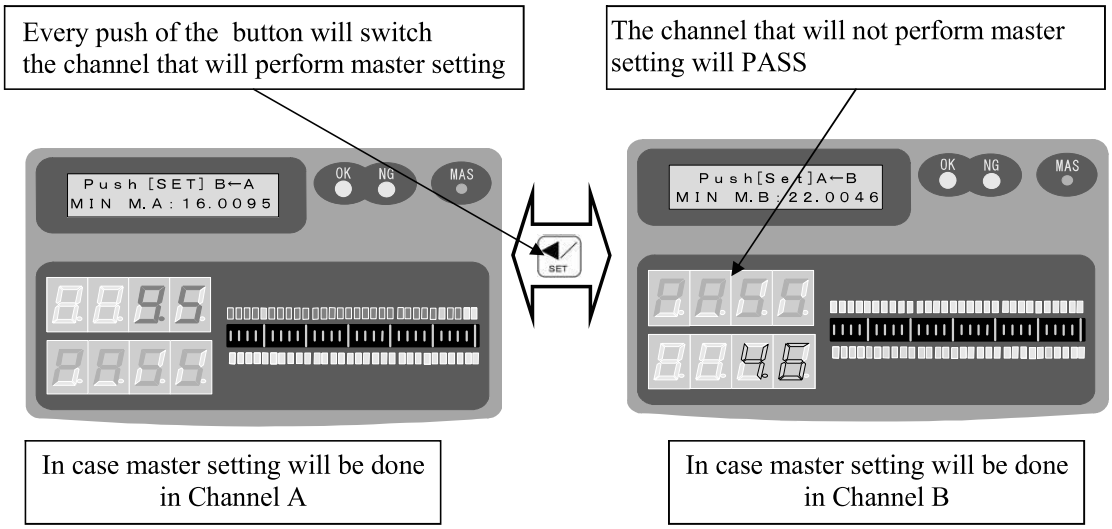


Master Setting Mode (Minimum (Range) Master Setting Screen)
□In case the [Master Set Way] has been set to [ALL]

- Displays the Minimum Master Setting screen
- Shows the measurement values of the master setting without corrections

- The red and orange lights will blink repeatedly when there is Master Setting NG
- The green and orange lights will blink repeatedly when master setting is OK

- Green light will be displayed when the measurement values [μm] (Channel A values at the top and Channel B values at the bottom) of the master setting without corrections is within the minimum master setting range (measurement range ± 50%), while it will display red when the values are outside the range.
- If the display range of the bar has been exceeded, the right end of the bar will blink.
- If any of the channels is [NO USE], then the channel that will not perform master setting will be turned off.



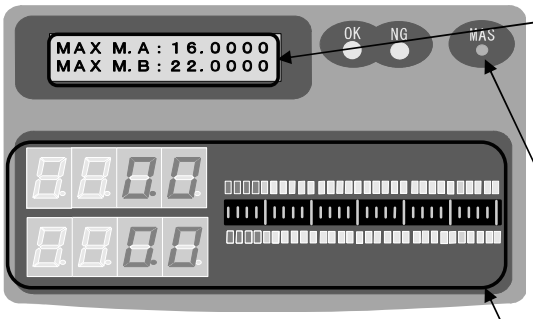
Master Setting Mode (Minimum Master Setting Screen)
□In case the [Master Set Way] has been set to [EACH]

[Explanations]

- This is the minimum master setting screen. Please set the minimum (range) master.
- The measurement values shown in the main display and in the LCD display are values that have not been corrected.
- The dark orange light at the left side of the bar shows the minimum master values, while the dark orange light on the right shows the maximum master values.
- The minimum (range) master setting can be performed when the main display has turned green.
- Minimum (range) master setting may not be performed when the main display is red. When master setting will still be done, make sure to regulate the sensor (please refer to 5.3 Sensor Regulation).
- Pressing RST would move the unit to the Measurement Mode.
- Every push of the PROG button will switch the bar display range in three steps.
- When the [Master set way] is set to [Each], pressing the SET button will switch operation to the channel that will perform master setting.
- Pressing MAS would transfer the screen to the Sensor Regulation screen.
- Pressing ENT would proceed to the Minimum (Range) Master Setting.

- When the Minimum (Range) Master Setting is OK, then the unit will proceed to the Maximum (Range) Master Setting. When the Minimum Master Setting is NG, the screen will display ERROR. The ERROR display can be erased by pressing ENT or the RST button once. Now after performing sensor regulation (please refer to 5.3 Sensor Regulation), perform master setting again.

5.2 Maximum Master Setting

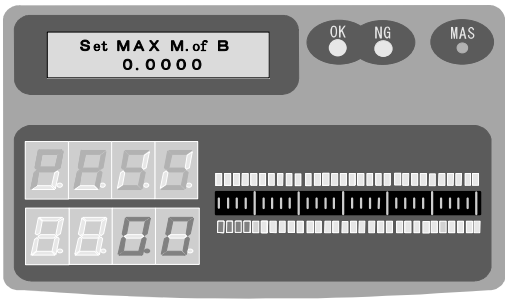


- Displays the Maximum Master Setting screen
- Shows the measurement values of the master setting without corrections

- The red and orange lights will blink repeatedly when there is Master Setting NG
- The green and orange lights will blink repeatedly when master setting is OK

- Green light will be displayed when the measurement values [μm] (Channel A values at the top and channel B values at the bottom) of the master setting without corrections is within the maximum master setting range (measurement range ± 20%, or within 0.5~2.0 times), while it will display red when the values are outside the range.
- If the display range of the bar has been exceeded, the right end of the bar will blink.
- If any of the channels is [NO USE], then the channel that will not perform master setting will be turned off.

Master Setting Mode (Maximum (Range) Master Setting Screen)
□In case the [Master Set Way] has been set to [ALL]



Master Setting Mode (Maximum (Range) Master Setting Screen)
□In case the [Master Set Way] has been set to [EACH]

[Explanations]

- This is the maximum (range) master setting screen. Please set the maximum (range) master.
- The measurement values shown in the main display and in the LCD display are values that have not been corrected.
- The dark orange light at the left side of the bar shows the minimum master values, while the dark orange light on the right shows the maximum master values.
- The maximum (range) master setting can be performed when the main display has turned green.
- Maximum (range) master setting may not be performed when the main display is red. When master setting will still be done, make sure to regulate the sensor (please refer to 5.3 Sensor Regulation).
- Every push of the 

button will switch the bar display range in three steps.
- Pressing 

would move the screen to the Sensor Regulation screen.
- Pressing 

would move the unit to the Minimum (Range) Master Mode.
- Pressing 

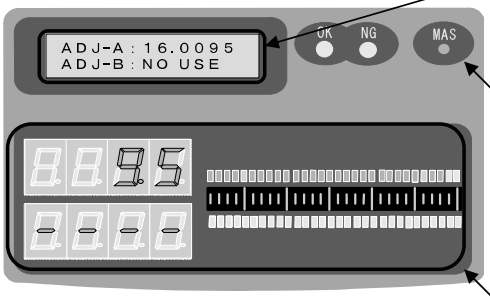
would proceed to the Maximum (Range) Master Setting.

When the Maximum (Range) Master Setting is OK, then the unit will display that the master set is OK and then proceed to the Measurement Mode. When the Maximum (Range) Master Setting is NG, the screen will display ERROR.
The ERROR display can be erased by pressing 

or 

button once.
Now after performing sensor regulation
(please refer to 5.3 Sensor Regulation), perform master setting again.

5.3 Sensor Regulation



Master Setting Mode (Sensor Regulation Screen)

- Displays the Sensor Regulation screen
- Shows the measurement values of the master setting without corrections
- If any of the channels is [NO USE], then the channel that will not perform master setting will be turned off.

- The red and orange lights will blink repeatedly when there is Master Setting NG
- The green and orange lights will blink repeatedly when master setting is OK

- The measurement values [μm] (Channel A values at the top and channel B values at the bottom) of the master setting without corrections will be shown in orange
- If the display range of the bar has been exceeded, the right end of the bar will blink.
- If any of the channels is [NO USE], then the channel that will not perform master setting will be turned off.

[Explanations]

- This is the Sensor Regulation screen. Please adjust the sensor. (Refer to [Regulation Procedure])
- The measurement values shown in the main display and in the LCD display are values that have not been corrected.
- The dark orange light at the left side of the bar shows the minimum master values, while the dark orange light on the right shows the maximum master values.
- Every push of the DISP button will switch the unit in this manner: <<Channel A & Channel B>> ←→ <<Calculated Values of Channel A & Channel B>>. (When the [CALC Function] is in position other than in NO USE, or when the master values of Channels A &B are similar)
- Every push of the PROG button will switch the bar display range in three steps.
- Pressing RST ENT would move the unit to the Minimum (Range) Master Mode.
- Pressing the MAS would move the operation to the screen for clearing the Master Setting data.

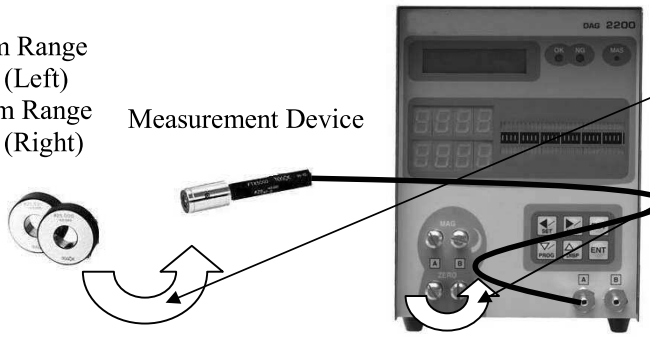
[Regulation Procedure]
The regulation procedure for the inside and outside diameters differ.

When regulating the sensor of Channel A

1) Inside Diameter

Master
Minimum Range
Master (Left)
Maximum Range
Master (Right)

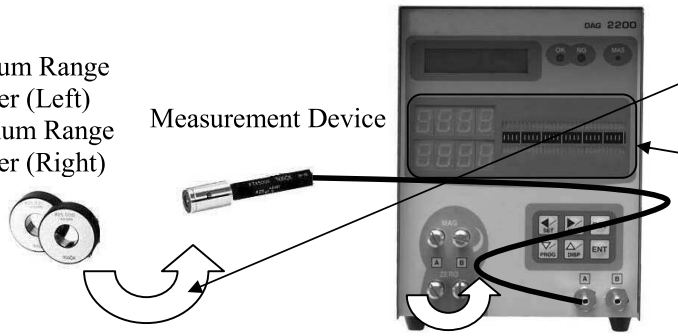
Measurement Device



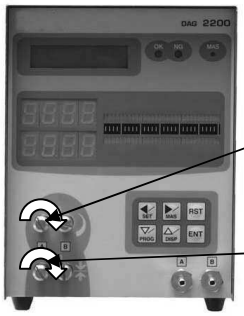
① Set the Minimum (Range) Master into the measurement device
② Turn the ZERO Regulation knob, and then match the Channel A display close to the value of the Minimum (Range) Master.

Master
Minimum Range
Master (Left)
Maximum Range
Master (Right)

Measurement Device



③ Set the Maximum (Range) Master into the measurement device
④ If the Channel A display:
- Is close to the value of the Maximum (Range) Master, then the regulation is completed. Proceed to ⑦.
- Did not reach the maximum master value, then there is insufficient sensitivity/magnification. Proceed to ⑤.
- Exceeded the max. master value, then there is excessive sensitivity or magnification. Proceed to ⑥.

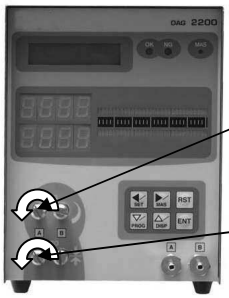


⑤ When there is insufficient magnification/sensitivity in the sensor:

a) While the Maximum (Range) Master is set in the measurement device, turn the sensitivity regulation knob clockwise, then adjust the –5x of the maximum master values to the positive (+) side.

b) Turn the Zero regulator knob clockwise and then match the values to the maximum master values.

c) Repeat from ①.



⑥ When there is insufficient magnification/sensitivity in the sensor:

a) While the Maximum (Range) Master is set in the measurement device, turn the sensitivity regulation knob counterclockwise, then adjust the +5x of the maximum master values to the negative (-) side.

b) Turn the Zero regulator knob counterclockwise and then match the values to the maximum master values.

c) Repeat from ①.

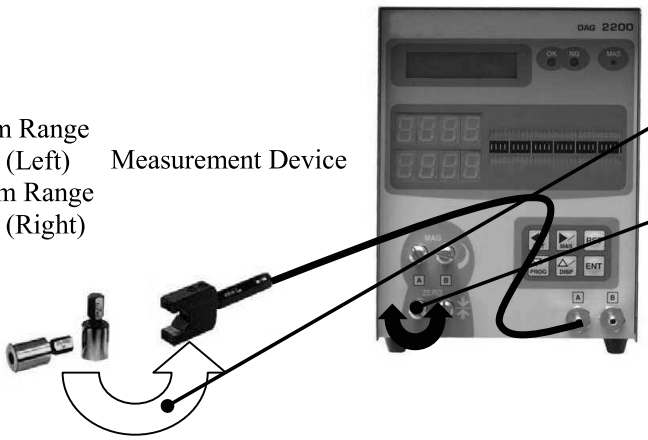
⑧ The regulation/adjustment of the sensor of Channel A is complete.
Adjust the sensor of Channel B in the same manner.
Except in special cases, future regulations/adjustments of the sensor would not be necessary.

