

# Handheld Digital Tachometer Non-contact type with Dual Non-Contact, Contact Operation

## DT-2100

### Instruction Manual



Thank you for purchasing Nidec-Shimpo's Handheld High-Performance Digital Tachometer DT-2100. For instructions on how to use this product properly and optimally for a long period of time, please be sure to read this manual thoroughly before use.

- Enables measurement of a rotating body at a distance using integral laser beam
- Maximum of 1000 data point storage
- The organic light emitting display (OLED) allows enhanced viewing, even in dark locations
- Selectable meter or graphic display modes
- High accuracy measurement capability of  $\pm 0.006\%$
- PC communication through USB with available software

Non-contact type digital tachometers are used to perform measurement by applying the supplied reflection tape to the rotating body of the object to be measured, and projecting the laser beam (red) to the tape. In addition, they can be used for contact type measurement by attaching the supplied contact adapter.

#### ■ Inspection result certificate

We skip issuance of the inspection result certificate for this product. However, at the time of factory shipment total shipment inspection has been completed, and we have strictly confirmed that there is no error in measurement accuracy and operation. Your understanding is appreciated.

Before operation, maintenance and inspection, please carefully read this instruction manual and follow it for proper use.

After carefully reading this manual, be sure to store it in a safe and convenient place for easy reference.

## Safety Requirements

Be sure to observe

Before operation, maintenance and inspection, please carefully read this instruction manual and follow it for proper use. Start using only after you have read about the equipment's functions, safety information and precautions.

This instruction manual provides three grades of safety warnings: "Danger", "Warning" and "Caution". Each of them is an important description related to safety. Be sure to follow them.



**Danger**

This indicates the possibility of fire, severe injury, and even death if a user disregards the instruction and operates the unit improperly.



**Warning**

This indicates the possibility of severe injuries if a user operates the unit improperly.



**Caution**

This indicates the possibility of minor injury or damage if a user operates the unit improperly.

#### ● Limited Warranty

- We are not responsible for damages resulting from negligence through failure to follow the instructions set out in this manual.
- We are not responsible for damages resulting from earthquake and/or fire unrelated to us, actions by third parties, or any other accidents, intentional or through customer negligence, as well as from accidents caused by misuse or improper use under abnormal conditions.
- For information regarding assurance provisions, please read the attached warranty certificate.



**Warning**



- Do not look into the laser beam
- Do not point the laser beam at people
- Do not allow usage by children



Do not contact the laser beam irradiation port with a rotating body  
 If the unit comes into contact with a rotating body, damage may result to the laser.



Do not measure using wet or oily hands, or with loosely fitted clothing.

If hands slip during measurement, fingers or part of the hand may get caught in the rotating equipment.



**Caution**



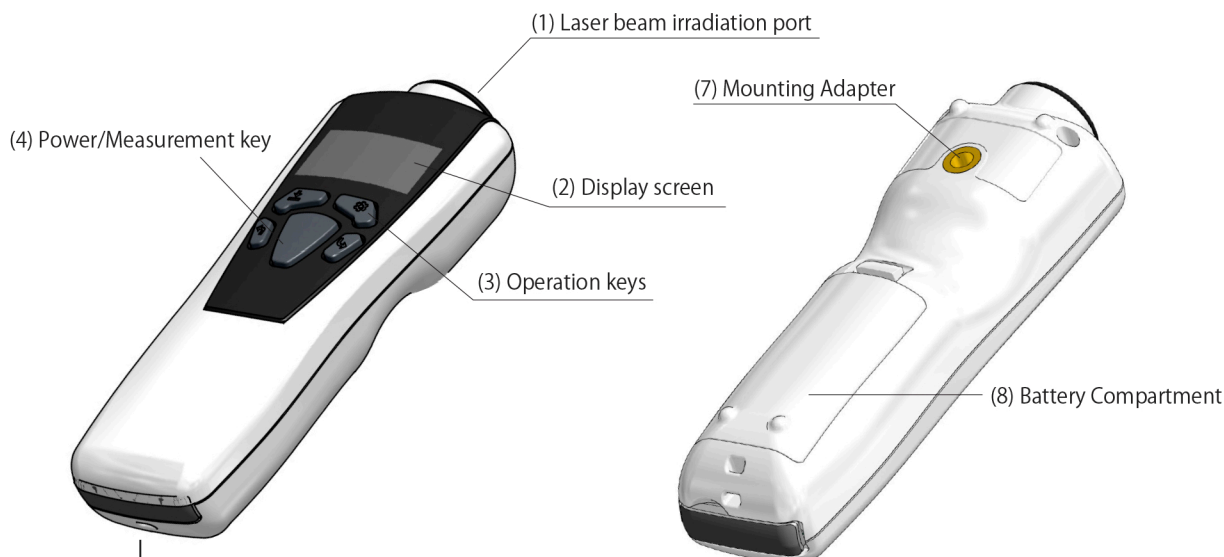
Be careful around installed reflective tape.

The reflection tape may come loose during high-speed rotation.

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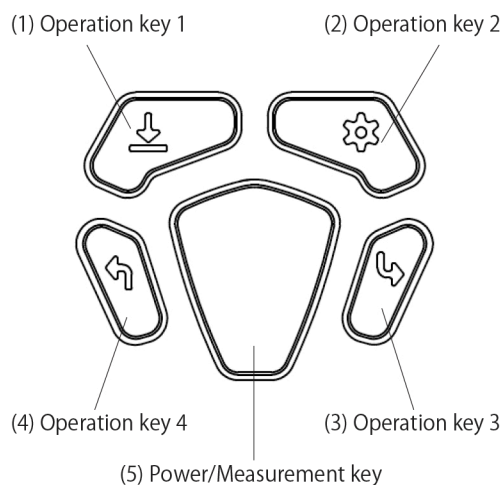


