

COLUMNAR ELECTRONIC MICROMETER

CEG2000 Instruction Manual



NIDEC-SHIMPO CORPORATION

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1 Overview

Our columnar electronic micrometer features color bars of three different colors, which makes the display easy to see. The meter also features an automatic master matching function. It can be used by itself or can easily be deployed in complex combinations with other components. With the bar displays arrayed next to each other, the property of the object being measured can be ascertained.

2 Features

- (1) Displays measurement results clearly using a three-color color bar display.
- (2) With an eight-digit display, it can display such information as measured values and setting names.
- (3) Master alignment for both large and small limits can be accomplished at the push of a button.
- (4) Because the instrument is only 50mm wide, it can be used in a series configuration.
- (5) With the serial communications function (included standard), data can be output to a PC and printer. The data can be saved and input into statistical and spreadsheet applications (such as Microsoft Excel).
- (6) In the Set-up Mode, all settings can be entered in order by pressing the ENT key.
- (7) Up to 10 different sets of settings and master values can be saved and selected from.

3 Operation

This instrument has the following four principal modes of operation:

(1) Measurement mode

- Measurement mode Measures
- Hold measurement Saves the measured values
However, if master matching was unsuccessful, the values are not saved.

(2) Set-up Mode

- Set-up Mode Inputs or changes settings.

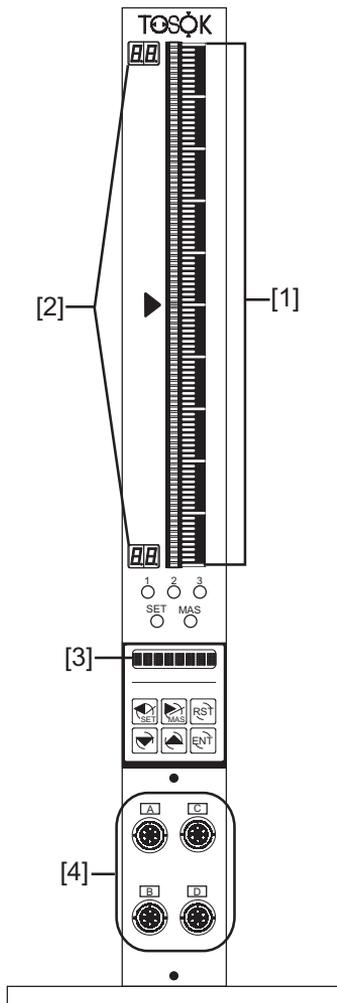
(3) Master matching mode

- Master matching Matches with a master.
This instrument conducts comparative measurements, so only use it after having measured a master for comparison.
- Adjust detector (ADJ) This will adjust the detector.
- Clear master match This will clear master match data.

(4) Program switching mode

- Program switching mode Switches programs.
The instrument launches with the last program that was used before it was last shut down.

4 Names and functions of the parts



[1] Bar graph display

Displays a 101-dot, three-color bar graph.

Table 1: Bar color and information displayed in each mode

Mode	Bar color	Information displayed
Measurement	Green (bright) Red (bright) Orange (dotted)	Value measured was OK. Value measured not OK. Upper or lower limit value.
Hold measurement	Green (dark) Red (dark)	Value measured was OK. Value measured not OK.
Setting	Orange (bright) Green (dotted)	Current setting value Previous setting value
Master matching	Green (bright) Red (bright) Orange (dotted)	Master matching possible Master matching not possible Master setting value
ADJ	Orange (bright) Green (dotted)	Value measured Master setting value

[2] Range display

The upper and lower measurements of the bar are given with a two-digit display. The display is the same for items 1-3 as shown in Table 2 below.

Table 2: Range display

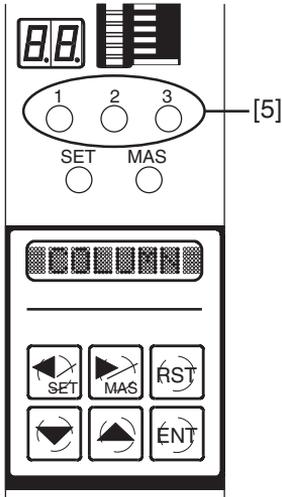
Measured range (microns)	Digital display
5	2.5
10	5.0
20	10.
50	25.
100	50.
200	10
500	25
1000	50

[3] Display

A 7×5 dot character, eight-digit display can show measured values, set values, setting names, and other information.

[4] Measurement device ports

Measurement devices can be connected as follows: A and B for two-channel type devices, and A-D for four-channel type devices.



[5] Item/decision lamps

This shows information such as the decision made and whether a measurement is currently being taken (whether the bar is being displayed). Each number, 1-3 shows the status for the corresponding item (3 is for the calculated result). Table 3 shows the relationship between lamp colors and status.

Table 3: Lamp colors and status

Lamp color	Status	Mode
Green (bright)	Decision: OK	Measurement
Green (bright and dark)	Decision: OK (bar being displayed)	Measurement
Green (dark)	Decision: OK	Hold measurement
Green (dark) and black	Decision: OK (bar being displayed)	Hold measurement
Red (bright)	Decision: NG	Measurement
Red (bright and dark)	Decision: NG (bar being displayed)	Measurement
Red (dark)	Decision: NG	Hold measurement
Red (dark) and black	Decision: NG (bar being displayed)	Hold measurement
Orange (bright)	Item-related settings being input Master matching (Item 3 excluded) Sensor being adjusted (Item 3 excluded)	Setting Master matching ADJ

[6] Mode lamps

These show the current mode and master matching status. Table 4 shows the relationship between lamp color, mode and master matching status.

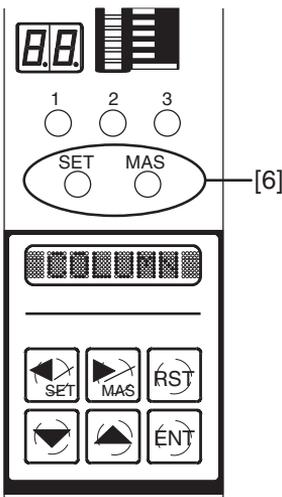
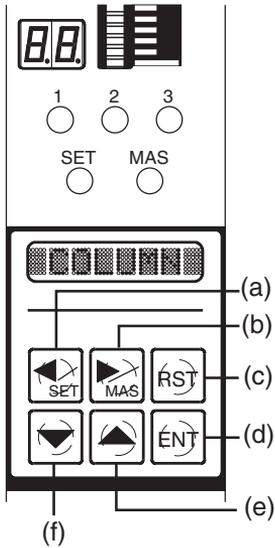


Table 4: Colors and status

Lamp name		Mode	Master matching status
SET	MAS		
Orange (bright)	—	Setting	—
Green (bright)	—	Program switching	—
—	Orange (bright)	Master matching	—
Orange (bright)	Red (bright)	Setting	Master matching unsuccessful
Green (bright)	Red (bright)	Program switching	Master matching unsuccessful
—	Orange (bright) & Red (bright)	Master matching	Master matching unsuccessful
—	Red (bright)	Measurement Hold measurement	Master matching unsuccessful



[7] Panel switches

(a) Left arrow key (SET key)

Mode	Key action	Status
Measurement	Hold down for two seconds	Switches to master matching
Setting	Press once	Select setting parameter

(b) Right arrow key (MAS key)

Mode	Key action	Status
Measurement	Hold down for two seconds	Switches to master matching
Setting	Press once	Select setting parameter
Master matching	Press once	Switch displayed information

(c) Reset key

Mode	Key action	Status
Hold setting value	Press once	Switches to measurement mode
Setting (settings being input)	Press once	Returns settings to their previous values
Setting (item being selected)	Press once	Cancel settings (Write/Cancel)
Master matching	Press once	Returns to previous display
ADJ	Press once	Returns to previous display