When regulating the sensor of Channel A

2) Outside Diameter

Master
Minimum Range
Master (Left)
Maximum Range
Master (Right)

Measurement Device

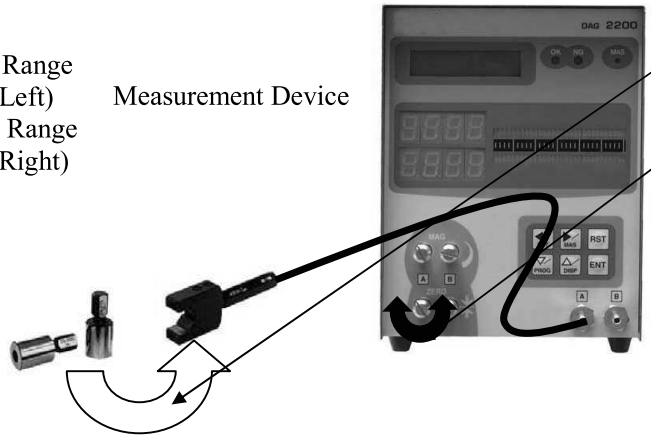


① Set the Maximum (Range) Master into the measurement device

② Turn the ZERO Regulation knob, and then match the Channel A display close to the value of the Maximum (Range) Master.

Master
Minimum Range
Master (Left)
Maximum Range
Master (Right)

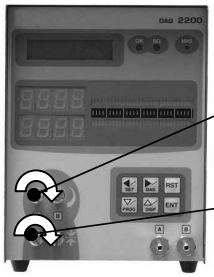
Measurement Device



③ Set the Minimum (Range) Master into the measurement device

④ If the Channel A display:

- Is close to the value of the Minimum (Range) Master, then the regulation is completed. Proceed to ⑦.
- Did not reach the minimum master value, then there is insufficient sensitivity/magnification. Proceed to ⑤.
- Exceeded the min. master value, then there is excessive sensitivity or magnification. Proceed to ⑥.

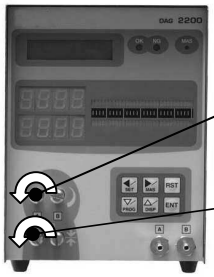


⑤ When there is insufficient magnification/sensitivity in the sensor:

a) While the Minimum (Range) Master is set in the measurement device, turn the sensitivity regulation knob clockwise, then adjust the +5x of the minimum master values to the negative (-) side.

b) Turn the Zero regulator knob clockwise and then match the values to the minimum master values.

c) Repeat from ①.



⑥ When there is insufficient magnification/sensitivity in the sensor:

a) While the Minimum (Range) Master is set in the measurement device, turn the sensitivity regulation knob counterclockwise, then adjust the -5x of the minimum master values to the positive (+) side.

b) Turn the Zero regulator knob counterclockwise and then match the values to the minimum master values.

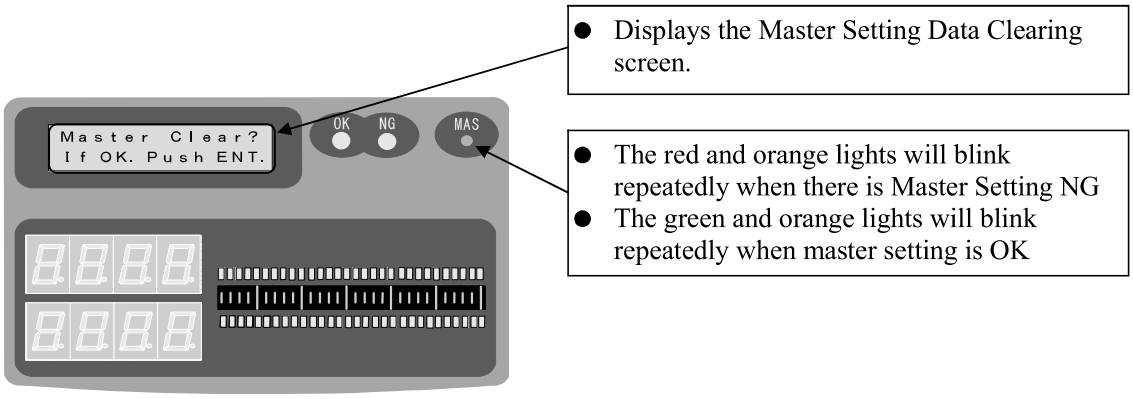
c) Repeat from ①.

⑦ Perform steps ①~⑥ for both Channels A and B.

⑧ The regulation/adjustment of the sensor of Channel A is complete.
Adjust the sensor of Channel B in the same manner.
Except in special cases, future regulations/adjustments of the sensor would not be necessary.

5.4 Clearing the Master Setting Data

This section discusses the method for clearing the zero correction and sensitivity correction data.
This is not normally used. Use this when checking for abrasions/wear and tear on the measurement device.



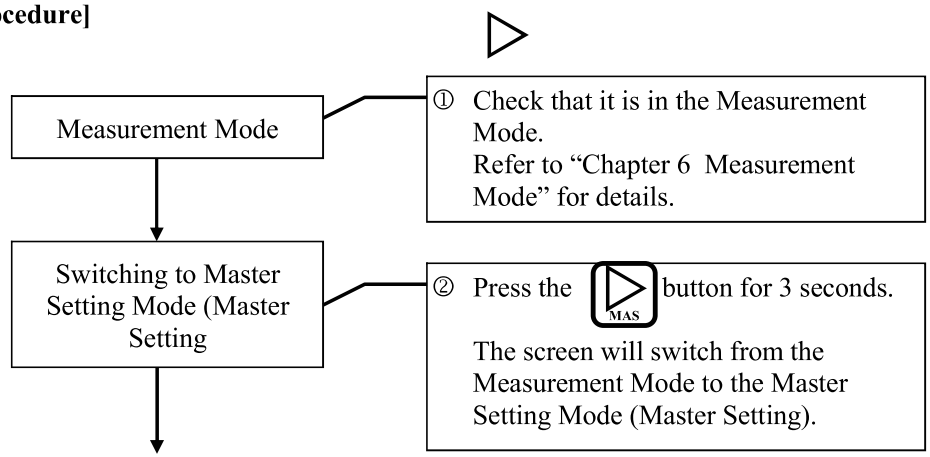
Master Setting Mode (Clearing the Master Setting Data)

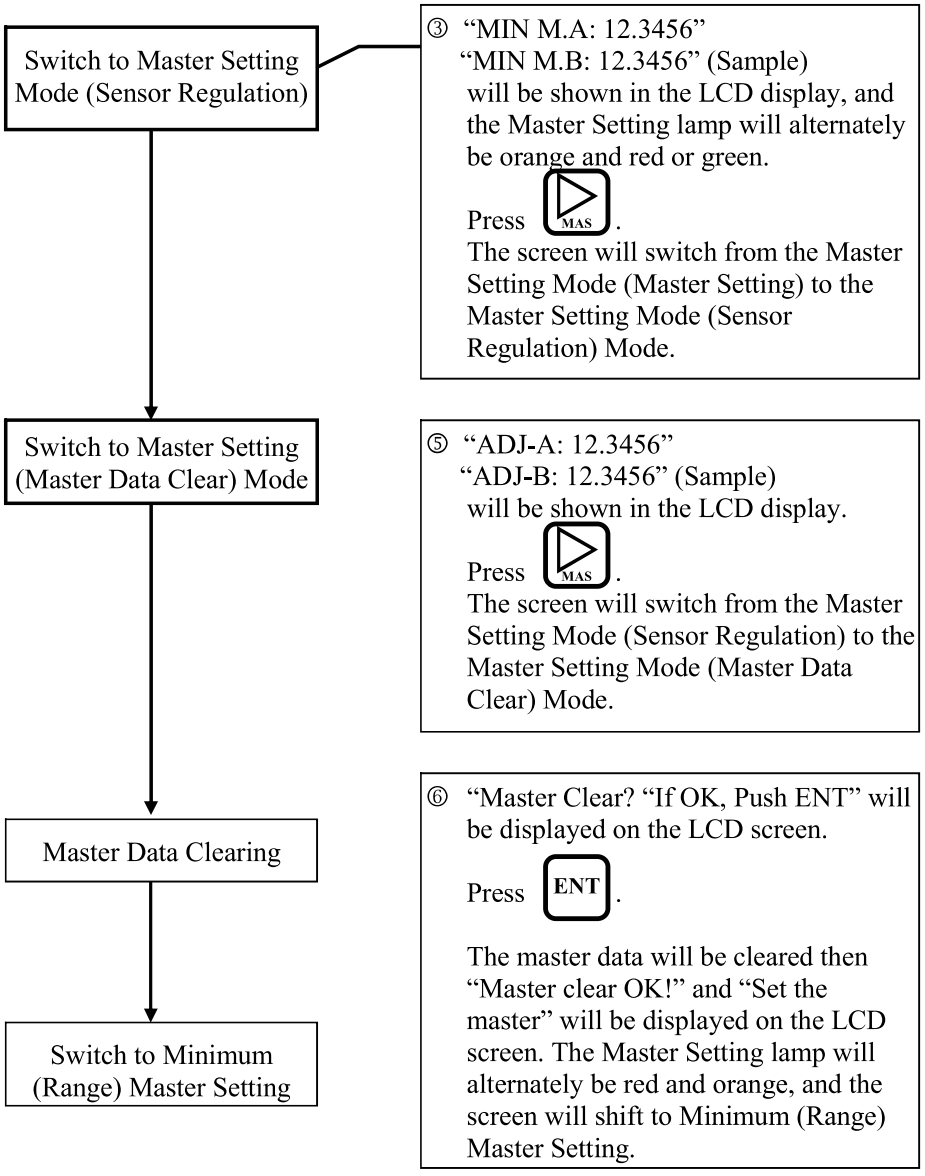
[Explanations]

- This is the screen for clearing the Master Setting Data.
- Pressing MAS RST would move the unit to the Minimum (Range) Master screen.

  If the ENT button is pressed, then after clearing the master setting data, "Master clear OK!" and "Set the master" will be shown in the LCD display, and the screen will move to the Minimum (Range) Master Setting screen.

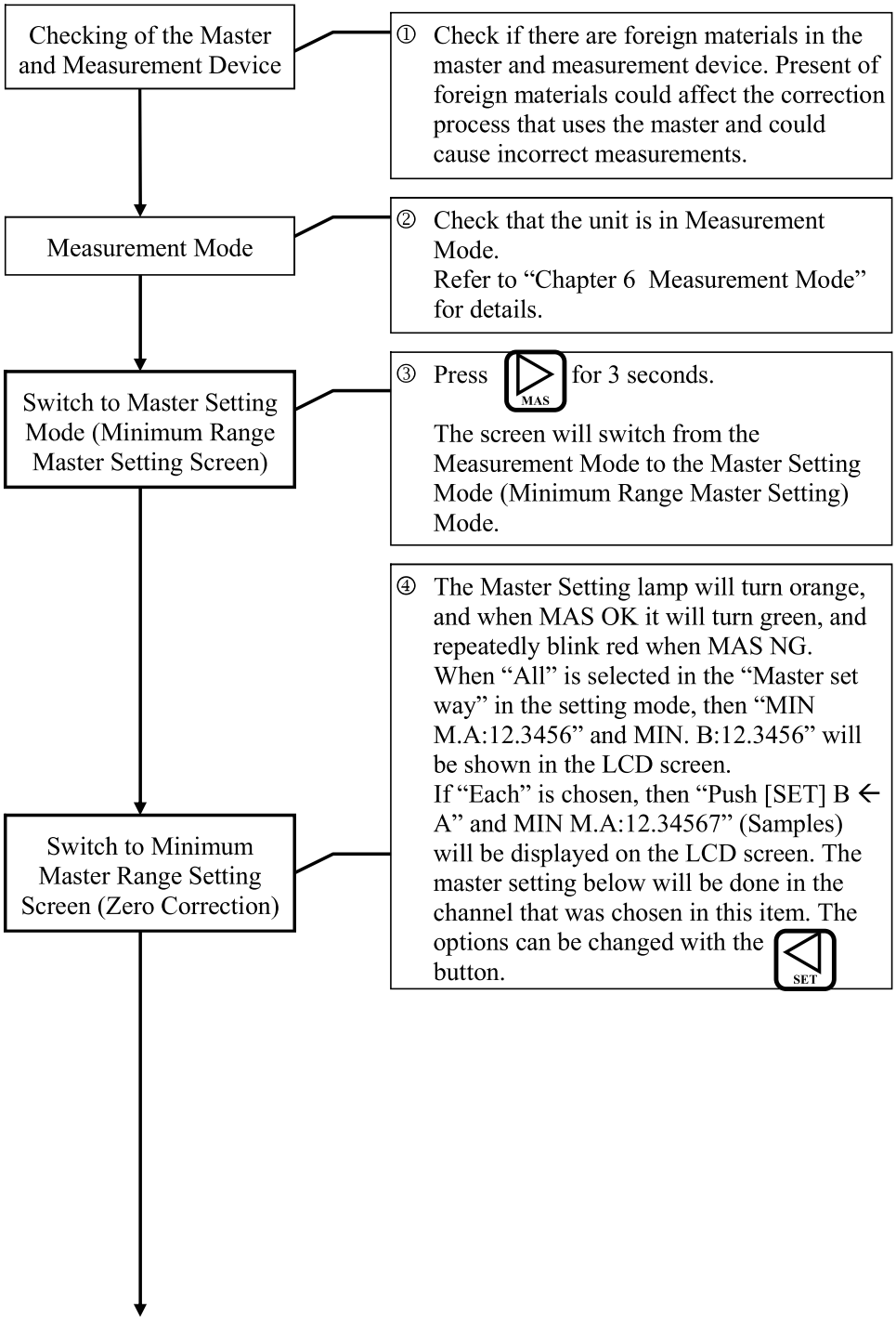
[Procedure]