# 1. Part Names and Functions



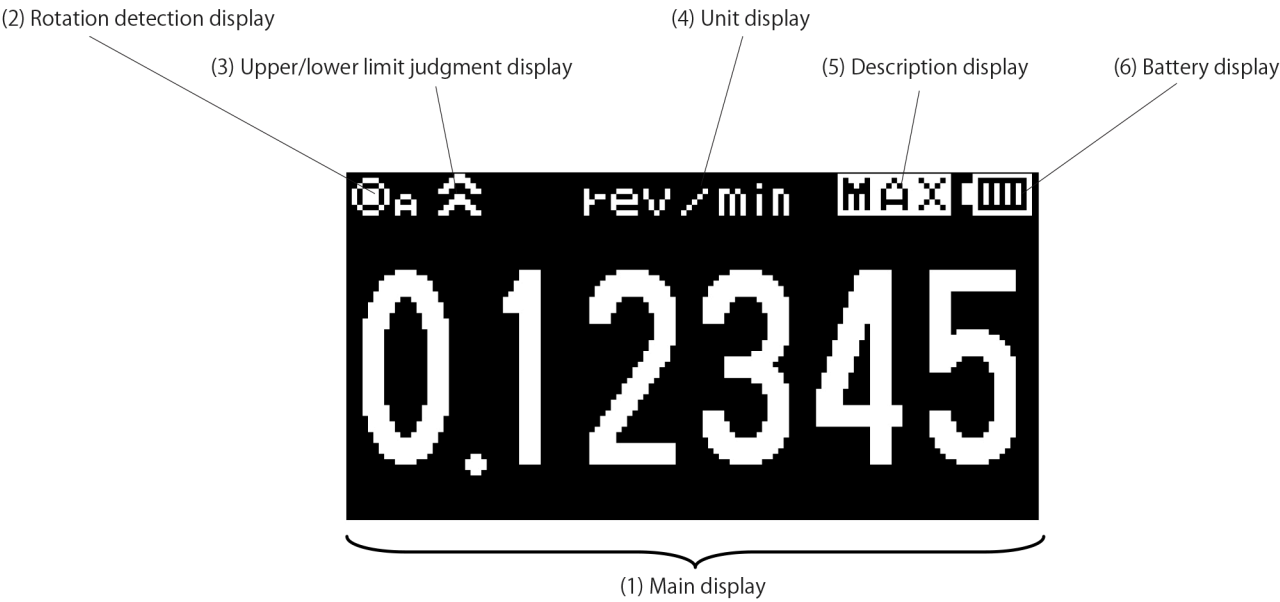
| Parts name                      | Functions  |
|---------------------------------|--|
| (1) Laser beam irradiation port | Apply the reflection tape to the rotating body of the object to be measured. Project the laser beam (red) to the tape and measure the rotation speed.        |
| (2) Display screen              | Displays the measurement value.  |
| (3) Operation keys 1 to 4       | Used to change setting or store memory data.   |
| (4) Power/Measurement key       | Press this key to turn the power ON.<br>The power will be turned OFF when no operation has been performed for a certain period of time. (Auto off function)  |
| (5) USB connector               | Power can be supplied through the USB connector.<br>Also, connecting the unit to a PC enables communications using the available software. (Sold separately) |
| (6) Connector                   | For internal production usage only   |
| (7) Mounting Adapter            | Allows unit to be mounted with its 1/4" threaded connection on tripod  |
| (8) Battery Compartment         | Uses two AA dry cell batteries   |






## ■ Operation keys and power/measurement key details



| Parts name                | Mode   | Function  |
|---------------------------|--|---|
| (1) Operation key 1       | • Measurement mode (measurement standby, during measurement) | Used to store the memory data.                                |
|                           | • Set mode   | Used to select the item.                                      |
|                           | • Memory data display mode                                   | Used to select the item.                                      |
| (2) Operation key 2       | • Measurement mode (measurement standby, during measurement) | Used to display memory data, and configure various settings.  |
|                           | • Set mode   | Used to select the item.                                      |
|                           | • Memory data display mode                                   | Used to select the item.                                      |
| (3) Operation key 3       | • Measurement mode (measurement standby, during measurement) | Used to switch the measurement display.                       |
|                           | • Set mode   | Used as the enter key.  |
|                           | • Memory data display mode                                   | Used as the enter key.  |
| (4) Operation key 4       | • Measurement mode (measurement standby, during measurement) | Used to return the measurement display to the normal display. |
|                           | • Set mode   | Used as the cancel key.                                       |
|                           | • Memory data display mode                                   | Used as the cancel key.                                       |
| (5) Power/Measurement key | • When the power is OFF                                      | Used to turn the power ON.                                    |

■ Display screen details



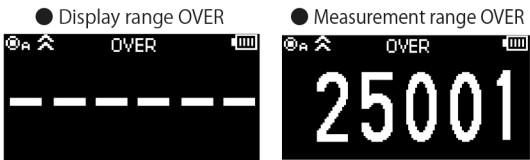
| Key name                               |  |
|--|--|
| (1) Main display                       | Displays the measurement value.  |
| (2) Rotation detection display         | Flashes during measurement.<br>"A" is displayed when the contact adapter has been attached. <div>With contact<div>Without contact</div></div>                              |
| (3) Upper/lower limit judgment display | Displays judgment results of the display value according to the comparator setting. <div>When the upper limit is reached<div>When the lower limit is reached</div></div> |
| (4) Unit display                       | Displays the current set unit.   |
| (5) Description display                | Displays description for the measurement value currently indicated.  |
| (6) Battery display                    | Displays the remaining battery level.<br>Flashes when the remaining battery level becomes close to 0.<br>Also, the following mark is displayed when the power is supplied through the USB cable. <div>When the USB cable is connected</div>                   |

\*For screen protection, the display becomes dark when no operation has been performed for 10 seconds.  
Also, the display is turned OFF when no operation has been performed for 1 minute.

■ OVER display

When the measured value exceeds the display range, "- . . . . -" is displayed.  
Also, when it exceeds the measurement range, "OVER" is indicated in the unit display, and it blinks.

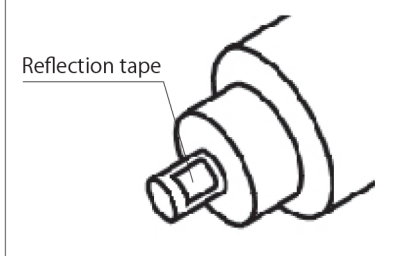
\*When "OVER" is indicated, the measurement accuracy is not guaranteed.



## 2. Measurement Method

### ■ Non-contact measurement

- 1** Apply the reflection tape to the object to be measured



Apply the supplied reflection tape to the rotating body of the object to be measured.

- Do not apply to a rotating body smaller than the reflection tape.
- If the rotating body is glossy, apply black tape, or paint it black and apply the reflection tape.
- Before applying the reflection tape, wipe off water/oil on the attachment surface of the rotating body, and apply the tape without any irregularities.

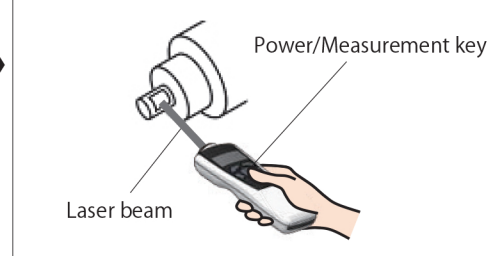
- 2** Point the laser beam irradiation port to the object to be measured



Point the laser beam irradiation port to the reflection tape applied to the rotating body.