(d) ENTER key

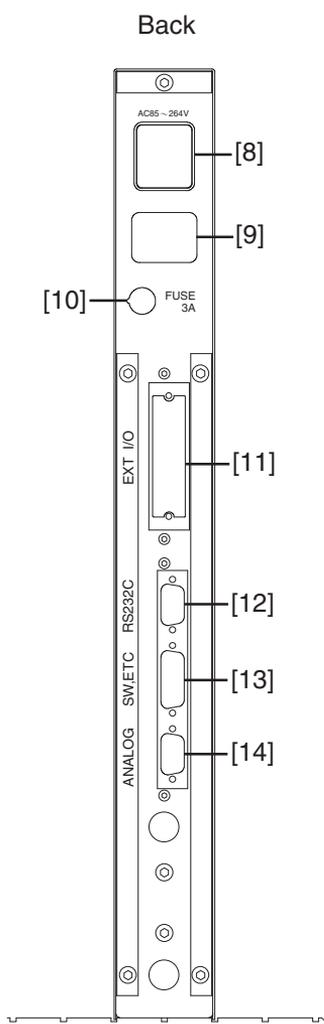
Mode	Key action	Status
Measurement	Press once	Holds the measured values (If master matching was successful)
Setting	Press once	Decide setting item and setting value
Master matching	Press once	Read in master values
ADJ	Press once	Decide adjustment item and adjustment value

(e) Up arrow key

Mode	Key action	Status
Measurement	Press once	Switch which information is displayed
Setting	Press once	Enter setting values
Master matching	Press once	Switch display masters
ADJ	Press once	Switch detector that is displayed

(f) Down arrow key

Mode	Key action	Status
Measurement	Hold down for two seconds	Switch to program switching mode
Measurement	Press once	Switch which information is displayed
Setting	Press once	Enter setting values
Master matching	Press once	Switch display masters
ADJ	Press once	Switch detector that is displayed



[8] Input power connector/power switch

This turns on the AC power. Although the instrument can be used within the 85-264V AC range, the included power cable can only be used in the 85-125V AC range.

[9] Output power connector

When used in a series configuration, this connects to the input power connector of the neighboring unit. It connects to the input power connector internally.

[10] Fuse holder

Glass tube fuses (5.2 × 20 3A) are used.

[11] DC input and output connectors (optional)

This is a connector for decision/ BCD output for connection to lamps, sequences, etc.

[12] RS232C connectors

This is a serial connector for use in linking to PCs and printers.

[13] Switch input connector

This connector enables measurement commands and master commands to be given by means of an external push button. This can also be used for RS422 communication and Digimatic output (optional).

[14] Analog input/output connector

This connector is for input of external analog signals and output of amp output signals.

5 Specifications

Item	Specification	Comments
Input	Electrically, 2 (4) channels	
Measurement item	3 (Calculation 1)	
Calculation method	1-2, 1+2, 2-1, AVE (1-2), AVE (1+2), AVE (2-1)	1=ITEM 1 2=ITEM 2
Measurement range (mm)	0.00500 0.0100 0.0200 0.0500 0.100 0.200 0.500 1.00	
Resolution (mm)	0.00005 0.0001 0.0002 0.0005 0.001 0.002 0.005 0.01	
Bar display	101-dot (red, green, orange, bright/dark)	
Bar display type	Bar (OK: Green, Not OK: Red), Dots (Max./Min.)	
Scale display	Two-digit (numbers), two locations	
Multi-function display	Eight-digit (Numbers/letters) Measured values, setting items, setting values, error messages	
Shift range	±300% (Full scale)	
Decision	± Not OK/OK	
Display of decision	Bar display (color), items, decision lamp, multi- function display	
Automatic master matching	Small limit, large limit	
Automatic master range	Small: ±50% (full scale) Large: ±20% (full scale)	
Program entry	Push-button on panel	
Number of set programs	10	
Power voltage and frequency	85-256V AC 50/60Hz	Comes with 100V AC cable
Power capacity	30VA	
Dimensions/weight	50mm (width) × 480mm (height) × 200mm (depth), 4 kg	
Operating temperature	0-45°C	
Standard		
External input buttons	4 (measurement, reset, large limit, small limit)	Push-button, Foot SW
Serial output	1 (printer, PC)	RS232C
Options		
Printer output	1 (DP1)	Digimatic
Decision output	8 (DC12/24V)	
BCD output	1 set (DC12/24V)	
Analog input	4 (connection to column)	
Serial communication	1	RS422/RS485

6 Operation

6.1 Overview

- What to do when the detector has been connected and adjusted and the settings have already been entered.
- What to do when the measurement head has been replaced

In this section, we will explain the procedures for the above two situations.

6.1.1 What to do when the detector has been connected and adjusted and the settings have already been entered.

Please use the following procedure.

(1) Power on

Turn on the power switch in the rear of the unit (press the side marked with a circle) to supply power (85-265V AC and 50/60Hz). The unit will start up in Measurement Mode.

In Measurement Mode, hold down the right arrow (MAS) key for two seconds.

Holding the key down for an additional two seconds switches to Clear Master Match.

(2) Clearing the master matching data

Clear the master matching data as necessary. For details, refer to 6.4.3 “Clearing the Master Match.”

(3) Master matching

Now match to a master. For details, refer to 6.4.1 “Master matching.”

(4) Measuring

In Measurement Mode, press the ENT key once, the unit will be set to Hold Measurement Value. This can be cleared by pressing the RST key. However, if the master match was unsuccessful, the measured value cannot be saved. For details, please refer to 6.2 “Measuring.”

6.1.2 What to do when the measurement head has been replaced

Please use the following procedure.

(1) Connection

Connect the detectors to the front of the column unit and the included power cord to the back.

(2) Power on

Turn on the power switch in the rear of the unit (press the side marked with a circle) to supply power (85-265V AC and 50/60Hz). The unit will start up in Measurement Mode.

In Measurement Mode, hold down the left arrow (SET) key for two seconds, which will switch to Set-up Mode.

(3) Inputting setting values

Please input the setting values. For details, please refer to 6.3 “Set-up mode.”

In Measurement Mode, hold down the right arrow (MAS) key for two seconds. After that, pressing the key down once switches to Adjust Detector (ADJ).

(4) Adjust Detector

Please adjust the detector. For details, refer to 6.4.2 “Adjusting the detector.”

In “Adjust Detector” mode, holding down the ENT key for two seconds switches to Master Matching.

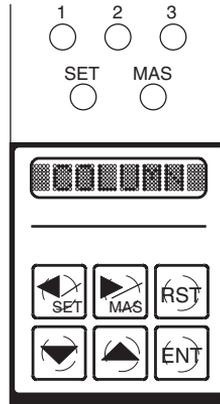
(5) Master matching

Please match to a master. For details, refer to 6.4.1 “Master matching.”

(6) Measuring

In Measurement Mode, pushing the ENT key once switches to Hold Measured Values. This can be cleared by pressing the RST key. However, if the master match was unsuccessful, the measured values cannot be saved. For details, please refer to 6.2 “Measuring.”

6.2 Measuring



6.2.1 Measurement mode

- Items currently being shown in the bar display are indicated by the blinking (light and dark) of “Item/decision lamps 1, 2, and 3.” For details on the colors of the lamps, refer to 4. [5] “Item/decision lamps.”
- The up and down arrow keys can be used to toggle between bar display items.

6.2.2 Hold measured value

- In Measurement Mode, pressing the ENT key will hold the measured value (will enter a holding state). However, if master matching was unsuccessful, the measurements will not be held.
- For the item shown in the bar display, the Item/decision lamps will blink (light and blank). For details on the colors of the lamps, refer to 4.[5] “Item/decision lamps.”
- The up and down arrow keys can be used to toggle between bar display items.
- Pressing RST (reset) releases the hold.

6.3 Set-up mode

Set-up must be performed for each program used. After changing the program number, please perform set-up.

6.3.1 Selecting the measurement range

- 1) In Set-up Mode, hold down the left arrow key for at least two seconds.
- 2) The orange “SET” LED will light up, “RANGE” will be displayed and the system will be in Set-up Mode.
- 3) Push the ENT key once.
- 4) The current measurement range will be displayed.
- 5) Press the up and down arrow keys to select a measurement range (5, 10, 20, 50, 100, 200, 500, and 1000 microns).
- 6) After making a selection, press the ENT key.
- 7) After measurement range selection has been completed, next is the set-up of the shift value. “SHIFT” will now be displayed.