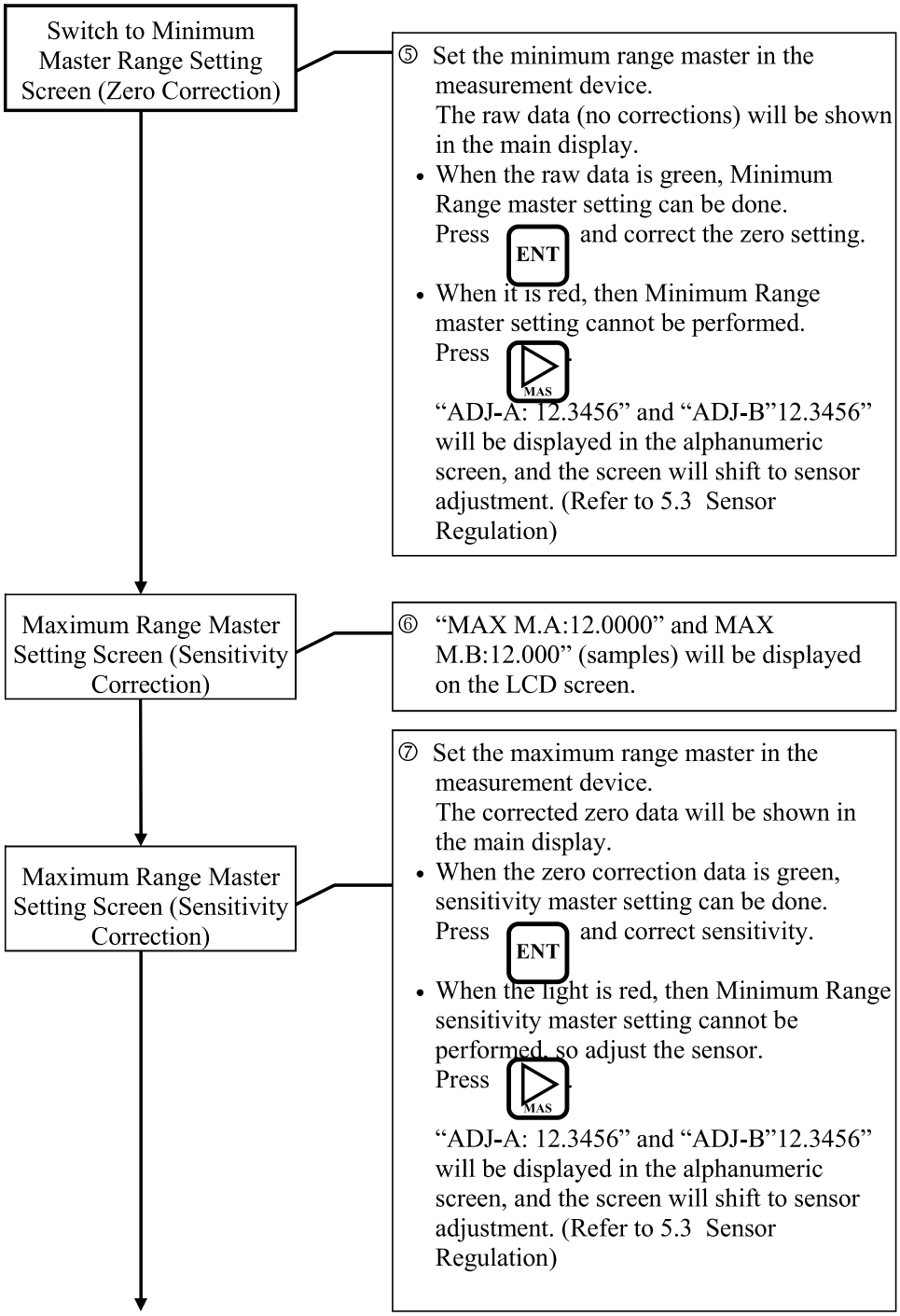


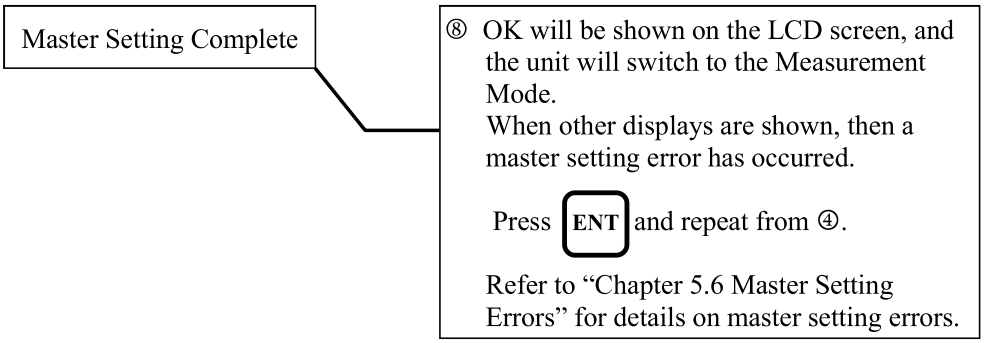

Switch to Master Setting Mode (Sensor Regulation)
③ "MIN M.A: 12.3456"
"MIN M.B: 12.3456" (Sample)
will be shown in the LCD display, and the Master Setting lamp will alternately be orange and red or green.
Press MAS.
The screen will switch from the Master Setting Mode (Master Setting) to the Master Setting Mode (Sensor Regulation) Mode.
Switch to Master Setting (Master Data Clear) Mode
⑤ "ADJ-A: 12.3456"
"ADJ-B: 12.3456" (Sample)
will be shown in the LCD display.
Press MAS.
The screen will switch from the Master Setting Mode (Sensor Regulation) to the Master Setting Mode (Master Data Clear) Mode.
Master Data Clearing
⑥ "Master Clear? "If OK, Push ENT" will be displayed on the LCD screen.
Press ENT.
The master data will be cleared then "Master clear OK!" and "Set the master" will be displayed on the LCD screen. The Master Setting lamp will alternately be red and orange, and the screen will shift to Minimum (Range) Master Setting.
Switch to Minimum (Range) Master Setting

5.5 Master Setting Procedure

This section discusses the procedure for correcting the zero setting through the minimum range master, and the sensitivity (magnification) through the maximum range master.




Switch to Minimum Master Range Setting Screen (Zero Correction)
⑤ Set the minimum range master in the measurement device.
The raw data (no corrections) will be shown in the main display.
• When the raw data is green, Minimum Range master setting can be done.
Press ENT and correct the zero setting.
• When it is red, then Minimum Range master setting cannot be performed.
Press MAS.
"ADJ-A: 12.3456" and "ADJ-B"12.3456" will be displayed in the alphanumeric screen, and the screen will shift to sensor adjustment. (Refer to 5.3 Sensor Regulation)
Maximum Range Master Setting Screen (Sensitivity Correction)
⑥ "MAX M.A:12.0000" and MAX M.B:12.000" (samples) will be displayed on the LCD screen.
Maximum Range Master Setting Screen (Sensitivity Correction)
⑦ Set the maximum range master in the measurement device.
The corrected zero data will be shown in the main display.
• When the zero correction data is green, sensitivity master setting can be done.
Press ENT and correct sensitivity.
• When the light is red, then Minimum Range sensitivity master setting cannot be performed, so adjust the sensor.
Press MAS.
"ADJ-A: 12.3456" and "ADJ-B"12.3456" will be displayed in the alphanumeric screen, and the screen will shift to sensor adjustment. (Refer to 5.3 Sensor Regulation)



5.6 Master Setting Errors

When there are master setting errors, the following error details will be displayed on the alphanumeric display.

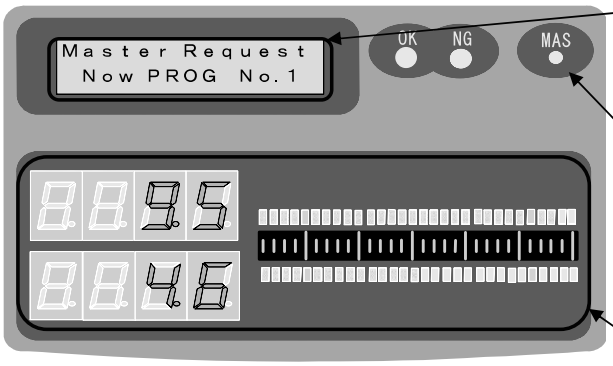
Master set way	Outside the Zero Correction Range	Outside the Sensitivity Correction Range
ALL	ZERO ERR	GAIN ERR
EACH	ZERO Set error	Zero Set Error

In case the abovementioned errors are displayed, check the master that was used. If there are no problems with the master, then adjustments via the zero/sensitivity regulator knob would be necessary. (Refer to 5.3 Sensor Regulation)

Pressing the ENT or RST button will erase the error message.

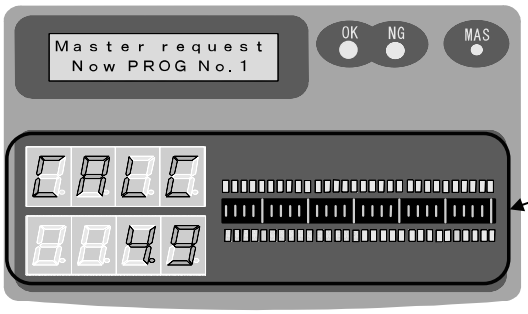
Chapter 6 Measurement Mode

6.1 Requesting for Master Setting



- Displays the master setting request message and the present program number.
- The red light will blink when there is Master Setting NG, while the green light will light up when it is OK.
- The measurement values [μm] (Channel A values at the top and channel B values at the bottom) that require master setting will be shown in orange.
- If the display range of the bar has been exceeded, the right end of the bar will blink.

When Requesting for Master Setting
(Main Measurement Screen)



- The raw calculation data [μm] (the calculation method can be changed in the settings) that require master setting will be shown in orange.
- If the display range of the bar has been exceeded, the right end of the bar will blink.

Master Setting Request Screen
(Main Calculation Screen)

[Explanations]

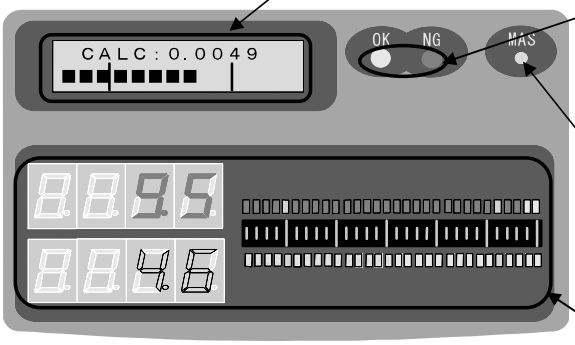
- In this condition or stage, the measurement values cannot be put on hold.
- The dark orange light at the right side of the bar shows the maximum judgment values, while that on the left shows the minimum judgment values.

- The screen shown above is the usual display when the unit is turned on. When the master setting is OK, then any button pressed will erase the message and measurement can be performed.
- Every push of the DISP button will switch the main measurement and main calculation screens. (When "NO USE" is selected in the "CALC Function," then it will only be the main measurement screen.)
- Pressing the SET button for 3 seconds will switch the screen to the Setting Mode.
- Pressing the MAS button for 3 seconds will switch the screen to the Master Setting Mode.
- Pressing the PROG button for 3 seconds will switch the screen to the Program Switch Mode

6.2 During Measurement

- When NO USE is chosen with regard to the CALC Function:
  - The top is the display for Channel A (in mm). (The display resolution can be changed.)
  - The bottom is the display for Channel B (in mm). (The display resolution can be changed.)

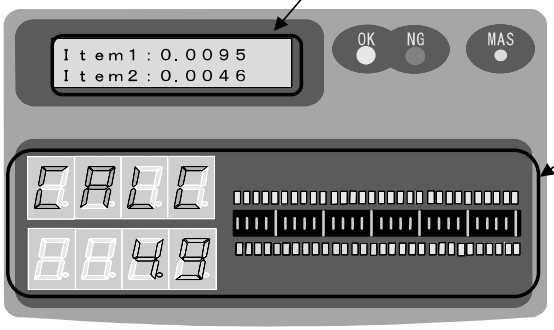
  ※In the above cases, the displayed values are raw and have not been corrected.
- For the other cases:
  - The top is the display for the calculation values (in mm). (The display resolution and the calculation method can be changed.)
  - The bottom is the bar graph of the calculation values.



- The general judgment lamp will light up (the OK light will be on when the measurement and calculation values are OK, and the NG light will be on when there are errors).
- The red light will switch on.
- This will be green when the measurement values [μm] that have been corrected through master setting (Channel A values at the top and channel B values at the bottom) are OK, and red if NG.
- If the display range of the bar has been exceeded, the right end of the bar will blink.

During Measurement
(Main Measurement Screen)

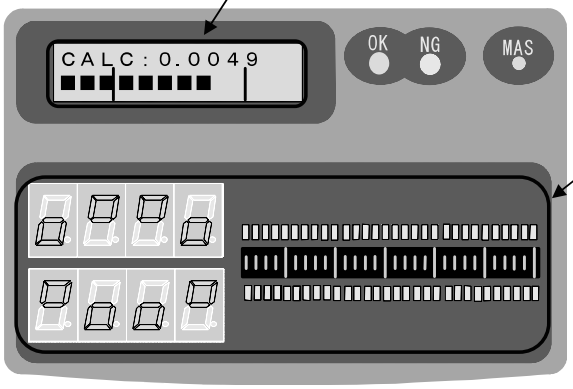
- The top is the display for Channel A (in mm). (The display resolution can be changed.)
- The bottom is the display for Channel B (in mm). (The display resolution can be changed.)



- This will be green when the calculation values are OK, and red if NG.
- If the display range of the bar has been exceeded, the right end of the bar will blink.

During Measurement
(Main Calculation Screen)

- When NO USE is chosen with regard to the CALC Function:
  - The top is the display for Channel A (in mm). (The display resolution can be changed.)
  - The bottom is the display for Channel B (in mm). (The display resolution can be changed.)
- For the other cases:
  - The top is the display for the calculation values (in mm). (The display resolution and the calculation method can be changed.)
  - The bottom is the bar graph of the calculation values.