- Keep a distance of 50 to 4000 mm (2 in. to 13 ft.) between the reflection tape and irradiation port.

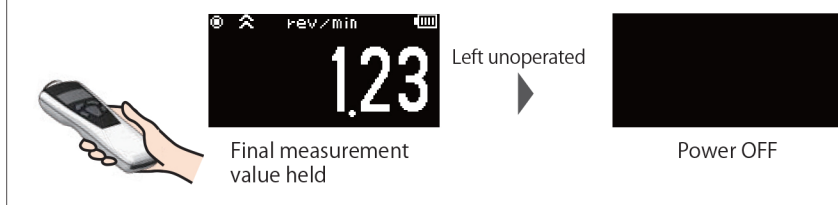
- 3** Press the power/measurement key to start measurement



Press the power/measurement key, and start measurement.

- When the rotating body is static, the value "0" is displayed.
- When the rotating body rotates, the actual measurement data is displayed every display update cycle.

- 4** Power OFF when no operation has been performed for a certain period of time (Auto off function)



After measurement ends, the power is turned OFF when no operation has been performed for a certain period of time.

- The period of time until the power goes OFF can be set in "Auto off" in the system settings.
- When performing communication using the optional USB cable, the auto off function is disabled.

\*When the speed and distance units are selected in the unit setting, be sure to select "3. SET\_SYSTEM" in contents selection, and set the distance value per pulse in the "9. DIST/PULS" setting.


### ■ Precautions on measurement and handling

- ⊘ Never look into the laser beam. Failure to follow this could result in injury to the eyes.
- ⊘ Do not point the laser beam at people.
- ⊘ Do not allow usage by children.

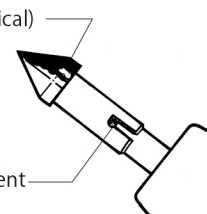
## Contact measurement

Attaching the optional contact adapter enables measurement in the contact mode.

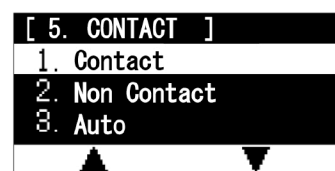
**1** Attach the contact adapter




**2** Select the appropriate contact fitting and attach.



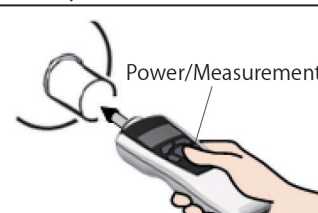
**3** In the "5. CONTACT" setting of "3. SET\_SYSTEM" in contents selection, change to "1. Contact" or "4. Contact (Low)".



**4** Put the contact on the object to be measured



**5** Press the power/measurement key, and start measurement



For rotation speed measurement, attach the conical or funnel contact.

- When the object to be measured has a concave shaft, attach the conical contact.
- When the object to be measured has a conical shaft, attach the funnel contact.

\*When attaching the contact, securely fit the measurement shaft pin into the contact groove.

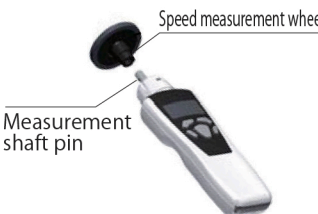
\*Select "4. Contact (Low)" when using the optional contact adapter for low speed.

Carefully put the contact on the center of the rotating body of the object to be measured.

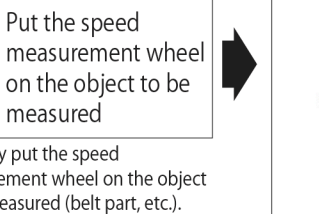
Press the power/measurement key, and start measurement.

## When using the speed measurement wheel


**1** Attach the speed measurement wheel to the measurement shaft



**2** Put the speed measurement wheel on the object to be measured



**3** Press the power/measurement key, and start measurement



Note) When attaching the wheel, securely fit the measurement shaft pin into the wheel groove.

Refer to the above (rotation speed measurement)

\*The auto off function works similarly as in the case of non-contact measurement.

\*When performing the non-contact measurement again after contact measurement ends, be sure to select "3. SET\_SYSTEM" in contents selection, and set to "1. Contact" in the "5. CONTACT" setting.

\*When using the speed measurement wheel, in the "8. DIAMETER" setting of "3. SET\_SYSTEM" in contents selection, set the diameter value of the peripheral speed foil. When using the supplied speed measurement wheel (circumference of 6 inches), use it with the default value (diameter value of 48.5104 mm).

## Precautions on measurement and handling

- ! Before measurement, securely fit the contact adapter to the contact. Also, during measurement, carefully put the contact on the rotating body of the object to be measured.
- ! When attaching the speed measurement wheel for measurement, align it along the object to be measured, and do not push the wheel with excessive force. Also, for safety measurement, use with a speed of 300m/min (500cm/s, 18000m/h, ~ 18km/h, 197inch/s) or less.

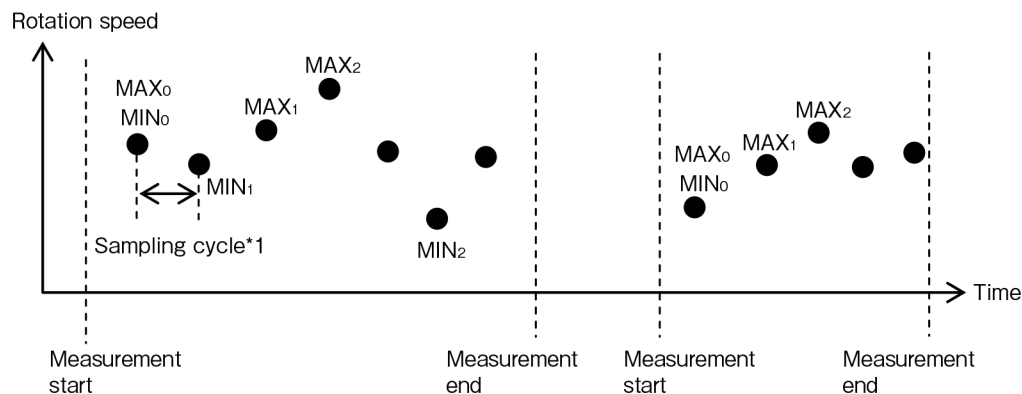
### 3. Measurement Display Description

Press the operation key 3 in the measurement mode. The measurement value description to be displayed is switched.  
The types of the measurement value to be displayed are as follows:

| Display   | Description    |  |
|---|----------------|--|
| Normal  | Description    | Displays the measurement value corresponding to the selected unit.   |
|   | Display update | Updates every display update cycle.  |
| Maximum value<br>(Inactive during distance and manual measurement)              | Description    | Displays the maximum value from measurement start to end. This value is reset when the next measurement starts.  |
|   | Display update | Updates every display update cycle.  |
| Minimum value<br>(Inactive during distance and manual measurement)              | Description    | Displays the minimum value from measurement start to end. This value is reset when the next measurement starts, or the auto zero function is performed.              |
|   | Display update | Updates every display update cycle.  |
| Average value<br>(Inactive during distance and manual measurement)              | Description    | Displays the average value within the "GRAPH_TIME" specified in the system settings.   |
|   | Display update | Updates every "GRAPH_TIME".  |
| Acceleration rate<br>(Inactive during distance and manual measurement)          | Description    | Displays the acceleration rate within the "GRAPH_TIME" specified in the system settings.   |
|   | Display update | Updates every "GRAPH_TIME".  |
| Prescale  | Description    | Displays the measurement value when "PRESCALE" is enabled. This feature is selected in the system settings. When "PRESCALE" is not specified, this is not displayed. |
|   | Display update | Updates every display update cycle.  |
| Prescale maximum value<br>(Inactive during distance and manual measurement)     | Description    | Displays the maximum value among the measurement values when "PRESCALE" is enabled. This value is reset when the next measurement starts.                            |
|   | Display update | Updates every display update cycle.  |
| Prescale minimum value<br>(Inactive during distance and manual measurement)     | Description    | Displays the minimum value among the measurement values when "PRESCALE" is enabled. This value is reset when the next measurement starts.                            |
|   | Display update | Updates every display update cycle.  |
| Prescale average value<br>(Inactive during distance and manual measurement)     | Description    | Displays the average value within the "GRAPH_TIME" specified in the system settings, among the measurement values when "PRESCALE" is enabled.                        |
|   | Display update | Updates every "GRAPH_TIME".  |
| Prescale acceleration rate<br>(Inactive during distance and manual measurement) | Description    | Displays the acceleration rate within the "GRAPH_TIME" specified in the system settings, among the measurement values when "PRESCALE" is enabled.                    |
|   | Display update | Updates every "GRAPH_TIME".  |

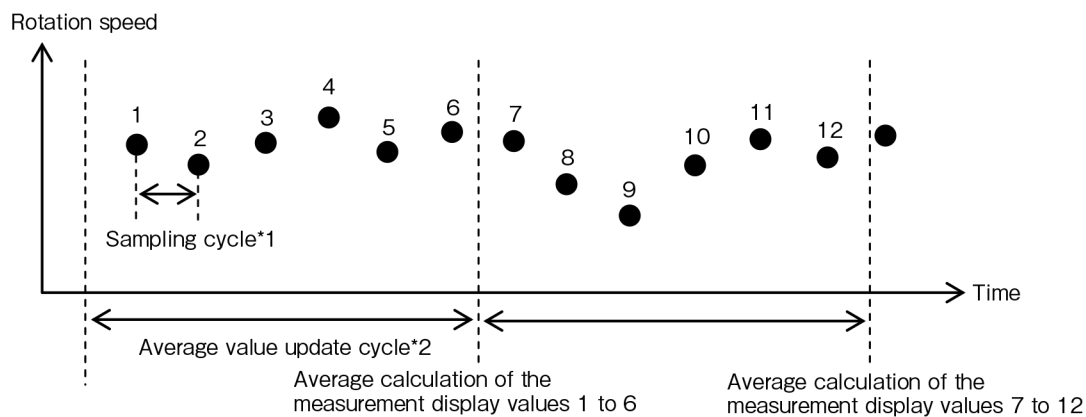
#### ■ About calculation of the maximum value (MAX) and minimum value (MIN)

- As shown in the figure below, the instrument sets the measurement value when measurement starts with initial values of MAX<sub>0</sub> and MIN<sub>0</sub>. It then compares them to new measurement values every sampling cycle.  
New updated maximum and minimum values are created and displayed if they exceed (for MAX<sub>0</sub>) or are below (for MIN<sub>0</sub>).  
(Updates in the order of MAX<sub>0</sub> → MAX<sub>1</sub> → MAX<sub>2</sub>)
- The maximum and minimum values are reset when measurement starts.



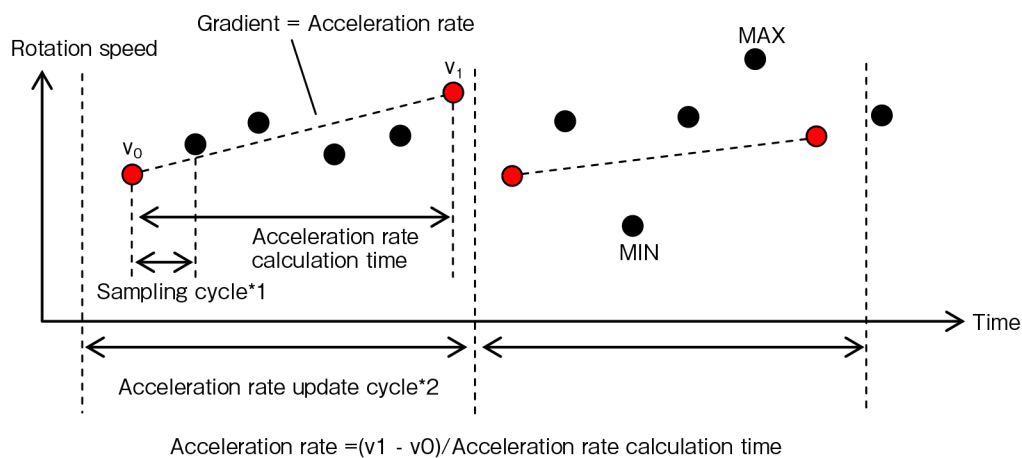
## ■ About calculation of the average value (AVE)

The average value is displayed by averaging the measurement values in the corresponding cycle every average value update cycle.



## ■ About calculation of the acceleration rate (ACC)

The acceleration rate is calculated based on  $v_0$  and  $v_1$  in the corresponding cycle every acceleration rate update cycle.



\*1 The sampling cycle is "DISP\_CYCLE" in the system settings.

\*2 The average value update cycle and acceleration rate update cycle are "3-2 Graph time" in the system settings.

\*The acceleration rate is displayed up to 5 digits, and when the speed is decreased, it is displayed as a negative value.

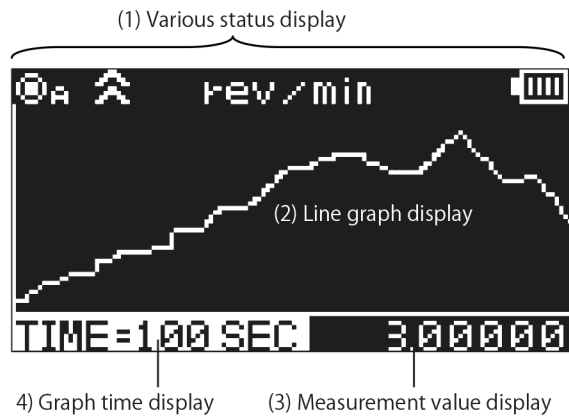
\*Minus value of the acceleration value cannot be displayed in the graph.