6.3.2 Setting the shift value

For one-sided tolerances and such, the bar display will move to the center. Set this function to 0 to make it inactive.

- 1) With “SHIFT” displayed, press the ENT key.
- 2) The current shift value will be displayed.
- 3) Use the up and down arrow keys to enter the new shift value.
- 4) After entering the shift value, press the ENT key.
- 5) After the shift value is set, next will come selection for mask matching. “MAS SET” will be displayed.

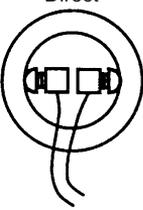
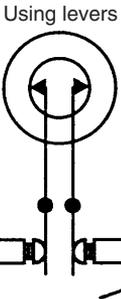
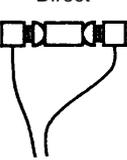
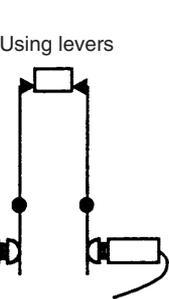
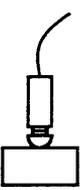
6.3.3 Selection for mask matching

- 1) With “MAS SET” displayed, press the ENT key.
- 2) The current mask matching setting value will be displayed.
- 3) Use the up and down arrow keys to select either “ALL” or “EACH.”
- 4) When carrying out mask matching:
“ALL”Mask matching is performed all at once.
“EACH”Mask matches are performed one by one.
- 5) After selecting the mask match settings, press the ENT key.
- 6) After mask matching set-up is complete, next will come polarity selection for each measuring unit. “XDUCER” will be displayed.

6.3.4 Polarity selection for each measuring unit

- 1) With “XDUCER” displayed, press the ENT key, and perform the set-up of each measuring unit.
- 2) Use the up and down arrow keys to toggle between measuring units A-D and “FINISH” as shown on the display. Select the name of the measuring unit to change the settings for and press the ENT key.
 - Select a letter A-D . . . to change the settings for a particular measuring unit.
 - Select “FINISH”. . . . to quit the set-up process.

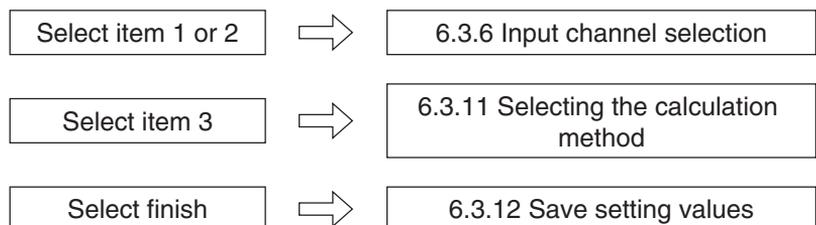
Go to selections in “6.3.5 Item selection.”
- 3) With “POL” displayed, press the ENT key. Set the polarities for each measuring unit.
- 4) Use the up and down arrow keys to select “+” or “-”, and then press the ENT key.

	Internal diameter measurement			External diameter measurement			Height measurement
Measuring method	Direct 	Using levers 	PG Type 	Direct 	Using levers 	OG Type 	
Selection of POL	-	-	-	+	-	+	+

- 5) Return to step 2) above.

6.3.5 Selection of items

- 1) With “ITEM” and the eight-digit display visible, press the ENT key. Then, enter the settings for each item.
- 2) Use the up and down arrow keys to toggle between item numbers 1-3 and “FINISH” as shown on the display. Select the name of the item to change the settings for.
- 3) Select the name of the item to change the settings for and press the ENT key.



6.3.6 Input channel selection (In items 1 and 2)

- 1) With “INPUT” and the eight-digit display visible, press the ENT key. Next, select an input channel.
- 2) The current input channel will be displayed. Use the up and down arrow keys to select an input channel.
- 3) Select the input channel and press the ENT key.

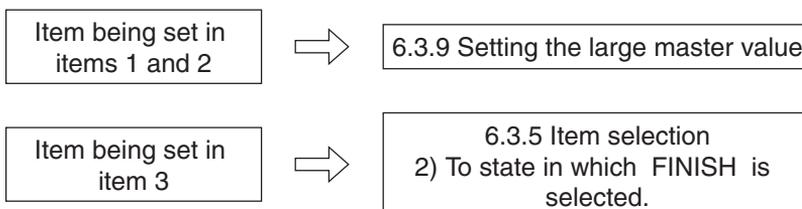


6.3.7 Setting the decision upper limit value (Set for all items)

- 1) With “MAX” displayed, press the ENT key.
- 2) “Current decision upper limit value” will be displayed.
- 3) Use the up and down arrow keys to input the new decision upper limit value.
- 4) After selecting the decision upper limit value, press the ENT key.
- 5) After decision upper limit value has been set, next will come selection of the decision lower limit value. “MIN” will be displayed.

6.3.8 Setting the decision lower limit value (Set for all items)

- 1) With “MIN” displayed, press the ENT key.
- 2) The current decision lower limit value will be displayed.
- 3) Use the up and down arrow keys to input the new decision lower limit value.
- 4) After selecting the decision lower limit value, press the ENT key.



6.3.9 Setting the large master value (Set in items 1 and 2)

- 1) With "MAX M." displayed, press the ENT key.
- 2) The current large master value will be displayed.
- 3) Use the up and down arrow keys to input the new large master value.
- 4) After inputting the large master limit, press the ENT key.
- 5) The eight-digit display will be shown.

MIN M.



6.3.10 Setting the small master value

ERR MAS



The value will return to what it was before it was changed and the display will be as in 2) above.

An error will be displayed if the large master value is equal to or less than the small master value.

6.3.10 Setting the small master value (Set in items 1 and 2)

- 1) With "MIN M." displayed, press the ENT key.
- 2) The current small master value will be displayed.
- 3) Use the up and down arrow keys to input the new small master value.
- 4) After inputting the small master limit, press the ENT key.
- 5) The eight-digit display will be shown.

Item 1, Item 2
Item 3, Item 4



Switches to the same state as in 2) in 6.3.5 Item Selection

ERR MAS



The value will return to what it was before it was changed and the display will be as in 2) above.

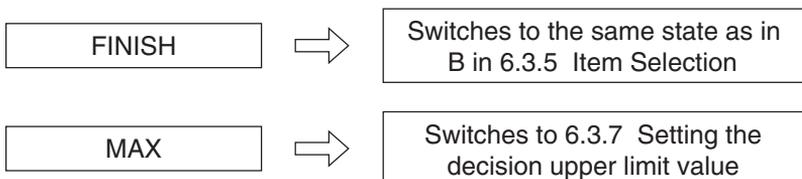
An error will be displayed if the small master value is equal to or greater than the small master value.

6.3.11 Selecting the calculation method (in Item 3 only)

- 1) With “CALC” displayed, press the ENT key.
- 2) The current calculation expression will be displayed.

! NOTE In the calculation method display, “1” shows Item 1 and “2” shows Item 2.

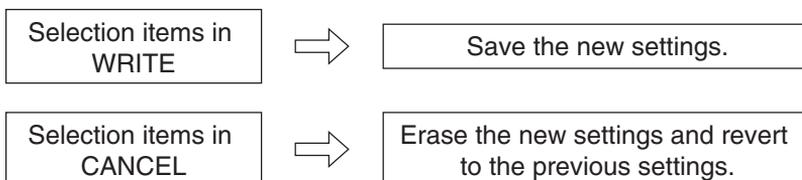
- 3) Use the up and down arrow keys to either select a calculation method, or select “Use none.”
- 4) After selecting the calculation method, press the ENT key.
- 5) The eight-digit display will be shown.



6.3.12 Saving setting values (Saving the previous items 6.3.1-11)

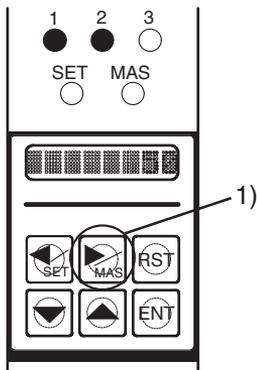
If you quit while still inputting settings, “END” can be displayed by pressing both reset and the left and right arrow keys.