- If the overall judgment is OK, this will be O (green), while it will be x (red) if the judgment is NG.

During Measurement
(Main General Judgment Screen)

[Explanations]

- This shows that the unit is in the Measurement Mode.
- The displayed values have been corrected through: ①the display resolution, ②master setting, and ③display value shift.
- The dark orange light at the left side of the bar shows the –NG/OK limits, while that on the right shows the OK/+NG limits.
- When "NO USE" is selected for "CALC Function," then the general judgment lamp will perform overall judgment in Channel A and Channel B. If any of these channels chose "NO USE," then the judgment will be made on the channel that can be used. In case options other than "NO USE" is chosen in the "CALC Function," then general judgment can be made on Channel A, Channel B and the calculation values.
- Every push of the 

button will switch the main measurement and master setting screens, and the main screen for the general judgment. (When "NO USE" is selected in the "CALC Function, then the main calculation screen will not be an option.)
- Pressing the 

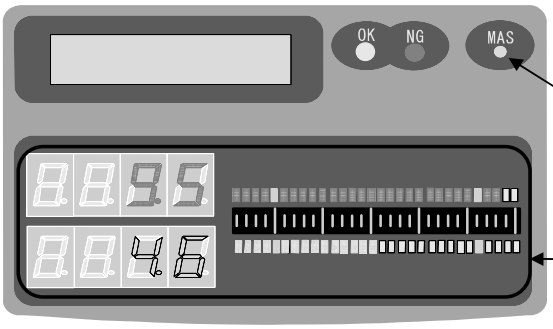
button for 3 seconds will switch the screen to the Setting Mode.
- Pressing the 

button for 3 seconds will switch the screen to the Master Setting Mode.
- Pressing the 

button for 3 seconds will switch the screen to the Program Switch Mode
- Pressing the 

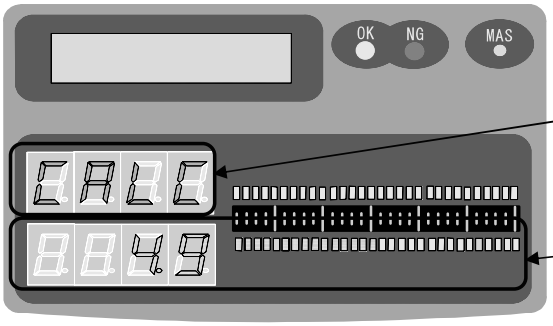
button will put the measurement values on hold. (Refer to "6.3 Holding the Measurement Values)
  When the external I/F is being used, then together with the measurement values being frozen (or on hold), the measurement values, judgment results and other elements will be generated as output. (When the "External switch" is in "Not hold," the values cannot be put on hold.)

6.3 When Putting Measurement Values on Hold



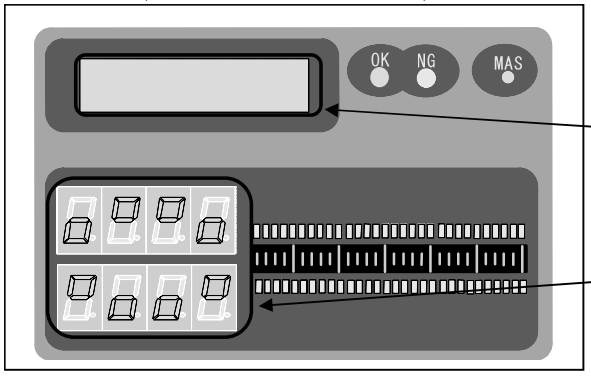
- The green light will switch on.
- The values during measurement will be put on hold (or frozen).
- The display color will turn from light → dark.

Freezing Measurement Values
(Main Measurement Screen)



- The display color will turn from light → dark.
- The "CALC" and "Hold" messages will be repeated alternately.
- The values during measurement will be put on hold (or frozen).
- The display color will turn from light → dark.

Freezing Measurement Values
(Main Calculation Screen)



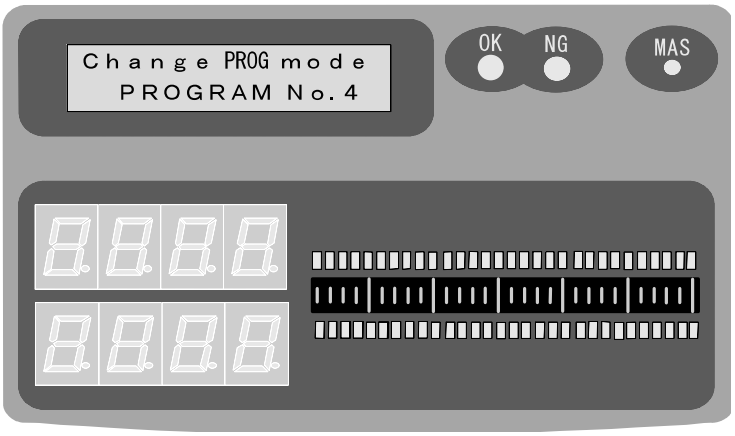
- The values during measurement will be put on hold (or frozen).
- The display color will turn from light → dark.

Freezing Measurement Values
(Main General Judgment Screen)

[Explanations]

- When erasing the frozen measurement values and returning to the measurement process, press **RST** or input the RESET signals.
- The measurement values cannot be frozen when the master setting was NG.

Chapter 7 Change Program Mode



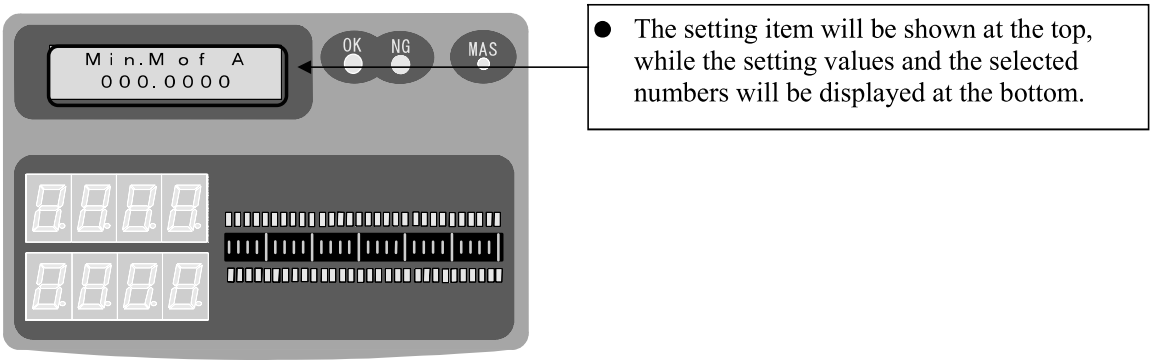
Change Program Mode

[Explanations]

- Pressing the PROG button for 3 seconds will switch the screen to the Change Program mode.
- "Change PROG mode" will be displayed at the top of the LCD screen, while the number of the program that is being currently used will be shown at the bottom.
- Choose the number (1~10) of the program that you want to use by pressing DISP SET or PROG MAS.
- When the ENT button is pressed, the program will be loaded, and the unit will switch from the Change Program mode to the Measurement mode.
- When the RST button is pressed, the program will stay as is (unchanged), and the unit will switch from the Change Program mode to the Measurement mode.
- When the device is turned on, it will start with the program number that was last selected and used.

Chapter 8 Setting Mode

8.1 Explanation of the Screen



Setting Mode

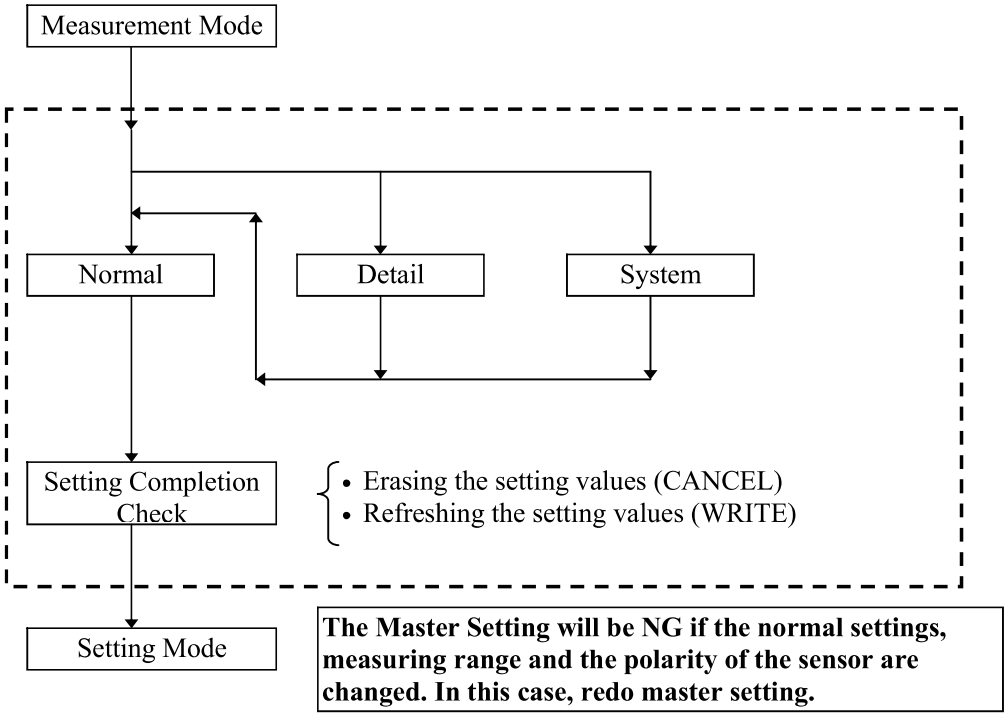
[Explanations]

- Pressing the SET button for 3 seconds will switch the screen to the Measurement mode.
- When inputting the setting values, the inputted values will change by pressing DISP PROG.

  (The numbers are lined up in a loop, so that when the DOWN key is pressed when it is at 1, it will get to 9, while when the UP key is pressed when it is at 9, it will go to 1.)
- When inputting the setting values, the digit of the inputted values will change by pressing SET MAS.

  (The cursors form a loop in such a way that when the cursor is at the rightmost digit and the RIGHT key is pressed, the cursor will move to the leftmost digit, and the other way around when the left key is pressed when the cursor is at the leftmost digit.)
- When choosing the item, the items will change by pressing DISP SET or PROG MAS. (Refer to “Chapter 10 Operation Flow”)

8.2 Structure of the Setting Mode



8.3 Setting Details

This section discusses the setting item names and setting details in the Setting Mode.
Roughly classified, the Setting mode can be divided into the following 3:

- Normal ··· The master values, judgment limits and other factors can be set
- Detail ··· The measuring range, display resolution, polarity, calculation method, master setting method and so on can be changed
- System ··· The external switch input, average shift frequency and so on can be changed

① Setting Item Names and Setting Details in NORMAL

● Settings Related to the Master Data

- 「MIN M. of A(B)」 ··· Input the minimum master setting range for each channel
- 「MAX M. of A(B)」 ··· Input the maximum master setting range for each channel

- Settings Related to the Judgment Limits
  - 「-NG/OK of A(B)」 … Input the –NG and OK judgment limits for each channel
  - 「OK /+NG of A(B)」 … Input the OK and +NG judgment limits for each channel
  - 「-NG/OK of CALC」 … Input the –NG and OK judgment limits of the calculation results
  - 「OK /+NG of CALC」… Input the OK and +NG judgment limits of the calculation results

- Settings Related to the Master
  - 「CORRECT of A(B)」… The corrected instrumental errors of each channel can be set
    The above setting data will be added onto the corrected master data, and then displayed.
    The setting can be within +0.9999~ -0.9999[mm].

② Setting Item Names and Setting Details in DETAIL
  - 「Measuring range」 … The measurement range can be selected.
  - 「Resolution」… The display resolution can be selected.
    The display resolution that can be chosen vary depending on the measurement range.

- Settings Related to the Polarity
  - 「POLARITY of A(B)」… The polarity of each channel can be selected.
    Choose + when the inside diameter will be measured, and – for the outside diameter.
    When only one channel will be used, make sure to select “NO USE” with regard to the polarity of the sensor of the channel that will not be used.
    In this case, the “CALC Function” will automatically choose “NO USE, “ the “Master set way” will be set to “ALL,” and the inputting of the setting values will be skipped in the channel that will not be used.

- Settings Related to the Calculation Method
  - 「CALC Function」 … The calculation method can be selected in case the measurement values of Channels A and B will be calculated. If this is switched to “NO USE,” then the inputting of the judgment limits of the calculation results will be skipped.

- Settings Related to Master Setting
  - 「Master set way」 … The master setting method can be selected.

③ Setting Item Names and Setting Details in SYSTEM

- 「External switch」 … The input type of the external switch can be selected.
- 「Smooth time」 … The average shift frequency can be selected.
- 「Shift of A(B) (CALC」… The nominal dimensions of Channels A&B and the calculation results can be set. The measurement values displayed in the Measurement mode are the figures that have already deducted the values inputted in this step.

Resolution [μm]	Shift of A(B) (CALC							
0.02, 0.05	1	2	3	.	4	5	6	7
0.1, 0.2, 0.5	1	2	3	.	4	5	6	7
1, 2, 5	1	2	3	.	4	5	6	7

※Depending on the resolution, there are digits in which the settings may become void the

Chapter 9 External Input/Output Functions

9.1 Serial (RS232C) Communication Function

(1) Overview

This product utilizes serial communication and can send the output containing the measurement/judgment values to the printer or computer (hereunder referred to as PC).