## 4. Graph Display

Using the "4. GRAPH\_DISP" setting of "2. SET\_USER" in contents selection enables the graph to be indicated on the display.

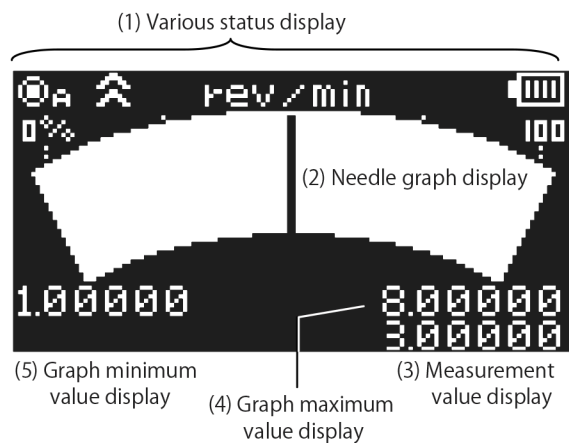
### (1) Graph\_1 (Line graph)



| Parts name                    | Operation  |
|-------------------------------|--|
| (1) Various status display    | Same as in the normal display  |
| (2) Line graph display        | Displays the line graph for the measurement value. Depending on selection one of the below will equal the graph values:<br>Maximum value on the vertical axis:<br>Graph maximum value setting<br>Minimum value on the vertical axis:<br>Graph minimum value setting<br>Horizontal axis: Graph time setting value<br>Graph flow: Graph flow setting value |
| (3) Measurement value display | Displays the current measurement value<br>Can switch among MAX, MIN, AVE, and ACC  |
| (4) Graph time display        | Displays the graph time setting value  |

\*Update cycle: Every display update cycle

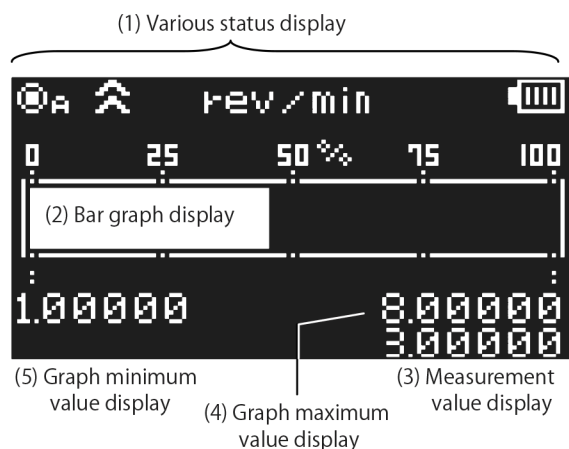
### (2) Graph\_2 (Gauge Mode)



| Parts name                      | Operation   |
|---------------------------------|---|
| (1) Various status display      | Same as in the normal display   |
| (2) Gauge Display               | Displays the needle graph for the measurement value. Depending on selection one of the below will equal the gauge values:<br>Graph maximum value:<br>Graph maximum value setting<br>Graph minimum value:<br>Graph minimum value setting |
| (3) Measurement value display   | Displays the current measurement value<br>Can switch among MAX, MIN, AVE, and ACC   |
| (4) Graph maximum value display | Displays the graph maximum value setting  |
| (5) Graph minimum value display | Displays the graph minimum value setting  |

\*Update cycle: Every display update cycle

### (3) Graph\_3 (Bar graph)



| Parts name                      | Operation  |
|---------------------------------|--|
| (1) Various status display      | Same as in the normal display  |
| (2) Bar graph display           | Displays the bar graph for the measurement value. Depending on selection one of the below will equal the gauge values:<br>Graph maximum value:<br>Graph maximum value setting<br>Graph minimum value:<br>Graph minimum value setting |
| (3) Measurement value display   | Displays the current measurement value<br>Can switch among MAX, MIN, AVE, and ACC  |
| (4) Graph maximum value display | Displays the graph maximum value setting   |
| (5) Graph minimum value display | Displays the graph minimum value setting   |



## 5. Memory Function

The measurement value can be registered and stored in the memory during measurement.

The stored data can be displayed in contents selection "1. DATA".

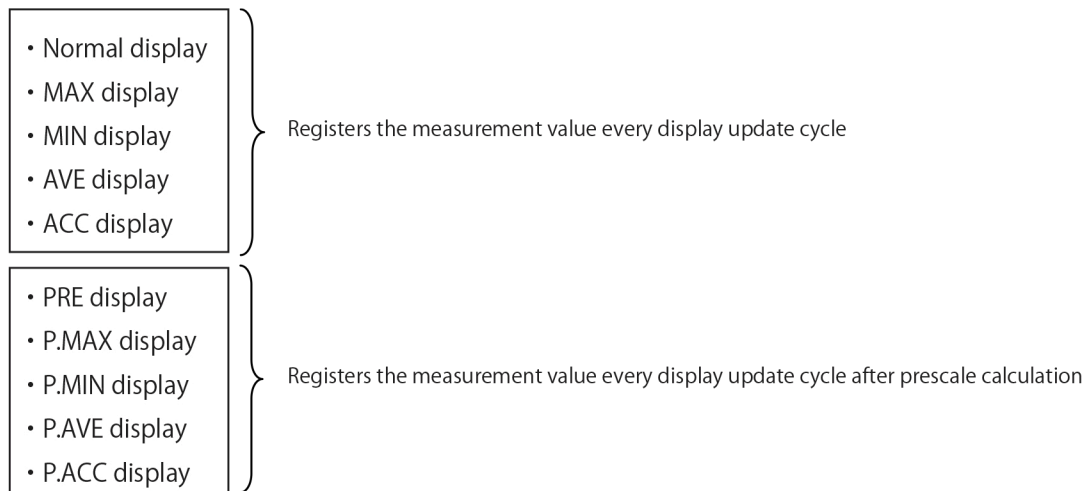
Registration contents and methods depend on the memory mode.

Set the memory mode in the "2. MEMORY\_MODE" of "2. SET\_USER" in contents selection.