- 1) With “END” displayed, press the ENT key.
- 2) “WRITE” will be displayed.
- 3) Use the up and down arrow keys to either select either “WRITE” or “CANCEL.”
- 4) After making this selection, press the ENT key.
- 5) Quit Set-up Mode and return to Measurement Mode.

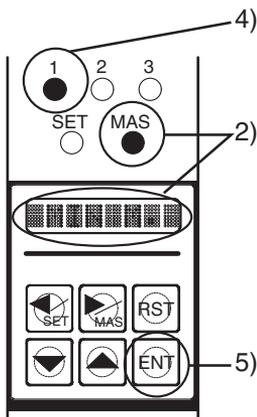


6.4 Master Matching Mode

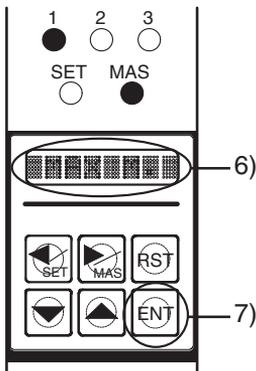
6.4.1 Master matching



- 1) In Set-up Mode, hold down the right arrow (MAS) key for at least two seconds.



- 2) The “MAS” LED (orange) will light up and “MIN M.” will be displayed, switching to “Master Matching.”
- 3) When “ALL” is selected under “Master Match Selection (MAS SET)” in Setting Mode, master matching will be done all at once. If “EACH” is selected, master matching will be performed one at a time.
- 4) When master matching is performed one at a time, master matching is performed for the item currently shown in the bar display. Use the up and down arrow keys to toggle between the items that master matching will be performed on. The Item/Decision Lamps show which item is currently shown in the bar display.
When “1” is lit, it means that Item 1 is displayed.
When “2” is lit, it means that Item 2 is displayed.
- 5) Set the small master to a detector, and when the bar display stabilizes, press the ENT key.



- 6) Small master matching will be performed, and “MAX M.” will be displayed.
- 7) Set the large master to a detector, and when the bar display stabilizes, press the ENT key.
- 8) Large master matching will be performed.
If there are no errors..... To 9)
If there is an error..... To 10)
- 9) “MAS OK” will be shown in the eight-digit display for two seconds, after which Master Matching will be concluded and the unit will return to Measurement Mode.
- 10) The following error messages may appear in the eight-digit display.
“ERR ZERO” . . . A “zero” error (outside the master matching range)
“ERR MAG” . . . A “sensitivity” error (outside the master matching range)
“ERR REV” A MAX/MIN reversal
“ERR OFFR” . . . Out of measurable range
Press the ENT key to return to B above.
If the detector requires adjustment, press the right arrow key and proceed to adjust the detector.
- 11) If master matching is being performed one at a time, and master matching is OK for both items, the unit will switch to a new master matching channel and return to B above.
- 12) If the RST key is pressed during master matching, the unit will return to its previous state. If “MIN M.” was displayed, it will return to Measurement Mode.

6.4.2 Adjusting the detectors

No adjustment is required except after the measurement head is replaced.

- 1) ZERO ADJ (zero adjustment)
In the following procedure, the small master is used to match the small master value and the bar display position.
 - (a) In Measurement Mode, hold down the right arrow (MAS) key for at least two seconds.
 - (b) The “MAS” LED (orange) will light up, “MIN M.” will be displayed, and the unit will switch to Master Matching Mode.
 - (c) Press the right arrow button.
 - (d) The unit will switch to Detector Adjustment Mode and “ADJ” will be displayed.
 - (e) Use the up and down arrow keys to switch to the item to be adjusted (Item 1 or 2). The item currently shown in the bar display is indicated on the Item/Decision Lamps. In addition, the Detector Name for the measuring unit the item is using for measurement is shown in the eight-digit display.
 - (f) Press the ENT key.
 - (g) “ZERO ADJ” will be displayed.
 - (h) Press the ENT key.
 - (i) The name of the measurement unit that the item selected in (e) uses, as well as its current ZERO ADJ setting will be displayed.
 - (j) If the ZERO ADJ setting is not displayed, it is because the item selected in E has data for two measurement units. Use the left and right arrow keys to toggle between the ZERO ADJ settings for the two units.
 - (k) Set to small master and use the up and down arrow keys to adjust each measurement units ZERO ADJ setting so that the item’s data approaches the small master setting.
 - (l) After setting is complete, press the ENT key.
 - (m) “GAIN ADJ” will be shown in the eight-digit display. Proceed to set the GAIN ADJ setting.

- 2) GAIN ADJ (sensitivity adjustment)

In the following procedure, both small and large masters are used to match the small and large master values with the bar display range.

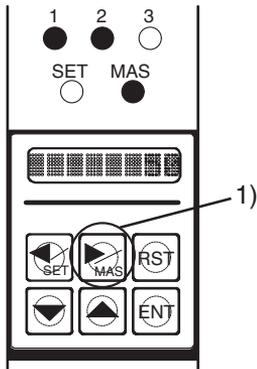
 - (a) With “GAIN ADJ” displayed, press the ENT key once.
 - (b) The measuring unit that the item selected in 6.4.2 1) (e) uses, as well as the current GAIN ADJ setting value, will be shown in the eight-digit display.
 - (c) If the GAIN ADJ setting value is not shown, it means that the item selected in 6.4.2 1) (e) has data for two measuring units. Use the right and left arrow keys to toggle between the data for these two measuring units.
 - (d) Alternately set the small master and the large master, and use the up and down arrow keys to adjust each item's measurement unit GAIN ADJ setting so that it approaches the small master setting and the large master setting.
 - (e) After these settings are complete, press the ENT key.
 - (f) “MAG ADJ” will be displayed. That concludes the GAIN ADJ setting input procedure.
 - (g) Proceed to input settings for MAG ADJ.

- 3) MAG ADJ (fine sensitivity adjustment)

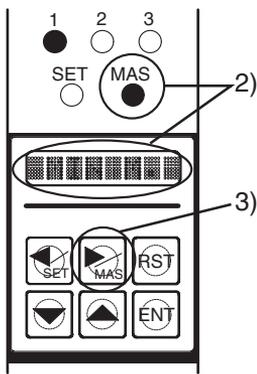
The following procedure is used to set the coefficient for each item when one item has two measuring units. This should be set to 1,000 for most purposes.

 - (a) With “MAG ADJ” displayed, press the ENT key once.
 - (b) The name of the measuring unit that the item selected in 6.4.2 1) (e) uses will be shown in the eight-digit display, along with its current MAG ADJ setting.
 - (c) If the MAG ADJ setting is not displayed, it is because the item selected in 6.4.2 1) (e) has data for two measuring units. Use the left and right arrow keys toggle between the data for each one.
 - (d) Use the up and down arrow keys set the GAIN ADJ for each measuring unit.
 - (e) After these settings are complete, press ENT.
 - (f) “MIN M.” will be displayed and the unit will switch to 6.4.1 “Master Matching.” This concludes the MAG ADJ setting procedure.

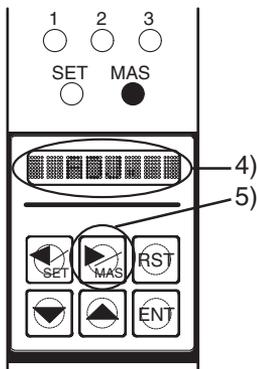
6.4.3 Clearing the master match



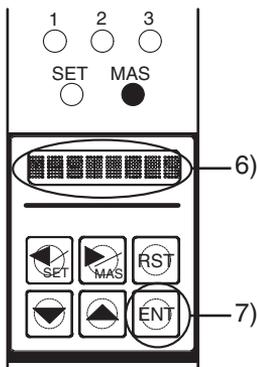
- 1) In Measuring Mode, hold down the right arrow (MAS) key for at least two seconds.



- 2) The “MAS” LED (orange) will light up, “MIN M.” will be displayed, and the unit will switch to Master Matching Mode.
- 3) Press the right arrow key once.