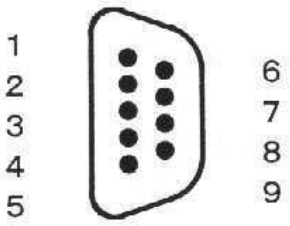
(2) Preparations

The "RS232C" at the back of this product is the connection to the printer or PC.

Connect these machines to the main body of the product with the use of the communication cable D-sub9P (male) that comes as an option.

(3) RS232C Connector

Caution Make sure that the cable is less than 15 meters long.



Pin No.	Signal
1	
2	RxD
3	TxD
4	
5	GND
6	
7	RTS
8	CTS

(4) Serial Port Settings

Settings	Setting Details
Baud Rate	9600
Bit/Characters	8
Stop Bit	1
Start Bit	1
Parity Bit	None

(5) Generation of the Measurement Results

The measurement data and the judgment results can be generated.

① Simple Commands (Commands from the PC for the required data)

1. Send the "D" <44H> command. The data on ② below will be returned. (The commands are case sensitive, so make sure to use the capital "D")
2. Send the "E" <45H> command. The measurement values will be frozen. (The commands are case sensitive, so make sure to use the capital "E")
3. Send the "R" <52H> command, and the frozen measurement values will be erased. (The commands are case sensitive, so make sure to use the capital "R")

② Simple Output Data
The following data will be returned.

String	I	T	E	M	1						-	2	5	.	0		-	N	G		
	I	T	E	M	2							1	2	.	5			O	K		
	I	T	E	M	3					N	O		U	S	E		N	J	G	CR	RF
	49	54	45	4D	31	20	20	20	20	20	2D	32	35	2E	30	20	2D	4E	47	20	
ASCII Code	49	54	45	4D	32	20	20	20	20	20	20	31	32	2E	35	20	2O	4F	4G	20	
	49	54	45	4D	33	20	20	20	20	4E	4F	20	55	53	45	20	4E	4A	47	0D	0A

(6) Data Transmission from the Main Device
In the Measurement mode, press **ENT** or the measurement switch (refer to "9.2 External Switch Input").
The data will be transmitted in the "5 ②Simple Output Data" form.
Caution Data cannot be transferred when the master setting is NG.

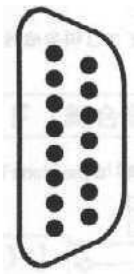
9.2 External Switch Input

(1) Overview
External switch, foot switch and other devices that have no voltage at the contact point can be connected to the "SW. ETC" at the back of this product, and measurement and RESET can be done with the use of these devices.

(2) Preparations
The "SW. ETC" at the back of this product is the connection point for the external switches.
The D-sub9P (male) cable can be connected.

(3) Input Switch Connector
External switches, foot switches and other non-voltage connectors can be connected to this product.
Inputting will be effective or valid by shorting the GND pin (6).
Please use the D-sub15P (male).

Caution
- Make sure that the cable is less than 2 meters long.
- This product cannot be used in switches other than push-button and foot switches.
- When connecting the product to a sequencer and relay device, make sure to use the DC input/output board (option).
- Do no connect anything in the pin numbers that have no signals labeled on them. Doing so may cause breakdown in the product.



(4) Operation Via the External Switches

a. Measurement Switch (Measurement)

① Press the "Measurement Switch" when in the Measurement mode.
The measurement values will be sent to the external devices/machines.

Caution The values will not be sent if the master setting is NG.

② When in the "External swtch" item in the Settings:
If "Hold" is selected, then the measurement data will be saved (or frozen) and the data will be generated.
If "Not Hold" is chosen, then only the data outputting will be done.

b. RESET Switch

① This erases the "hold" (frozen) status of the measurement values.

c. Minimum Master Setting

① When in the Measurement mode, set the minimum (range)/zero master in the measurement device.
② When the measurement value has stabilized, press the "Minimum Master Setting switch."
With this, the minimum (range) master setting will take place, and the unit will return to the Measurement mode.

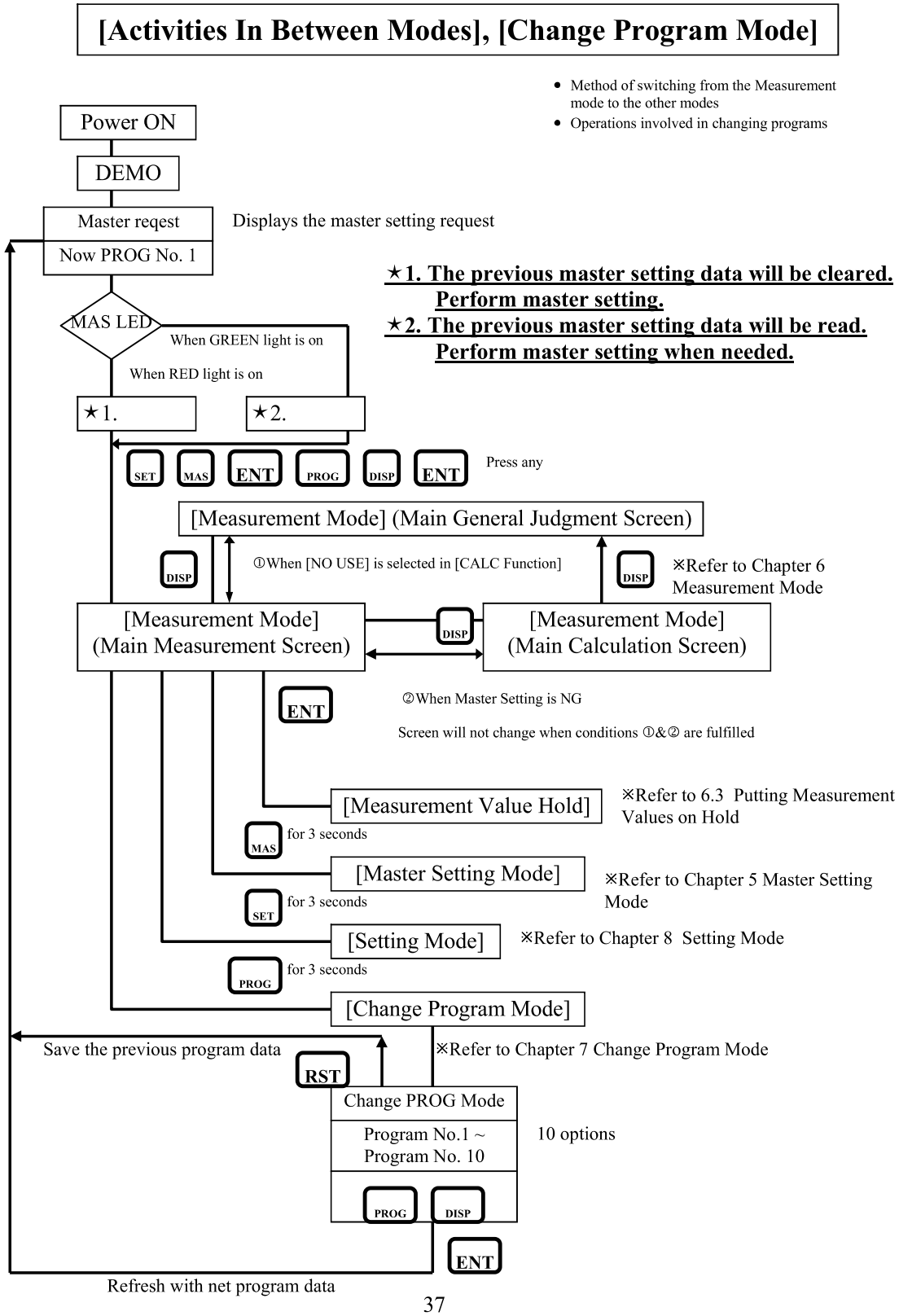
d. Maximum Master Setting

① When in the Measurement mode, set the maximum (range)/zero master in the measurement device.
② When the measurement value has stabilized, press the "Maximum Master Setting switch."
With this, the maximum (range) master setting will take place, and the unit will return to the Measurement mode.

Caution

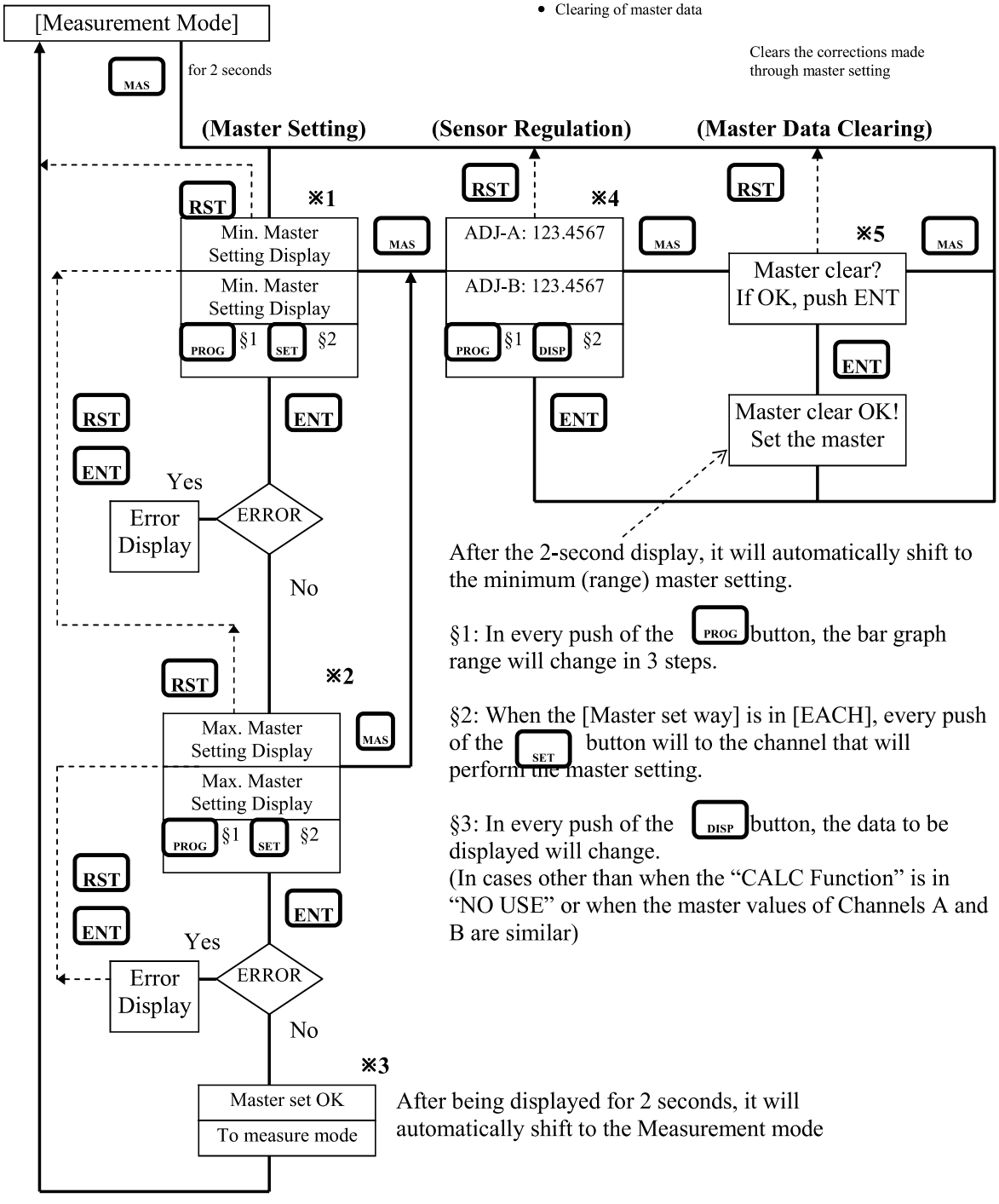
- Perform the master setting in the following order: Minimum Master Setting → Maximum Master Setting
- The master setting will be done for Channels A&B together

Chapter 10 Operation Flow



[Master Setting Mode]

- Master setting
- Sensor regulation/adjustment
- Clearing of master data



After the 2-second display, it will automatically shift to the minimum (range) master setting.

§1: In every push of the PROG button, the bar graph range will change in 3 steps.