### 5-1 Memory mode details

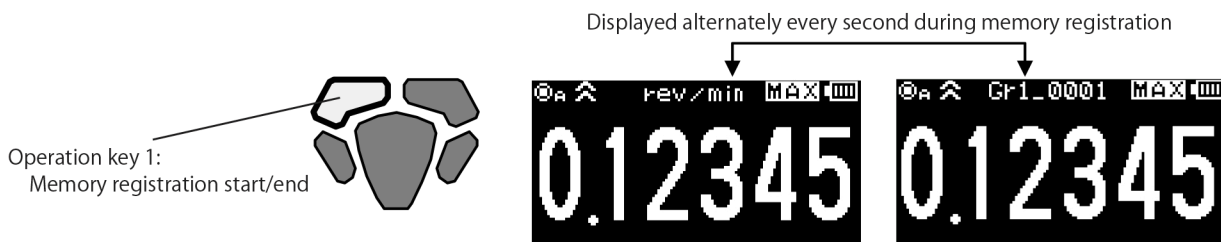
#### (1) Continuous memory mode

- In the continuous memory mode, the measurement value continues to be registered in the memory every display update cycle.
- The number of memory sets that can be registered in the continuous memory is up to 1000.
- For the continuous memory, the value description to be registered in the memory depends on the measurement display description.



#### ● Memory registration operation

- Press the Operation key 1 once during measurement to start memory registration. Press it again to end memory registration.
- When turning measurement OFF, or switching to the contents selection mode during memory registration, memory registration ends at that moment.
- The unit and "Gr ○ \_ □□□□ " are alternately displayed in the unit display part during memory registration.  
( ○ shows the number of memory groups, and □ shows the number of memory points currently registered: 0001 to 1000)



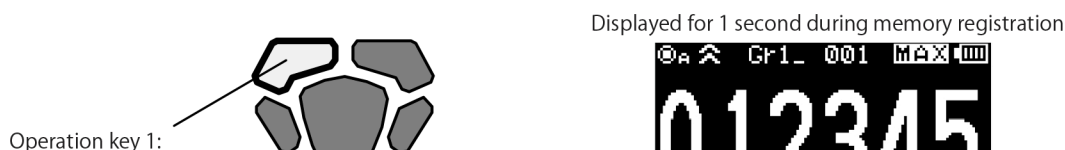
\*The continuous memory mode can be used only when one of the units from "rev/min" to "miles/h" is selected in the unit setting.

#### (2) Each memory mode

- In the each memory mode, only one set of the measurement value currently displayed is registered in the memory.
- The number of data points that can be registered in the each memory is up to 100.

#### ● Memory registration operation

- Press the operation key 1 once during measurement to register the display value at that moment in the memory.
- "Gr ○ \_ □□□□ " is displayed for 1 second in the unit display part during memory registration.  
( ○ shows the number of memory groups, and □ shows the number of memory sets currently registered: 001 to 100)

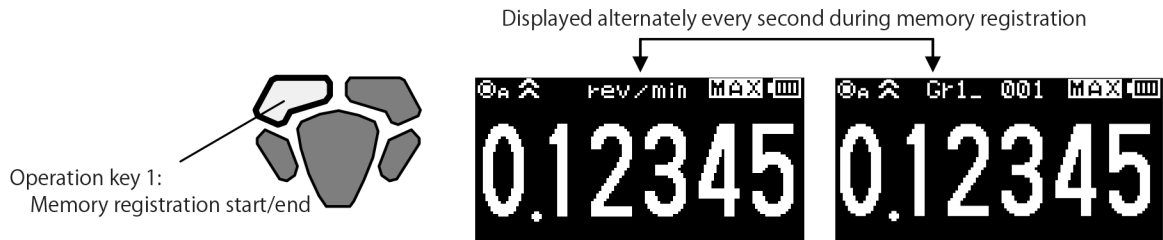


### (3) Statistics memory mode

- In the statistics memory mode, only the statistics data for the measurement value every display update cycle from memory registration start to end is registered in the memory.
- The number of data points that can be registered in the statistics memory is up to 100.

#### ● Memory registration operation

- Press the operation key 1 once during measurement to start memory registration, and press it again to end memory registration.
- When turning measurement OFF, or switching to the contents selection mode during memory registration, memory registration ends at that moment.
- The unit and "Gr ○ \_ □□□□" are alternately displayed in the unit display part during memory registration.  
(○ shows the number of memory groups, and □ shows the number of memory sets currently registered: 001 to 100)



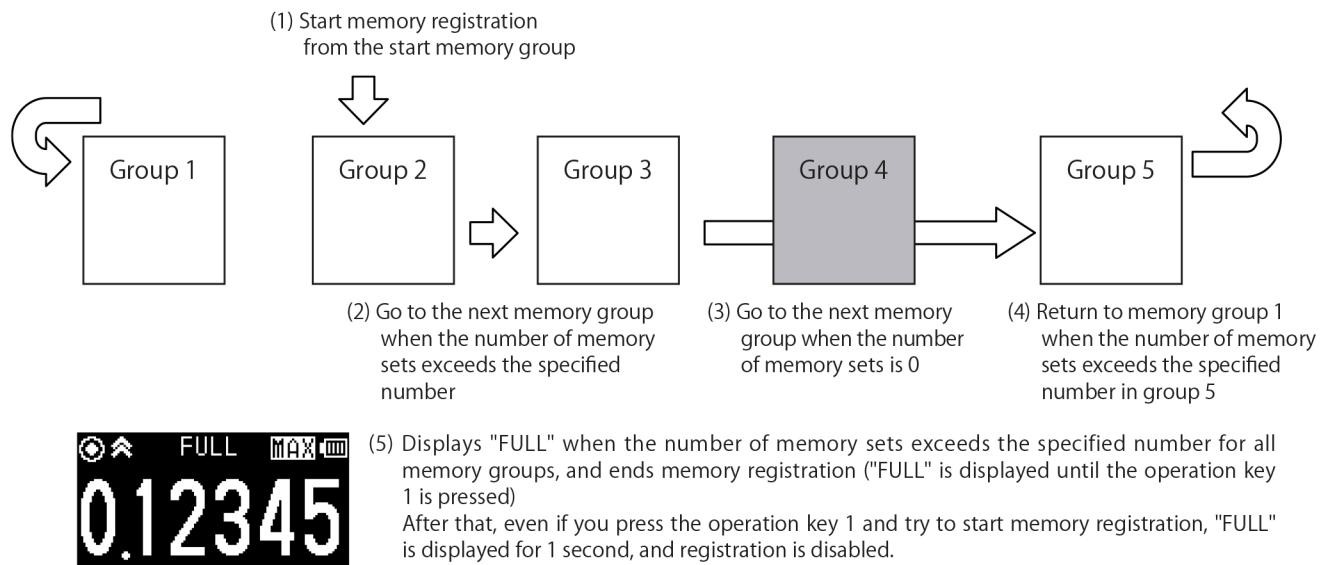
\*In the statistics memory mode, the statistics data in a single registration is calculated from the measurement value for up to 100 times of display update. When the display update frequency exceeds 100 in a single registration, memory registration automatically ends.