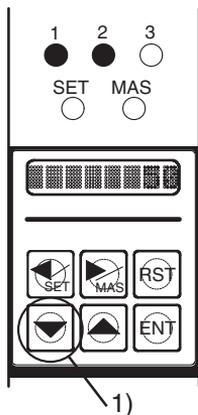


- 4) This will switch to Detector Adjustment, and “ADJ” will be displayed.
- 5) Press the right arrow key once.

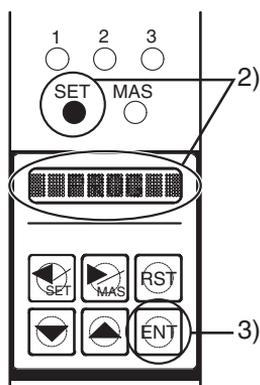


- 6) This will switch to Clear Master Match, and “MAST CLS” will be displayed.
- 7) Pressing the ENT key will clear all master matching data, “M.CLS OK” will be displayed and the unit will return to 6.4.1 “Master Matching.”

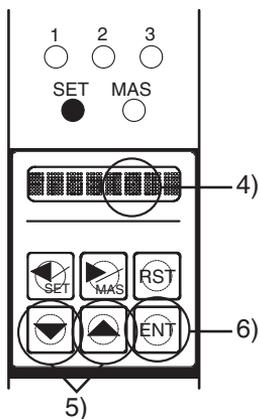
6.5 Program Switching Mode



- (1) In Measurement Mode, hold down the down arrow key for at least two seconds.



- (2) The “SET” LED (green) will light up, “PROG” will be displayed, and the unit will enter Program Switching Mode.
- (3) Press the ENT key.



- (4) The program that is currently in use is indicated by a number 0-9.
- (5) Using the up and down arrow keys, select the number of the program number to be used.
- (6) After making a selection, press the ENT key.
- (7) This will quit Program Switching Mode and return to Measurement Mode.
- (8) After a new program number has been selected, it may be necessary to perform master matching. If a measuring device has been replaced, it may be necessary to adjust the detector.
- (9) In order to perform set-up, first switch to the new program number and then enter Set-up Mode.
- (10) When power is turned on, the most recently selected program is launched.

7 An explanation of input and output

7.1 Serial output (RS232C)

7.1.1 Overview

Through the RS232C, this unit is capable of outputting measured values to a printer or sending the data to a PC. The following information can be sent to a PC:

- (1) Measurement items Items 1-3
- (2) Measured values The data shown in the unit's eight-digit display, Use None
- (3) Decision +Not OK, OK, -Not OK, NJG (only with "Use None")

7.1.2 Preparation

This unit's RS232C port enables it to output data. Please connect the optional D-sub9C (male) communications cable to this unit's RS232C port. Three different optional communications cables are available for different applications. For details, please refer to 9. "Options."

7.1.3 Serial port settings

Baud rate 9,600
 Bits/text 8
 Stop bit 1
 Start bit 1
 Parity bit None

7.1.4 Composition of transmitted data

Item 1 (five digits), space (one digit), measured value (eight digits), space (one digit), decision (three digits), space (one digit).

Item 2 (five digits), space (one digit), measured value (eight digits), space (one digit), decision (three digits), space (one digit).

Item 3 (five digits), space (one digit), measured value (eight digits), space (one digit), decision (three digits), CR, LF.

I	T	E	M	1				Measured value		Decision	
I	T	E	M	2				Measured value		Decision	
I	T	E	M	3				Measured value		Decision	CR LF

7.1.5 Method of data transmission to PCs

In Measurement Mode, press the ENT key. This will switch to the Hold Measured Value Mode described in 6.2.2, and will transmit the measured value. If the master match was unsuccessful data will not be transmitted.

7.1.6 Requesting data from PCs

- (1) Latch (data hold) command for the measured value
Send command byte “E” (45H). This micrometer will hold the measured value.
- (2) Latch release command
Send command byte “R” (52H). This micrometer will release its hold on the measured value.
- (3) Request for measured value
Send command byte “D” (44H). This micrometer will send the data in 4 above to the PC.

7.1.7 Examples

Text	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	LF
ASCII cord	49	54	45	4D	31	20	20	20	20	2D	32	35	2E	30	20	2D	4E	47	20
	49	54	45	4D	32	20	20	20	20	20	31	32	2E	35	20	20	4F	47	20
	49	54	45	4D	33	20	20	20	4E	4F	20	55	53	45	20	4E	4A	47	0D

7.2 Input from an external button

7.2.1 Overview

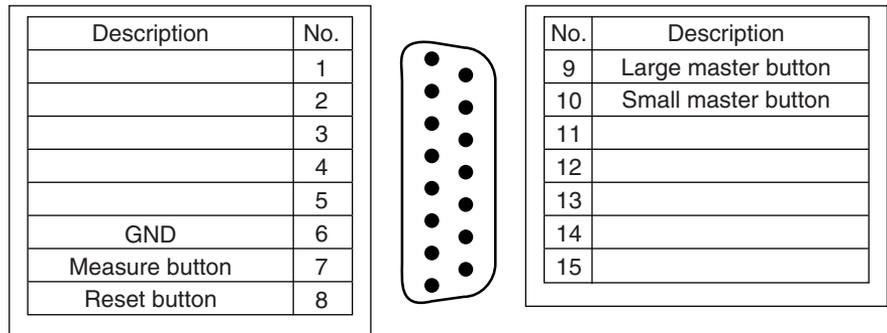
With this unit, the following can be done from external buttons.

- (1) Measuring
- (2) Resetting
- (3) Large master matching
- (4) Small master matching

7.2.2 Preparation

SW, ETC port on the back of the unit is the port for external buttons. The D-sub 15P (male) cable can be connected to this unit's SW, ETC port.

7.2.3 The port's pin layout



The pin layout of the SW, ETC port on the back of this unit.

7.2.4 Operation with external buttons

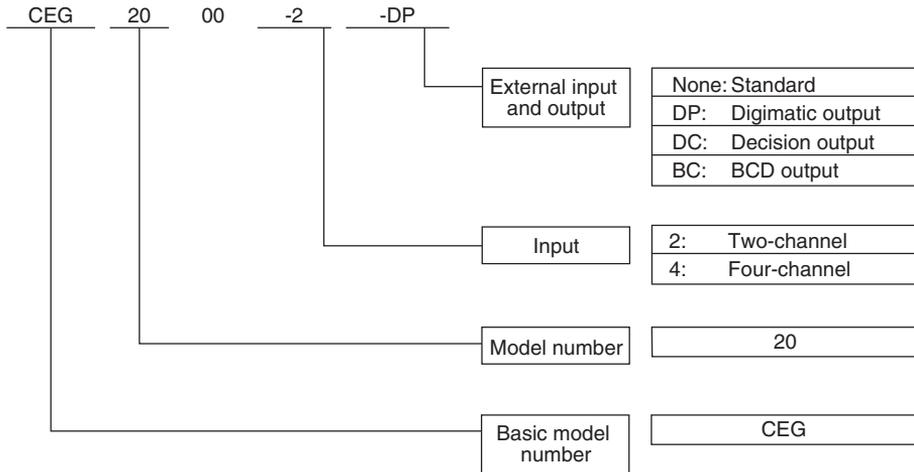
- (1) Measure button
 - (a) In Measurement Mode, press the Measure button.
 - (b) This will hold the measured value..

! NOTE If master matching was unsuccessful, this data cannot be held.

- (2) Reset button
This releases the hold.
- (3) Large Master Matching button
 - (a) In large master matching waiting status, set the large master to the detector.
 - (b) After the bar display stabilizes, press the Large Master Matching button.
 - (c) The unit will carry out large master matching and return to Measurement Mode.
 - (d) If there is a master matching error (see 6.4.1 10)), please cope with it using this unit's panel switches.
- (4) Small Master Matching button
 - (a) In Measurement Mode, set the small master to the detector.
 - (b) After the bar display stabilizes, press the Small Master Matching button.
 - (c) The unit will carry out small master matching and return to large master matching status.

! NOTE In Set-up Mode, please choose ALL from the Selection for mask matching (refer to 6.3.3).