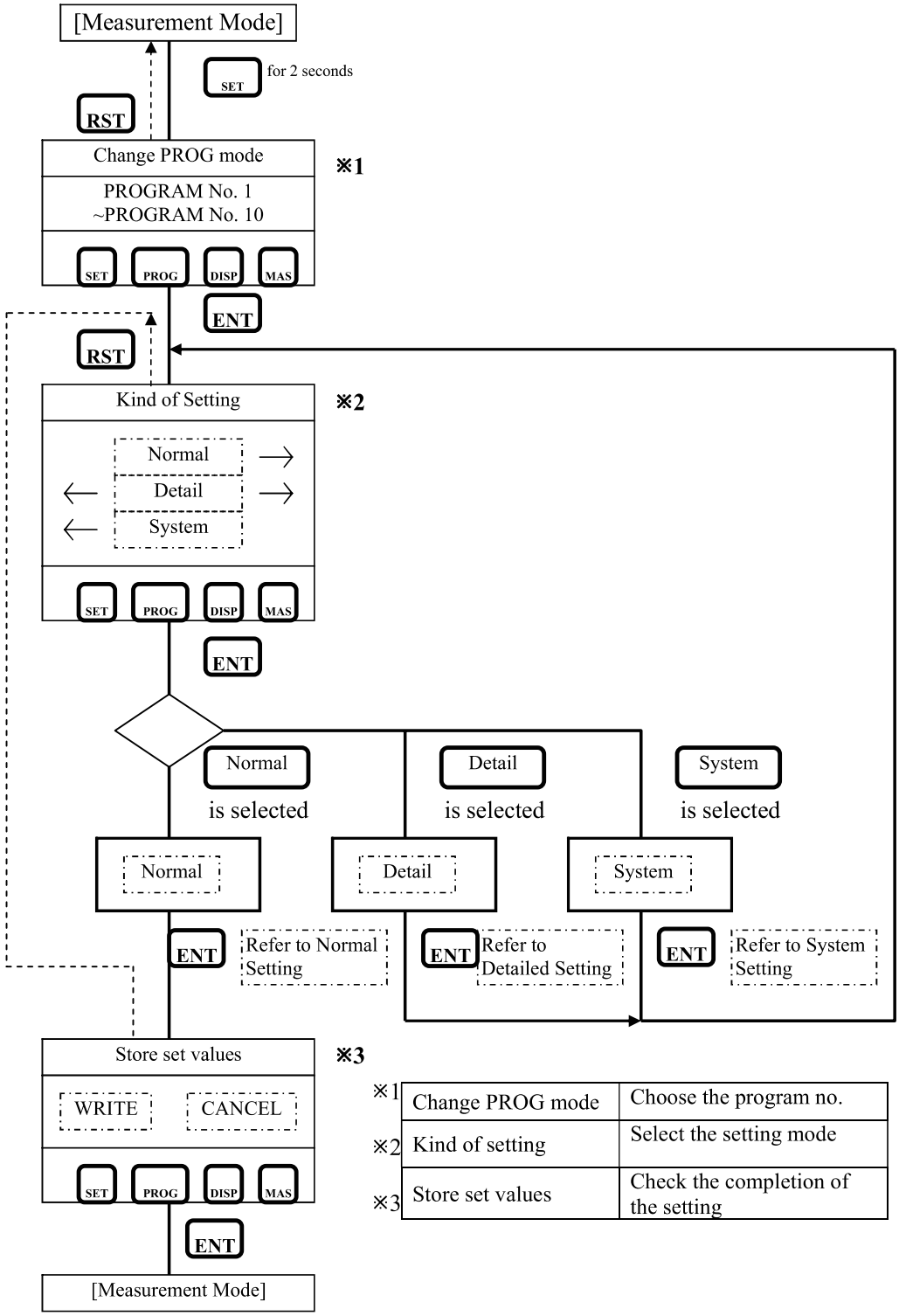
§2: When the [Master set way] is in [EACH], every push of the SET button will to the channel that will perform the master setting.

§3: In every push of the DISP button, the data to be displayed will change.
(In cases other than when the "CALC Function" is in "NO USE" or when the master values of Channels A and B are similar)

After being displayed for 2 seconds, it will automatically shift to the Measurement mode

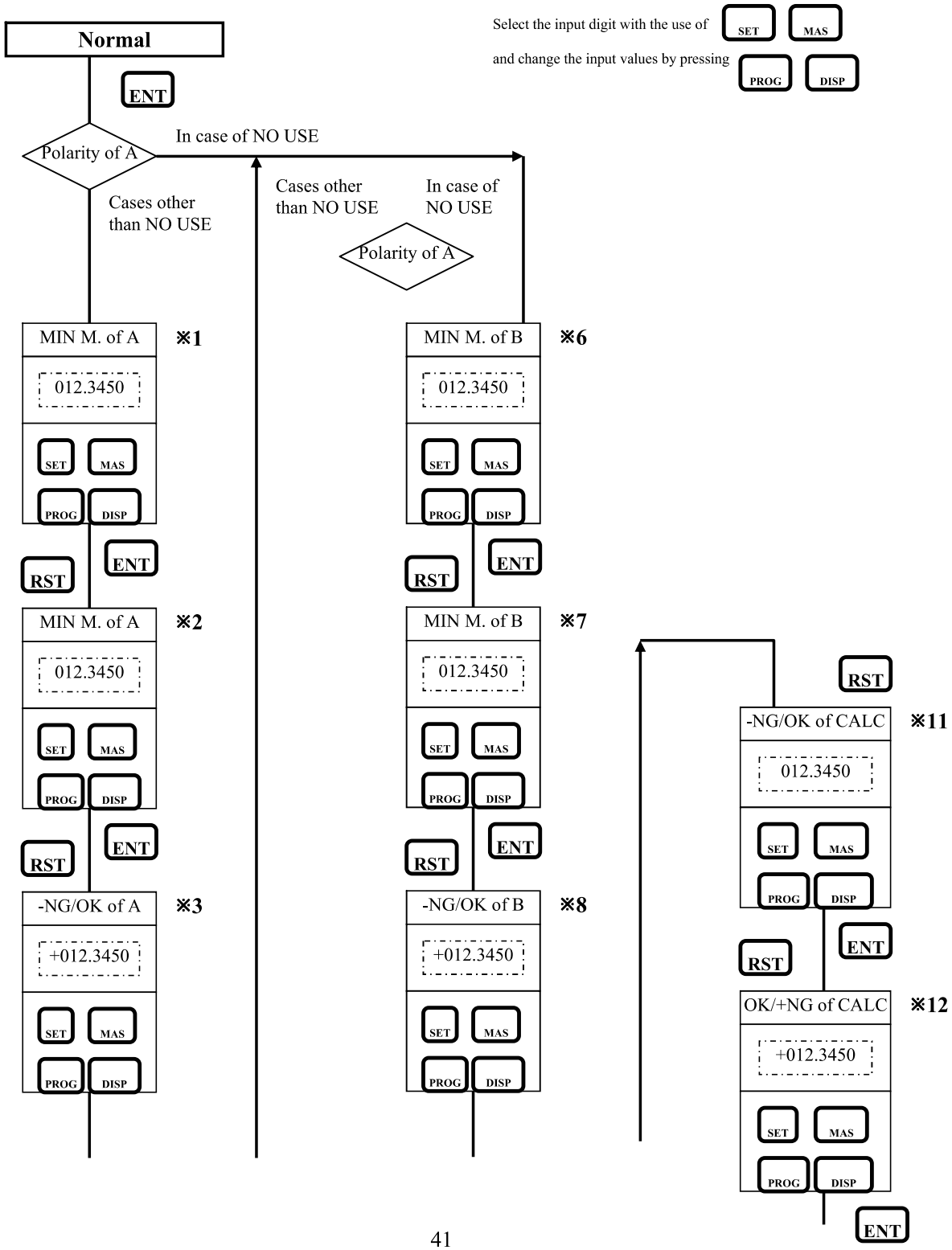
	[Master set way]		
	[ALL]	[EACH]	
※1	MAX M.A: 123.4567 MAX M.B: 123.4567	Push [SET] B ← A MIN M.A: 123.4567	Perform maximum (range) master setting of Channel A
※2	MAX M.A: 123.0000 MAX M.A: 123.0000	Set MAX M. of A 123.0000	Perform minimum (range) master setting of Channel A
※3	Master set OK To measure mode		Master setting complete. Proceed to Measurement mode
※4	ADJ-A: 123.4567 ADJ-B: 123.4567		Regulate or adjust the sensor
※5	Master Clear? If OK, push ENT.		Clears the corrected data of the previous master setting

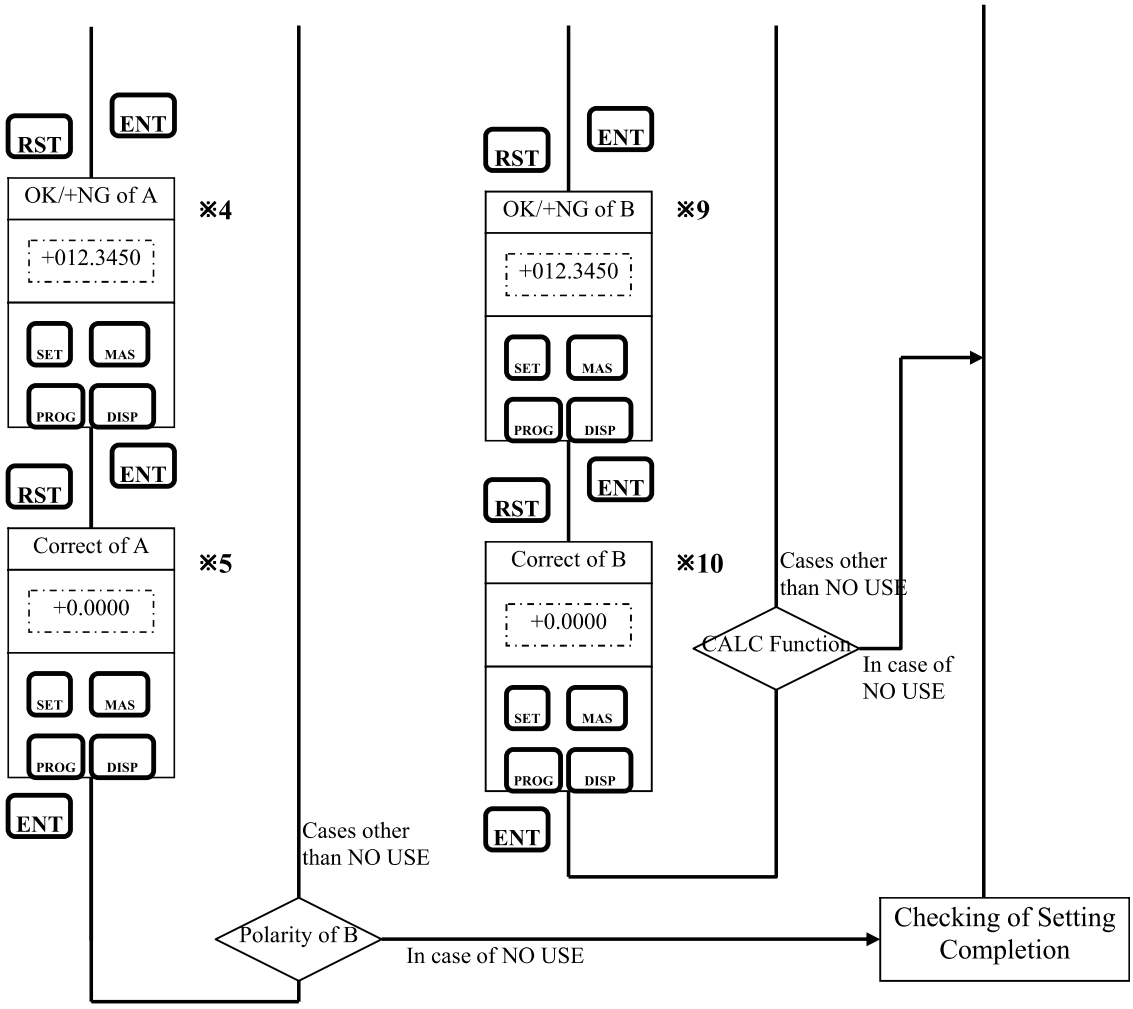
[Setting Mode]



※1	Change PROG mode	Choose the program no.
※2	Kind of setting	Select the setting mode
※3	Store set values	Check the completion of the setting

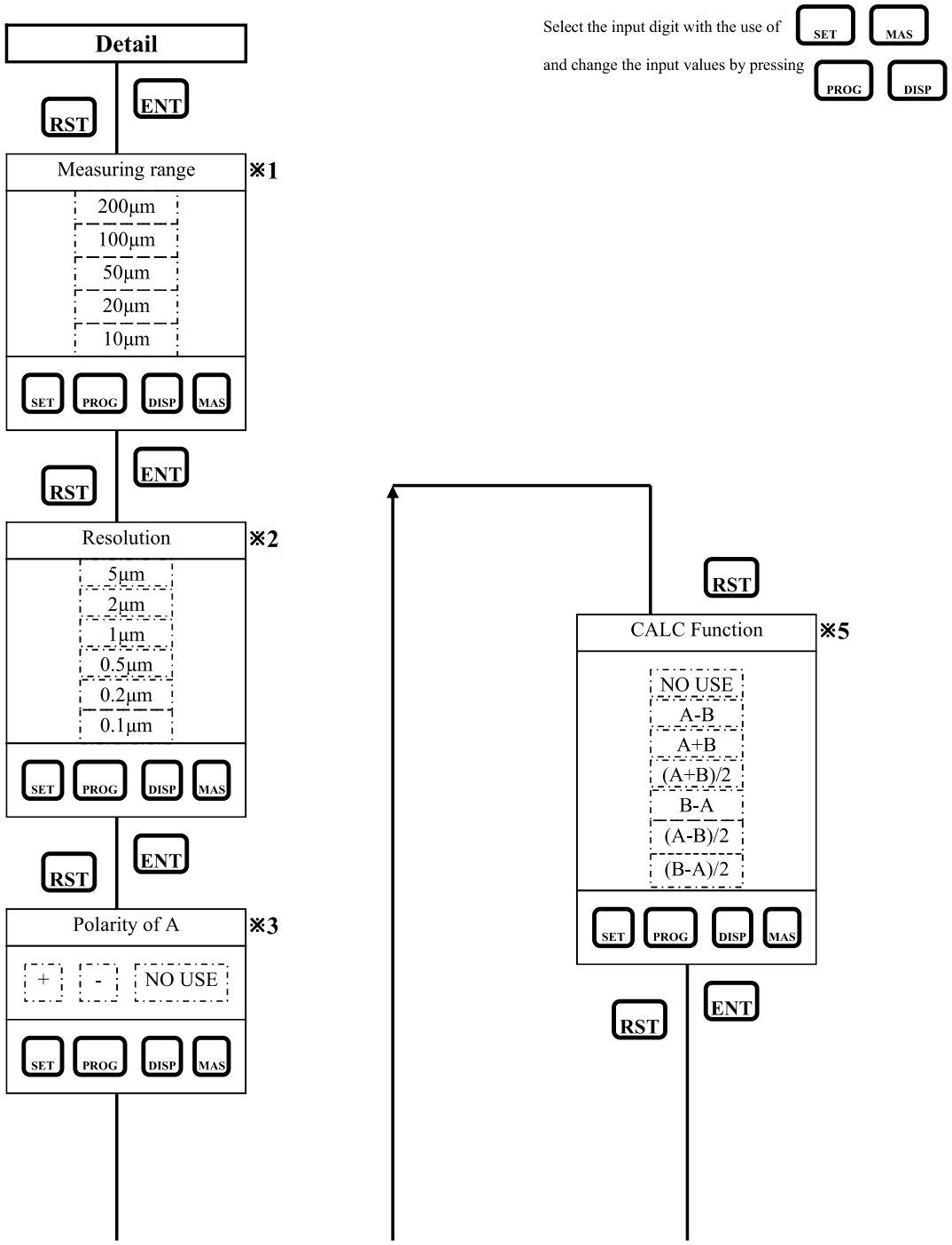
[Setting Mode (Normal Setting)]