\*The statistics memory mode can be used only when one of the units from "rev/min" to "miles/h" is selected in the unit setting.

### 5-2. Memory registration in the memory group

- Start memory registration from the start memory group (that has been set in "3. START\_MEM" of "2. SET\_USER" in contents selection).
- When the number of memory groups reaches the number of memory sets in each group (that has been set in "4. MEM\_GROUP" of "3. SET\_SYSTEM" in contents selection), the memory group switches to the next one.
- When the number of memory sets exceeds the total number of memory sets for all memory groups, "FULL" is displayed in the unit display part. In this case, additional memory cannot be registered.

Example: When the start memory group is set to memory group 2



# 6. Various Settings

## 6-1. Contents selection

Press the operation key 2 in the measurement mode to switch the display to the contents selection mode.

English

| [SET_CONTENTS] |  |
|----------------|--|
| 1. DATA        |  |
| 2. SET_USER    |  |
| 3. SET_SYSTEM  |  |

Japanese

| [選択してください] |  |
|------------|--|
| 1. メモリ表示   |  |
| 2. ユーザー設定  |  |
| 3. システム設定  |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to the selected item   |
| Operation key 4 | Return to the measurement mode  |

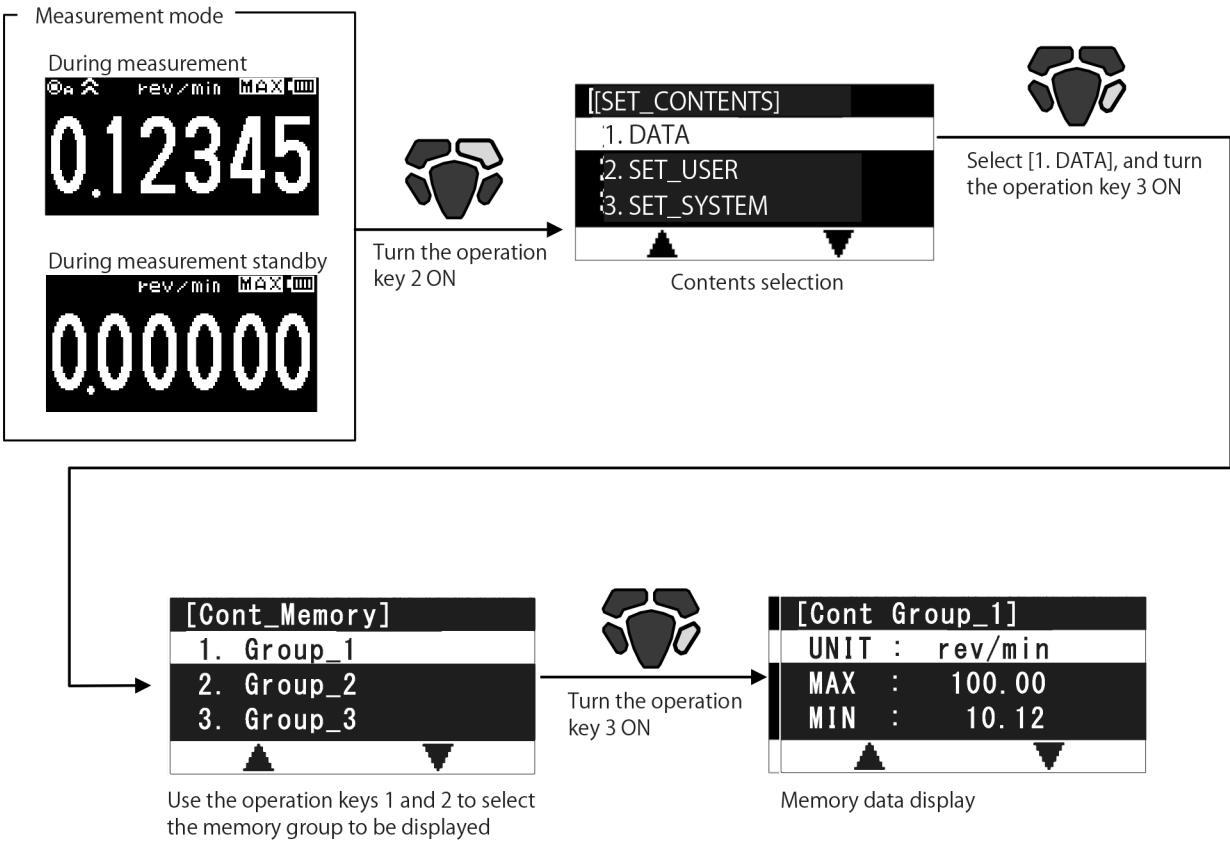
| Item |            |          | Description               |
|------|------------|----------|---------------------------|
|      | English    | Japanese |                           |
| 1    | DATA       | メモリ表示    | Go to the memory display  |
| 2    | SET_USER   | ユーザー設定   | Go to the user settings   |
| 3    | SET_SYSTEM | システム設定   | Go to the system settings |

## 6-2. Memory data display

The memory data registered for each group can be checked in contents selection "1. DATA".

### (1) Operation flow

Display the memory data according to the following operation.



## (2) Memory data display/details

### ● Continuous memory display

Select "1. DATA" in contents selection to display the memory group selection screen.

#### (1) Memory group selection

Select the memory group you want to display.

English

| [Cont_Memory] |  |
|---------------|--|
| 1. Group_1    |  |
| 2. Group_2    |  |
| 3. Group_3    |  |
|               |  |

Japanese

| [連続メモリ]   |  |
|-----------|--|
| 1. グループ_1 |  |
| 2. グループ_2 |  |
| 3. グループ_3 |  |
|           |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to memory description display  |
| Operation key 4 | Return to contents selection  |

| Item |         |          | Description             |
|------|---------|----------|-------------------------|
|      | English | Japanese |                         |
| 1.   | Group_1 | グループ_1   | Displays memory group 1 |
| 2.   | Group_2 | グループ_2   | Displays memory group 2 |
| 3.   | Group_3 | グループ_3   | Displays memory group 3 |
| 4.   | Group_4 | グループ_4   | Displays memory group 4 |
| 5.   | Group_5 | グループ_5   | Displays memory group 5 |



#### (2) Memory data display

Select the memory group in (1), and press the operation key 3 to display the memory data for the selected memory group.

Use the operation keys 1 and 2 to change the display line.