8 Models



9 Options

9.1 Main unit

- (1) Digimatic output Printer (DP1), etc.
- (2) Decision output 24V DC
- (3) BCD output 24V DC

9.2 Sold separately

- (1) Communications cable (CAG2000-OP-CB-1)
D-sub 9-pin port for PCs (EIA-232))
- (2) Communications cable (CAG2000-OP-CB-2)
D-sub 25-pin port for PCs (EIA-574))
- (3) Communications cable (CAG2000-OP-CB-3)
D-sub 25-pin port for PCs (EIA-574))

10 Maintenance

- (1) Use alcohol to clean dirt off of the main unit.
The use of thinner causes color loss and dullness.

11 Breakdowns: Causes and Responses

Symptom	Location of breakdown or maladjustment	Response
Repeat precision is unstable	Movement of the part that secures the measuring unit	Tighten the loose part.
The bar graph display does not move	<ol style="list-style-type: none"> 1) The proper amount of power is not being supplied. 2) The detector is maladjusted. 3) The unit is in Hold Measurement Mode (the bar graph is green or dark red). 4) The unit is in Set-up Mode (orange). 	<ol style="list-style-type: none"> 1) Supply power in the 85-264V range. 2) Adjust the detector. 3) Release using the RST (reset) key. 4) Quit Set-up Mode.
The bar graph and digital display are blinking.	<ol style="list-style-type: none"> 1) Power is not being supplied. 2) A fuse has blown. 3) The power supply or an internal circuit has failed. 	<ol style="list-style-type: none"> 1) Supply power in the 85-264V range. 2) Replace the fuse (3A). 3) Request service from the manufacturer.

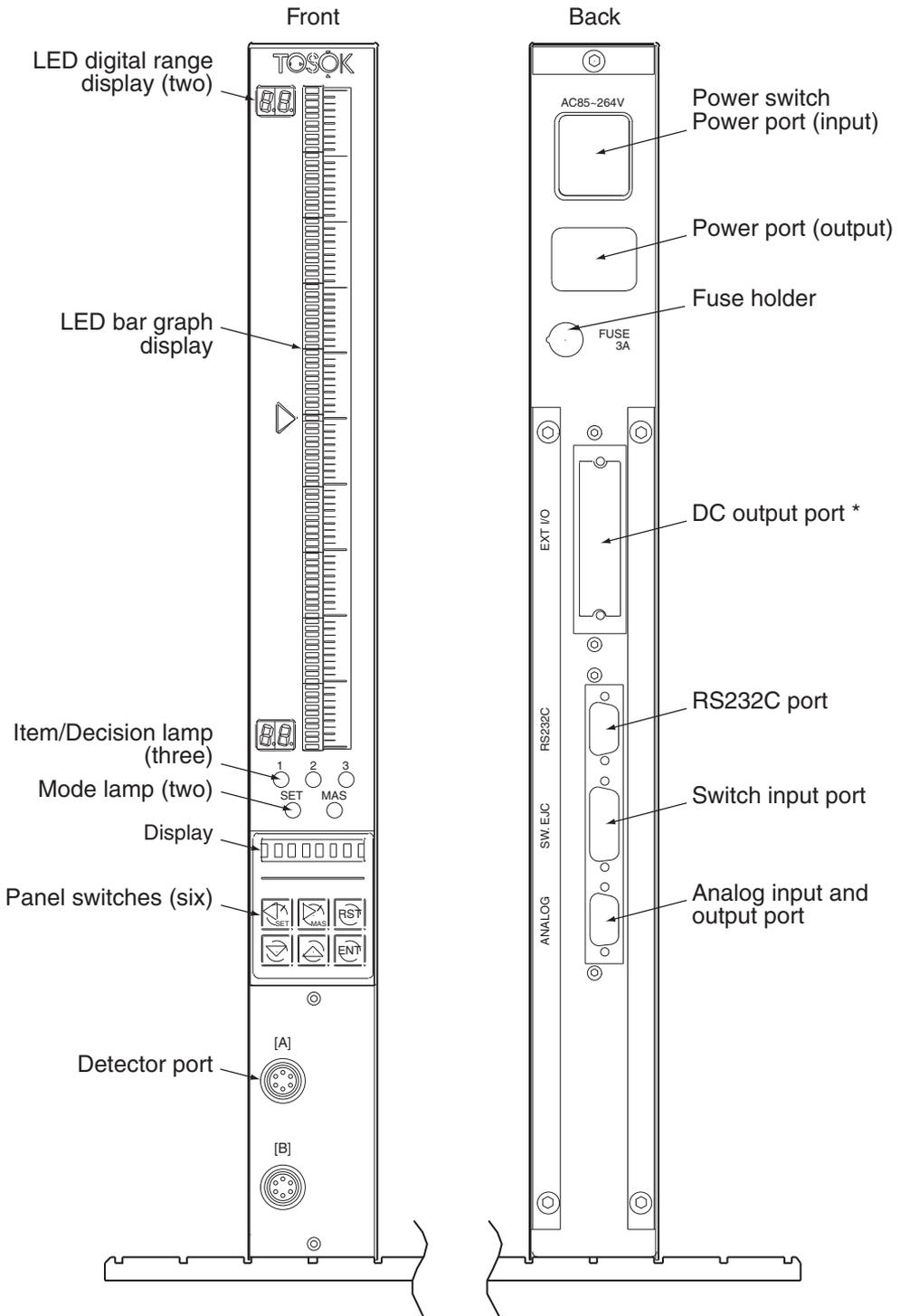
12 Points of Caution

- (1) Electrical wiring
The power cable included standard with this unit is 100V. To use the unit with voltage that exceeds 125V, please use the 250V power cable.
- (2) Do not use a hard tool, something sharp, to press the operation keys.
- (3) About exporting these units
Export of this product may fall under the Export Control Directive, and may therefore require the permission of the Ministry of Trade and Industry. Please discuss this with a representative at our nearest sales office.
- (4) Other
This product's specifications may be changed without prior notice.

13 Structural diagrams of the main unit

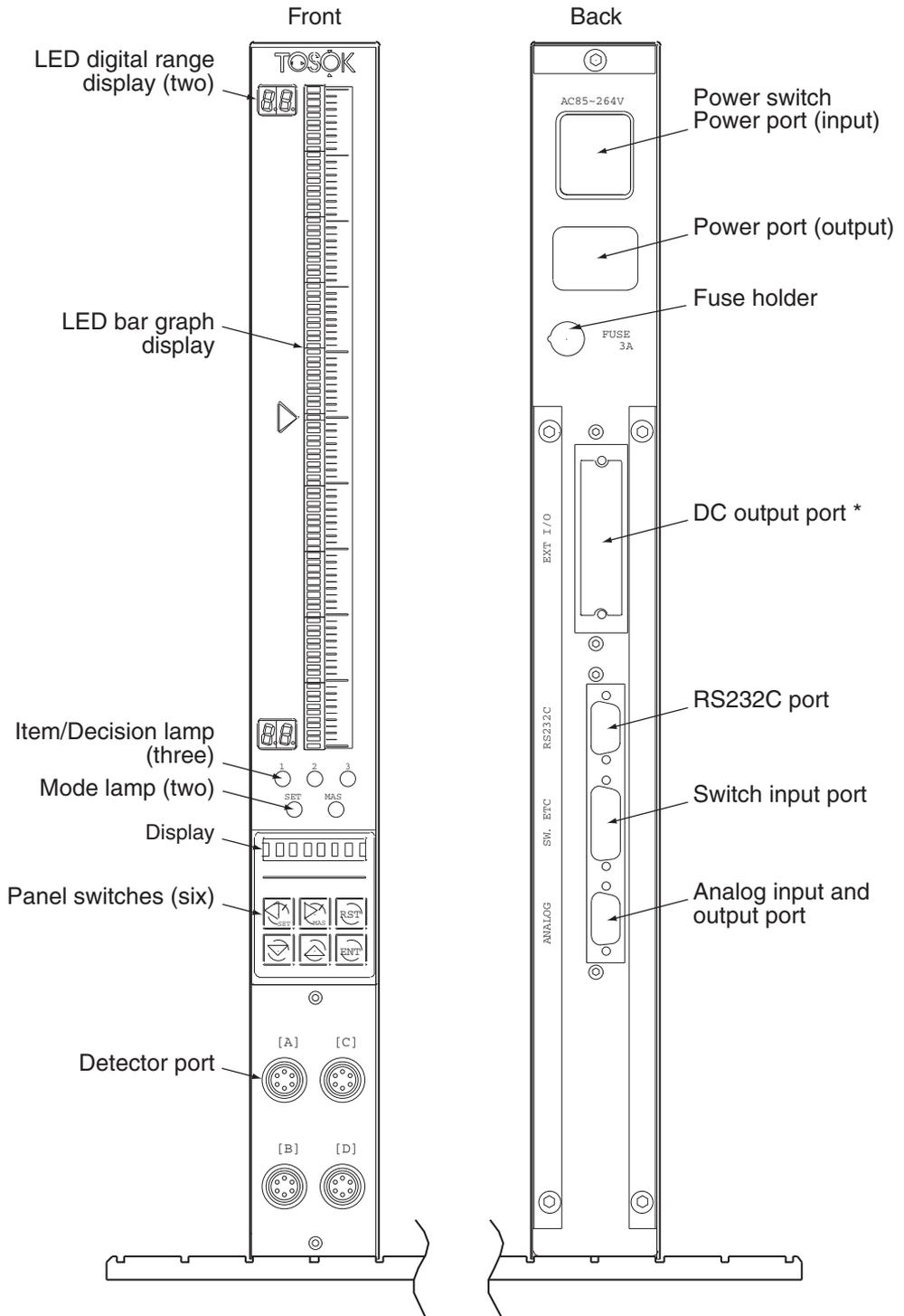
Structural diagram of the (two-channel) Columnar Electronic Gage