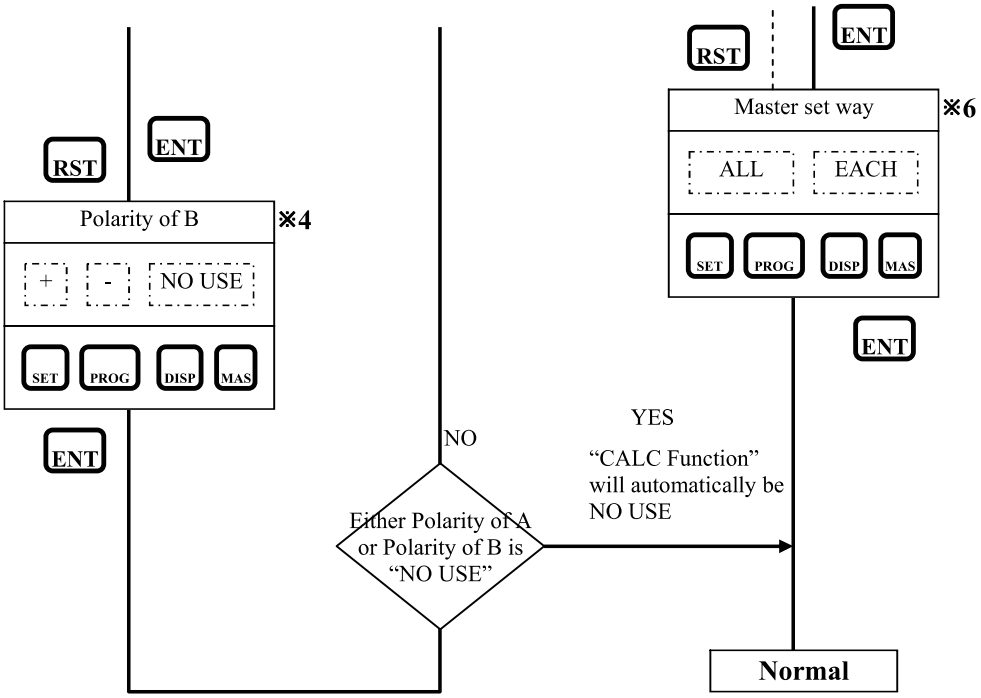




※1	MIN. M. of A	Input the minimum (range) master value of Channel A
※2	MAX. M of A	Input the maximum (range) master value of Channel A
※3	-NG/OK of A	Input the –NG/OK judgment limits of Channel A
※4	OK/+NG of A	Input the OK/+NG judgment limits of Channel A
※5	Correct of A	Input the corrected instrumental error of Channel A
※6	MIN. M. of B	Input the minimum (range) master value of Channel B
※7	MAX. M of B	Input the maximum (range) master value of Channel B
※8	-NG/OK of B	Input the –NG/OK judgment limits of Channel B
※9	OK/+NG of B	Input the OK/+NG judgment limits of Channel B
※10	Correct of B	Input the corrected instrumental error of Channel B
※11	-NG/OK of CALC	Input the –NG/OK limits of the calculation results
※12	OK/+NG of CALC	Input the OK/+NG limits of the calculation results

[Setting Mode (Detail Setting)]

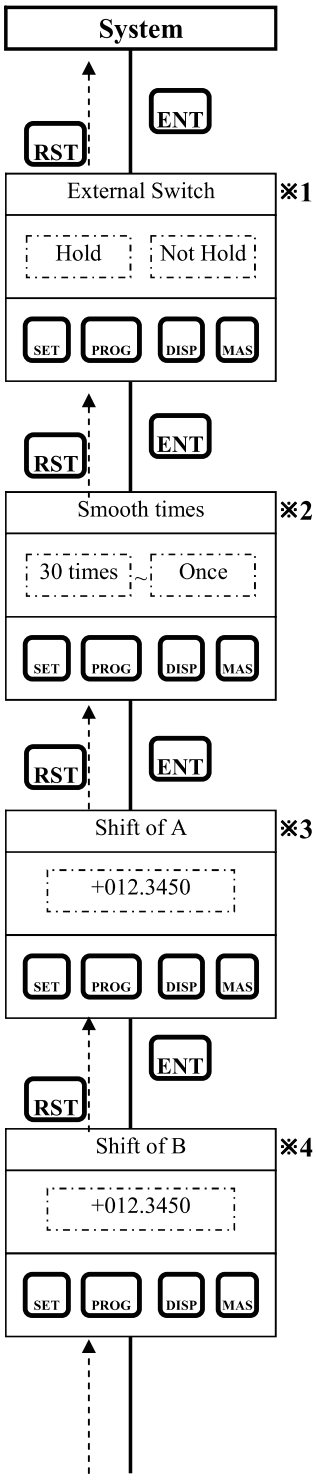


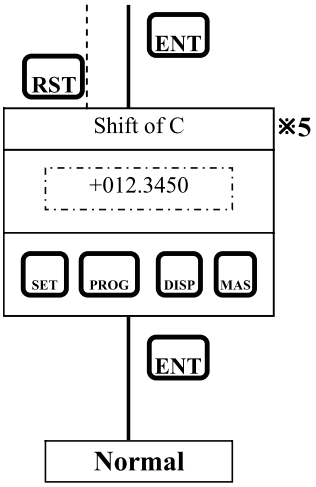


※ In Normal setting, the 100μm and 50μm can be selected.

※1	Measuring range	Select the measurement range
※2	Resolution	Select the resolution
※3	Polarity of A	Select the polarity of the Channel A sensor
※4	Polarity of B	Select the polarity of the Channel B sensor
※5	CALC Function	Select the calculation method
※6	Master set way	Select the master setting method

[Setting Mode (System Setting)]





※1	External switch	Select the external switch operation
※2	Smooth times	Select average shift frequency
※3	Shift of A	Input the nominal dimensions of Channel A
※4	Shift of B	Input the nominal dimensions of Channel B
※5	Shift of CALC	Input the nominal dimensions of the calculation results

Chapter 11 Measurement Sample

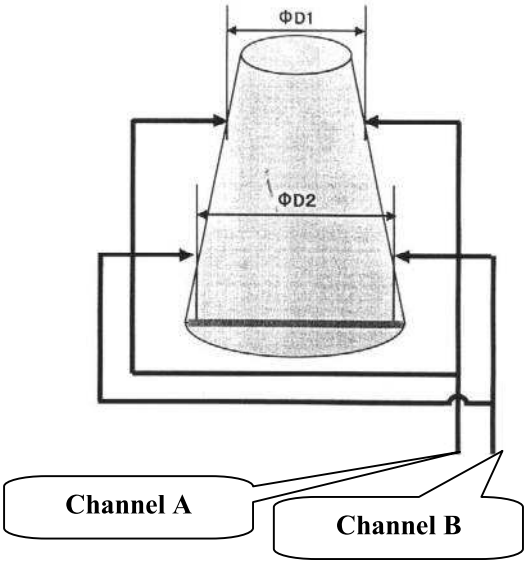
11.1 Taper Measurement

When measuring the taper of a cylinder as shown in the right diagram:

	ØD1	ØD2
Max. Range	12.0500	14.0500
Min. Range	11.9500	13.9500

Work Tolerance

Channel A	**12**	+0.0450 -0.0450
Channel B	**14**	+0.0450 -0.0450
Taper Degree (B-A)	**2**	+0.0300 -0.0300



(1) Set the Program No. to 1.
(2) Set the [Measuring range] to 100μm.
(3) Channel A will be for the measurement of the outside diameter, so choose – for Polarity A.
(4) Channel B will be for the measurement of the outside diameter, so choose – for Polarity B.
(5) In order to see the taper degree (B-A), select B-A in the [CALC Function].
(6) Choose ALL in the [Master set way].
(7) Input the minimum (range) master value (11.9500) of Channel A.
(8) Input the maximum (range) master value (12.0500) of Channel A.
(9) Input the –NG/OK limits (11.9550 (=12-0.0450)) of Channel A.
(10) Input the OK/+NG limits (12.0450 (=12+0.0450)) of Channel A.
(11) Input the corrected instrumental error (+0.0000) of Channel A.
(12) Input the minimum (range) master value (13.9500) of Channel B.
(13) Input the maximum (range) master value (14.0500) of Channel B.
(14) Input the –NG/OK limits (13.9550 (=14-0.0450)) of Channel B.
(15) Input the OK/+NG limits (14.045 (=14+0.0450)) of Channel B.
(16) Input the corrected instrumental error (+0.0000) of Channel B.
(17) Input the –NG/OK limits (1.9700 (=2-0.030)) of the taper degree (B-A).
(18) Input the OK/+NG limits (2.0300 (=2+0.030)) of the taper degree (B-A).
(19) Select [WRITE] in the [Store set value].
(20) Setting complete. Commence with the measurement after performing master setting

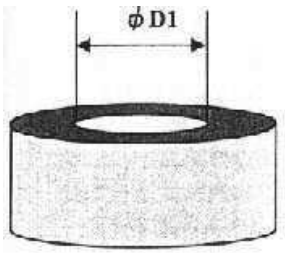
Setting Mode	Setting Item			Model	DAG2200
				Prog. No.	[1]
Detail	Measuring Range		Measuring Range		100μm
	Resolution		Resolution		0.1μm
	Channel A	Polarity	Polarity of A	+	
				-	√
	Channel B		Polarity of B	+	
				-	√
	Calculation Method		CALC Function (Input calculation method)		B-A
	Master Setting Method		Master set way	ALL	√
				EACH	
Normal	Channel A	Min. Master	MIN. M. of A (Input actual dimensions)		11.9500
		Max. Master	MAX M. of A (“)		12.0500
		Judgment Limits	-NG/OK of A (“)		11.9550
			OK/+NG of A (“)		12.0450
		Corrected Instrumental Error	Correct of A (-0.9999~+0.9999)		0.0000
	Channel B	Min. Master	MIN. M. of B (Input actual dimensions)		13.9500
		Max. Master	MAX M. of B (“)		14.0500
		Judgment Limits	-NG/OK of B (“)		13.9550
			OK/+NG of B (“)		14.0450
		Corrected Instrumental Error	Correct of B (-0.9999~+0.9999)		0.0000
	Calculation Value	Judgment Limits	-NG/OK of CALC (Input actual dimensions)		1.9700
			OK/+NG of CALC (“)		2.0300
System	External Switch Operation		External Switch	Hold	√
				Not Hold	
	Average Shift Frequency		Smooth Times (1~30)		10

Setting Sample in Case of Core Measurement (Above)

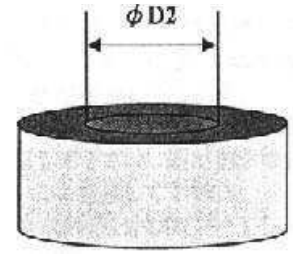
11.2 2-Series Inside Diameter Measurement

When measuring the respective inside diameters of Channels A & B.

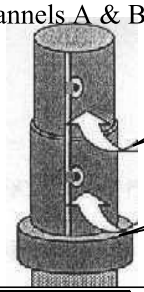
	ØD1	ØD2
Max. Range	14.010	14.660
Min. Range	14.000	14.650



Master (Max. & Min) for Channel A



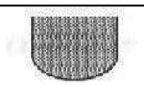
Master (Max. & Min) for Channel B



Work Tolerance

Channel A: Ø14 +0.0080 +0.0020

Channel B: Ø14.65 +0.0050 +0.0000



(1) Set the Program No. to 2.
(2) Set the [Measuring range] to 20μm.
(3) Channel A will be for the measurement of the outside diameter, so choose + for Polarity A.
(4) Channel B will be for the measurement of the outside diameter, so choose + for Polarity B.
(5) Select NO USE in the [CALC Function].
(6) Choose EACH in the [Master set way].
(7) Input the minimum (range) master value (14.0000) of Channel A.
(8) Input the maximum (range) master value (14.0100) of Channel A.
(9) Input the –NG/OK limits (14.0020 (=14+00.20)) of Channel A.
(10) Input the OK/+NG limits (14.0080 (=14+00.80)) of Channel A.
(11) Input the corrected instrumental error (+0.0000) of Channel A.
(12) Input the minimum (range) master value (14.6500) of Channel B.
(13) Input the maximum (range) master value (14.6600) of Channel B.
(14) Input the –NG/OK limits (14.6500 (=14.65+0.0000)) of Channel B.
(15) Input the OK/+NG limits (14.6600 (=14.65+0.0050)) of Channel B.
(16) Input the corrected instrumental error (+0.0000) of Channel B.
(17) Select [WRITE] in the [Store set value].