! NOTE An asterisk indicates an option.



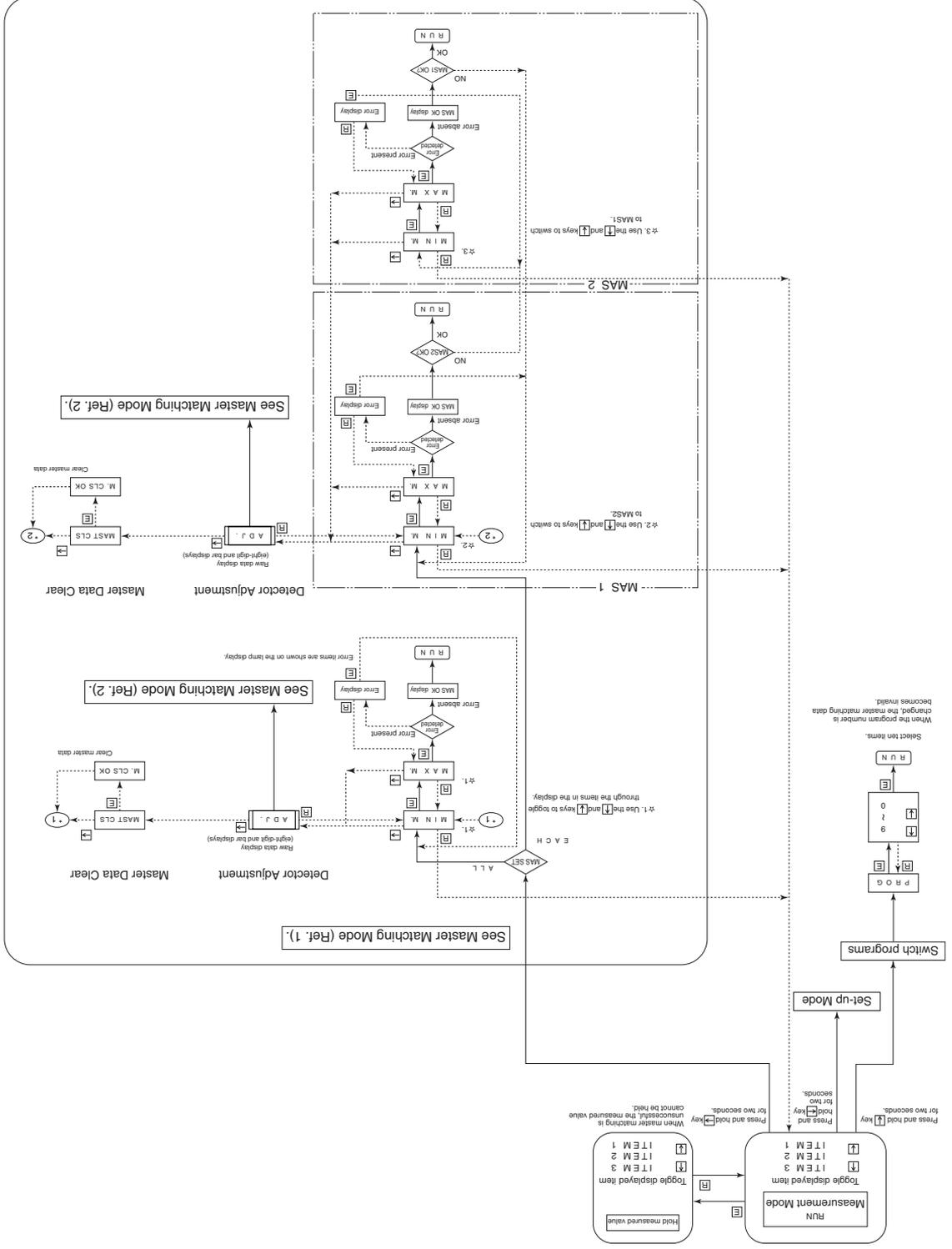
Structural diagram of the (four-channel) Columnar Electronic Gage

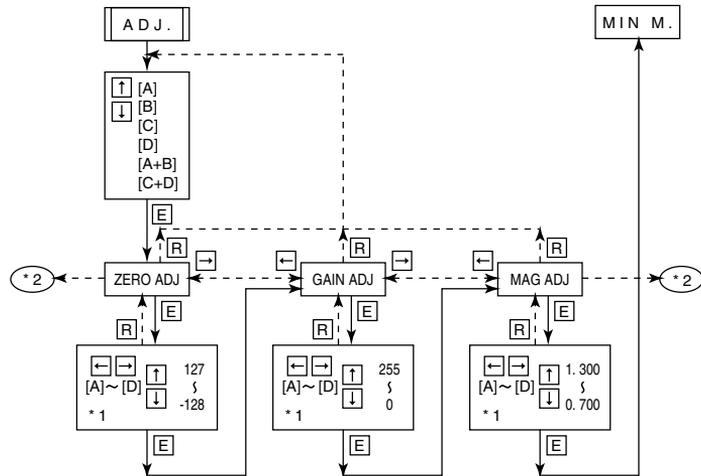
! NOTE An asterisk indicates an option.