Setting complete. Commence with the measurement after performing master setting

Setting Mode	Setting Item			Model	DAG2200
				Prog. No.	[2]
Detail	Measuring Range		Measuring Range		500μm
	Resolution		Resolution		0.1μm
	Channel A	Polarity	Polarity of A	+	√
				-	
	Channel B		Polarity of B	+	√
				-	
	Calculation Method		CALC Function (Input calculation method)		NO USE
	Master Setting Method		Master set way	ALL	
				EACH	√
Normal	Channel A	Min. Master	MIN. M. of A (Input actual dimensions)		14.0000
		Max. Master	MAX M. of A (“)		14.0100
		Judgment Limits	-NG/OK of A (“)		14.0020
			OK/+NG of A (“)		14.0080
		Corrected Instrumental Error	Correct of A (-0.9999~+0.9999)		0.0000
	Channel B	Min. Master	MIN. M. of B (Input actual dimensions)		14.6500
		Max. Master	MAX M. of B (“)		14.6600
		Judgment Limits	-NG/OK of B (“)		14.6500
			OK/+NG of B (“)		14.6550
		Corrected Instrumental Error	Correct of B (-0.9999~+0.9999)		0.0000
	Calculation Value	Judgment Limits	-NG/OK of CALC (Input actual dimensions)		-
			OK/+NG of CALC (“)		-
System	External Switch Operation		External Switch	Hold	√
				Not Hold	
	Average Shift Frequency		Smooth Times (1~30)		10

Setting Sample in Case of 2 Inside Diameter Measurement (Above)

Chapter 12 Maintenance

(1) Use alcohol to remove the dirt from the main body of the product.
Using thinner may cause fading of the color product or may produce dirt.

(2) The filter will get clogged when used for a long period of time.
Change the element 2 years after the start of use of the filter, or when the pressure has dropped to 0.1MPa.

(3) Cleaning the A/E Converter
Oil and dirt may adhere inside the air circuit when the product is used for a long period of time.
Clean the product through the following procedure.
When there is too much oil, we recommend using a pressurized air cleaner.

① Record the position (distance from the main body to the edge) of the zero position/sensitivity regulator knob.
After cleaning, the master setting process will be easier.

② Turn the zero position/sensitivity regulation knob counterclockwise and the pull it and remove it from the main body.

③ Inspect the O-ring of the needle. When it is already damaged, replace it.

④ Clean the needle if it is dirty.
Clean the hole part (ø13) that is hit by the needle with the use of a cotton swab with alcohol.

⑤ Assemble the needle into the main body of the product.
If the screw looks loose, use a – screwdriver to tighten it.
Be careful so that the screw will not be excessively tightened.

⑥ Turn the needle clockwise and then assemble it into the position that was recorded at the beginning of the cleaning process.
Adjust with the use of the zero position/sensitivity regulation knob, and perform master setting.

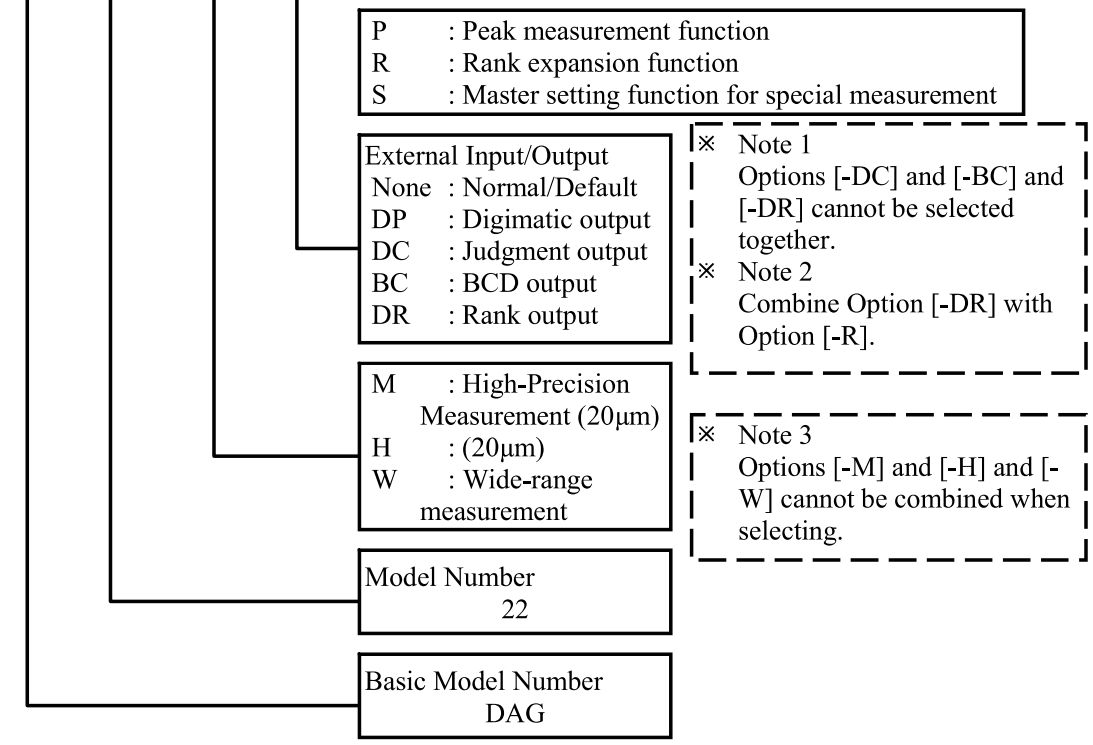
Chapter 13 Troubleshooting

Phenomenon	Breakdown Point or Place with Defective Regulation	Countermeasure
The precision when the product is used repeatedly does not become stable	① The supplied pressure is not stable	① Set the source pressure of the regulator to more than 300kPa
	② Defective regulator functions	② Overhaul or change the regulator
	③ The nozzle is worn out	③ Change the nozzle with a new nozzle
	④ There is air leak in the pipes, couplers, etc.	④ Check the leak and re-tighten
	⑤ Oil has penetrated the main body	⑤ Clean the main body (use the pressurized air cleaner)
The zero position regulator dial is not working	① The supplied pressure is not low or high	① Set the regulator pressure to 196kPa
	② Defective regulator functions	② Check the leak and re-tighten
	③ Nozzle clearance is too small	③④ Adjust the clearance to the proper clearance
	④ Nozzle clearance is too big	
The main display is not moving	① The correct power supply is not supplied	① Supply the unit with AC85-264V
	② Defective zero position regulation	② Adjust the master
	③ The measurement values are on hold. Indicator is green (dark) or red (dark)	③ Cancel or erase with the RST button
	④ The unit is in the Measurement mode	④ End the Measurement mode
The indicators do not light up	① No power	① Supply the unit with AC85-264V
	② Busted fuse	② Change the fuse (3A)
	③ Broken power supply/internal circuit	③ Send the unit to the manufacturer for repairs

Chapter 14 Others

14.1 Model

DAG 22 00 - H - DP - P - R



14.2 Options

(1) Main Unit Assembly

① High-Precision Measurement	Measurement range 10μm, Measurement range 20μm
② Wide-Range Measurement	Measurement range 200μm
③ Digimatic Output	Output to the printer (DP-1) ※with cable
④ Judgment Output	3-rank (-NG, OK and +NG) output (requires DC input/output board and connector)
⑤ BCD Output	Cord output of BCD data (requires DC input/output board and connector)
⑥ Rank Output	By using the unit in combination with the rank expansion function, up to 99 (OK range) judgment results can be produced
⑦ Rank Expansion Function	A maximum of 99 ranks (OK range) can be judged
⑧ Peak Measurement Function	Measurement value changes (+PEAK, -PEAK, TIR (=(+PEAK)-(PEAK)), TIR/2 ((+PEAK)-(-PEAK))/2) ※Comes with the automatic measurement function that is triggered by changes in the measurement values
⑨ Pitch Measurement Function	Pitch measurement can be done

(2) Separately Sold Items

① Filter (DAG2200-OP-AF)	Air filter + Mist filter
② Filter (DAG2200-OP-AFA)	Air filter + Mist filter (with auto-drain)
③ Regulator (DAG2200-OP-AF)	Precision regulator
④ Serial Communication Cable	
(DAG2200-OP-CB-1)	D-sub 9-pin connector (EIA-232) for the PC ※with sample software
(DAG2200-OP-CB-2)	D-sub 25-pin connector (EIA-574) for the PC
(DAG2200-OP-CB-2)	D-sub 25-pin connector (EIA-574) for the printer
⑤ Compressed Air Cleaner	
(DAG2200-OP-HAF)	High oil/water removal rate
⑥ Foot Switch	
(DAG2200-OP-FSW-1)	Single
(DAG2200-OP-FSW-2)	Dual

14.3 Specifications

Item		Specification	Remarks
Input Module		Air 2-channel	
Number of Programs		10	
Master Setting		Minimum, Maximum	
Automatic Master Setting Range	Zero Correction	Within Measurement Range ±50%	
	Sensitivity Correction	Within Measurement Range ±20%, or 0.5~2.0 times	
Main Display		30-dot color bar (red, green orange, light and dark) <LED Bar> 4-digit digital display (red, green, orange, light and dark) <7-segment LED>	Measurement value, calculation results and general judgment
LCD Display		16 * 2-character liquid crystal display	
Number of Setting Items		3	Measurement 2, Calculation 1
General Judgment Lamp		OK/Green LED, NG/Red LED	
Range [μm]		50, 100	Common in ITEM 1, ITEM 2, CALC
Resolution [μm] (Main Display Digital Values)		5, 2, 1, 0.5, 0.2, 0.1	Common in ITEM 1, ITEM 2, CALC
Power Supply	Voltage	AC85~264V	Comes with cable for AC100V
	Frequency	50/60Hz (common)	
	Capacity	40VA	
Regulator	Type	External	
	Supply Pressure	0.3~0.7MPa	
Weight (kg)		3	3.5 (When installing the regulator)
Dimensions (W x D x H) [mm]		150 x 180 x 193	D275 (When installing the regulator)
Working Temperature		0~45º	
Standard I/F		RS-232C, 1 port	Measurement values and judgment results output
		Push-button and foot switch input	Measurement command, RESET, master setting

Calculation Method			NO USE, A-B, A+B, (A+B)/2, B-A, (A-B)/2, (B-A)/2	Select 1
Options	High-Precision Measurement		Measurement range 10μm	Choose 1
			Measurement range 20μm	
	Wide-Range Measurement		Measurement range 200μm	
	Digimatic Output		1 port	Comes with DP-1 cable
	Judgment, BCD and Rank Output	Input Signals: 8	Measurement command, RESET, master setting and program change/switch	
		Output Signals: 24	Ready and Master OK	Signal common in 1, 2 and 3
			1. Judgment (Rank) output, 2. BCD output, 3. Rank output	Choose any of the 3
	Foot Switch	Single	Measurement command	
		Dual	Measurement command, RESET	
	Serial Communication Function		RS-232C	
	Peak Measurement Function		+PEAK, -PEAK, TIR(=+PEAK-(-PEAK)), TIR/2(=+PEAK-(-PEAK)/2))	Comes with automatic measurement function due to the measurement changes
	Rank Expansion Function		Maximum of 99 ranks	OK range
	Master Setting Function for Special Measurements			
	Regulator			Precision regulator
	Filter	Manual Drain		
		Auto-Drain		
	Compressed Air Cleaner			When there is too much water and oil

Chapter 15 Worksheet

Production No.:_____.

Setting Mode	Setting Item				Model										
					Program No.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Detail	Measuring Range				Measuring Range										
	Resolution				Resolution										
	Channel A	Polarity	Polarity of A		+										
					-										
	Channel B		Polarity of B		+										
					-										
	Calculation Method				CALC Function (Input calculation method)										
	Master Setting Method		Master set way		ALL										
					EACH										
Normal	Channel A	Min. Master			MIN. M. of A (Input actual dimensions)										
		Max. Master			MAX M. of A (“)										
		Judgment Limits			-NG/OK of A (“)										
					OK/+NG of A (“)										
		Corrected Instrumental Error			Correct of A (-0.9999~+0.9999)										
	Channel B	Min. Master			MIN. M. of B (Input actual dimensions)										
		Max. Master			MAX M. of B (“)										

		Judgment Limits	-NG/OK of B (“)										
			OK/+NG of B (“)										
		Corrected Instrumental Error	Correct of B (-0.9999~+0.9999)										
	Calculation Value	Judgment Limits	-NG/OK of CALC (Input actual dimensions)										
			OK/+NG of CALC (“)										
System	External Switch Operation		External Switch	Hold									
				Not Hold									
	Average Shift Frequency		Smooth Times (1~30)										

Warranty

After purchasing, fill in the product model, serial number, date of purchase, and customer information and keep it in a safe place.

① Model number	⑤ Warranty period from purchased date One year
② Serial number	
③ Purchased date (yyyy/mm/dd)	

⑥ Customer	Company name or name of purchaser
	Address
	TEL :
	FAX :

Warranty regulations

During the warranty period, we will repair the product at free of charge only in case of failure that occurs at our responsibility.

Please present or attach this warranty sheet when requesting no charge repair.

・The product warranty area is limited within Japan.

・The warranty covers only the purchased product itself.

The following costs and damages are not covered by the warranty

1) Transportation costs associated with this product
2) Cost of removal, installation and other incidental work when the product is connected to or incorporated in another device.
3) Consequential damage to the user due to a failure of this product, such as loss of usage opportunities and/or downtime of the operation
4) Any other consequential or incidental damage.

There is a charge for repairs caused by the following cases

1))In case of using under undesignated operational conditions such as with the special regulator specifications, the special air supply piping and etc. In case of using under the operational circumstances such as a high temperature/high humidity, near magnetic field, and improper supply air conditions.
2) Failure caused by the equipment systems where the product is built-in.
3) In case of modification or repair by the other company.
4) In case of natural disaster, fire, abnormal voltage, etc.
5) Failure caused by improper handling not following the cautions in the operation manual or failure caused by insufficient maintenance.
6) In case of a consumable part is deteriorated and needs to be replaced.

※ Repair support period for measuring and control devices

The measuring and control devices can be repairable within a period of 3 years from the date of discontinuation.

The major spare parts for repairs are also available in the same period.

Electronic parts may have some difficulties for procurement and production due to its short life cycle.

Please note repair may not be possible even during the period.

※ Repair request

Please contact your local distributor for repair requests.

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