14 Operational flow

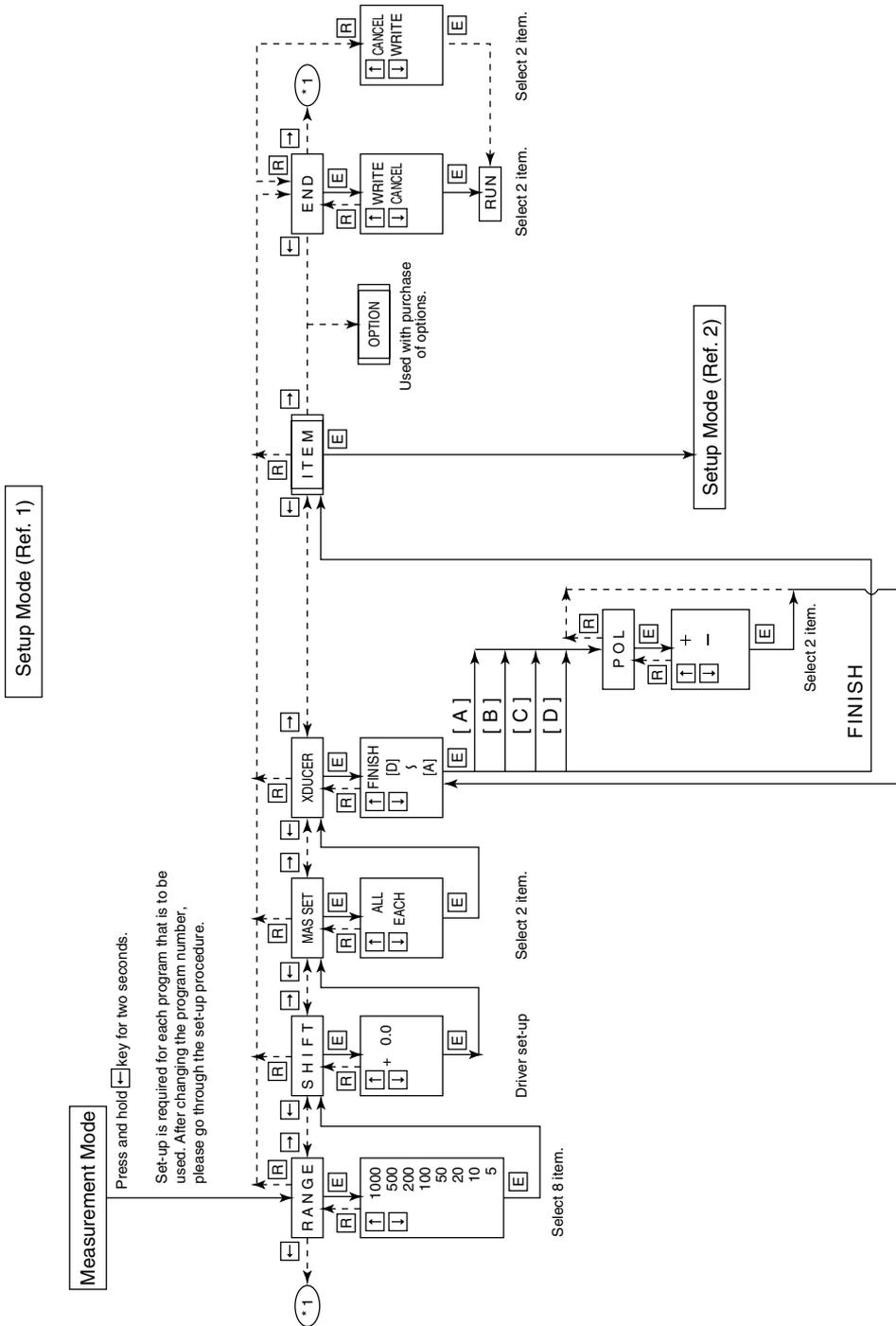
Standard software (for Electronic Micrometer) Ver2.11



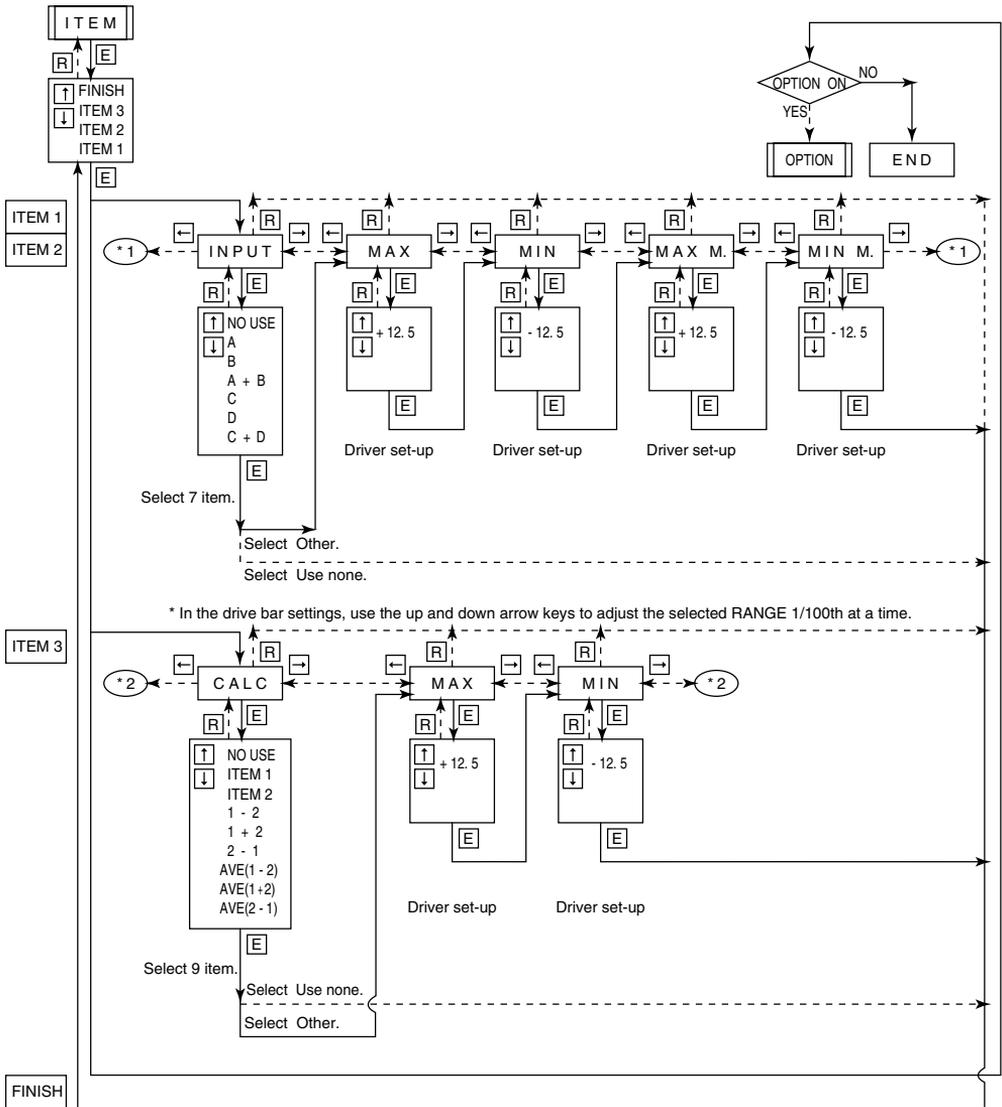


Note

* 1) Use the left and right arrow keys to select the measuring device to change the settings for, and use the up and down arrow keys to change the settings.



Setup Mode (Ref. 2)



Note

* 3) In the drive bar settings, use the up and down arrow keys to adjust the selected RANGE 1/100th at a time.

15 Worksheet

Standard software worksheet for the electronic gage

Program No.: PROG			0	1	2	3	4	5	6	7	8	9	
Setting item													
Range		RANGE											
Shift value		SHIFT											
Master matching method		MAS SET											
Input channel: XDUCER	Ch. A	A/D polarity	POL										
		DA ZERO	ZERO ADJ										
		DA GAIN	GAIN ADJ										
		A/D coefficient	MAG ADJ										
	Ch. B	A/D polarity	POL										
		DA ZERO	ZERO ADJ										
		DA GAIN	GAIN ADJ										
		A/D coefficient	MAG ADJ										
	Ch. C	A/D polarity	POL										
		DA ZERO	ZERO ADJ										
		DA GAIN	GAIN ADJ										
		A/D coefficient	MAG ADJ										
	Ch. D	A/D polarity	POL										
		DA ZERO	ZERO ADJ										
		DA GAIN	GAIN ADJ										
		A/D coefficient	MAG ADJ										
Items	Item 1	XDUCER being used	INPUT										
		Upper limit value	MAX										
		Lower limit value	MIN										
		Large mask setting value	MAX M.										
		Small mask setting value	MIN M.										
	Item 2	XDUCER being used	INPUT										
		Upper limit value	MAX										
		Lower limit value	MIN										
		Large mask setting value	MAX M.										
		Small mask setting value	MIN M.										
	Item 3	Calculation method	CALC										
		Upper limit value	MAX										
		Lower limit value	MIN										

A *Nidec* Group Company
SHIMPO

NIDEC-SHIMPO CORPORATION :1 Terada Kotari, Nagaokakyo-city, Kyoto,617-0833 Japan
Phone: 81-75-958-3608 FAX: 81-75-958-3647