English

| [Cont_Group_1] |  |
|----------------|--|
| UNIT : rev/min |  |
| MAX : 100.0    |  |
| MIN : 10.12    |  |
|                |  |

Japanese

| [連続メモリ グループ 1] |  |
|----------------|--|
| UNIT : rev/min |  |
| MAX : 100.0    |  |
| MIN : 10.12    |  |
|                |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enabled when CLEAR is selected<br>Go to memory clear                      |
| Operation key 4 | Return to memory group selection  |

| Display item | Description                            |
|--------------|--|
| UNIT :       | Unit                                   |
| MAX :        | Maximum value                          |
| MIN :        | Minimum value                          |
| AVE :        | Average                                |
| SD :         | Standard deviation                     |
| 1 blank line |  |
| 1: ~         | Displays the memory registration value |
| 1000 :       | for 1 to 1000 sets (max.)              |
| CLEAR        | Go to memory clear                     |

#### (3) Memory clear

While the memory data is displayed, the "CLEAR" column is displayed in the last line of the data.

Select the "CLEAR" column, and press the operation key 3 to display the memory clear screen below.

Registration description in the memory group currently displayed can be cleared as necessary.

English

| Data Clear? |  |
|-------------|--|
| 1. No       |  |
| 2. Yes      |  |
|             |  |

Japanese

| 消去しますか? |  |
|---------|--|
| 1. いいえ  |  |
| 2. はい   |  |
|         |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously     |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously     |
| Operation key 3 | Execute clear/Return to the continuous memory display without executing clear |

| Item |         |          | Description |
|------|---------|----------|-------------|
|      | English | Japanese |             |

## ● Each memory display

Select "1. DATA" in contents selection to display the memory group selection screen.

### (1) Memory group selection

Select the memory group you want to display.

| [Each_Memory] |  |
|---------------|--|
| 1. Group_1    |  |
| 2. Group_2    |  |
| 3. Group_3    |  |
|               |  |

| [単独メモリ]   |  |
|-----------|--|
| 1. グループ_1 |  |
| 2. グループ_2 |  |
| 3. グループ_3 |  |
|           |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to the memory data display   |
| Operation key 4 | Return to contents selection  |

| Item |         |          | Description             |
|------|---------|----------|-------------------------|
|      | English | Japanese |                         |
| 1    | Group_1 | グループ_1   | Displays memory group 1 |
| 2    | Group_2 | グループ_2   | Displays memory group 2 |
| 3    | Group_3 | グループ_3   | Displays memory group 3 |
| 4    | Group_4 | グループ_4   | Displays memory group 4 |
| 5    | Group_5 | グループ_5   | Displays memory group 5 |



### (2) Memory data display

Select the memory group in (1), and press the operation key 3 to display the memory data for the selected memory group.

Use the operation keys 1 and 2 to change the display line.

English

| [Each_Group_1] |  |
|----------------|--|
| UNIT : rev/min |  |
| MAX : 100.00   |  |
| MIN : 10.12    |  |
|                |  |

Japanese

| [単独メモリ グループ 1] |  |
|----------------|--|
| UNIT : rev/min |  |
| MAX : 100.0    |  |
| MIN : 10.12    |  |
|                |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enabled when CLEAR is selected<br>Go to memory clear                      |
| Operation key 4 | Return to memory group selection  |

| Display item | Description   |
|--------------|---|
| UNIT :       | Unit  |
| MAX :        | Maximum value of the registration data                          |
| MIN :        | Minimum value of the registration data                          |
| AVE :        | Average of the registration data                                |
| SD :         | Standard deviation of the registration data                     |
| 1 blank line |   |
| 1: ~         | Displays the memory registration value for 1 to 100 sets (max.) |
| 100 :        |   |
| CLEAR        | Go to memory clear  |

While the memory data is displayed, the "CLEAR" column is displayed in the last line of the data.

Select the "CLEAR" column, and press the operation key 3 to display the memory clear screen below.

Registration description in the memory group currently displayed can be cleared as necessary.

English

| Data Clear? |  |
|-------------|--|
| 1. No       |  |
| 2. Yes      |  |
|             |  |

Japanese

| 消えますか? |  |
|--------|--|
| 1. いいえ |  |
| 2. はい  |  |
|        |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Execute clear/Return to the each memory display without executing clear   |

| Item |         |          | Description |
|------|---------|----------|-------------|
|      | English | Japanese |             |

## ● Statistics memory display

Select "1. DATA" in contents selection to display the memory group selection screen.

### (1) Memory group selection

Select the memory group you want to display.

English

| [Stats Memory] |  |
|----------------|--|
| 1. Group_1     |  |
| 2. Group_2     |  |
| 3. Group_3     |  |
| ▲ ▼            |  |

Japanese

| [統計メモリ]   |  |
|-----------|--|
| 1. グループ_1 |  |
| 2. グループ_2 |  |
| 3. グループ_3 |  |
| ▲ ▼       |  |

| Item |         |          | Description             |
|------|---------|----------|-------------------------|
|      | English | Japanese |                         |
| 1    | Group_1 | グループ_1   | Displays memory group 1 |
| 2    | Group_2 | グループ_2   | Displays memory group 2 |
| 3    | Group_3 | グループ_3   | Displays memory group 3 |
| 4    | Group_4 | グループ_4   | Displays memory group 4 |
| 5    | Group_5 | グループ_5   | Displays memory group 5 |



### (2) Memory data display

Select the memory group in (1), and press the operation key 3 to display the memory data for the selected memory group.

Use the operation key 1 to change the display line.

Use the operation key 2 to display the description of the next registration memory.

English

| [Stats Group_1] |  |
|-----------------|--|
| No : 1          |  |
| UNIT : rev/min  |  |
| MAX : 10.12     |  |
| ▲ ▼             |  |

Japanese

| [統計メモリ グループ 1] |  |
|----------------|--|
| 1. グループ_1      |  |
| 2. グループ_2      |  |
| 3. グループ_3      |  |
| ▲ ▼            |  |

| Display item | Description        |
|--------------|--------------------|
| No:          | 1 - 100            |
| UNIT:        | Unit               |
| MAX :        | Maximum value      |
| MIN :        | Minimum value      |
| AVE :        | Average            |
| SD :         | Standard deviation |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enabled when CLEAR is selected<br>Go to memory clear                      |
| Operation key 4 | Return to memory group selection  |

### (3) Memory clear

English

| [Stats Group_1] |  |
|-----------------|--|
| CLEAR           |  |
| ▲ ▼             |  |

Japanese

| [統計メモリ グループ 1] |  |
|----------------|--|
| CLEAR          |  |
| ▲ ▼            |  |

Select CLEAR in the following item of the last No.



English

| Data Clear? |  |
|-------------|--|
| 1. No       |  |
| 2. Yes      |  |
| ▲ ▼         |  |

Japanese

| 消去しますか? |  |
|---------|--|
| 1. いいえ  |  |
| 2. はい   |  |
| ▲ ▼     |  |

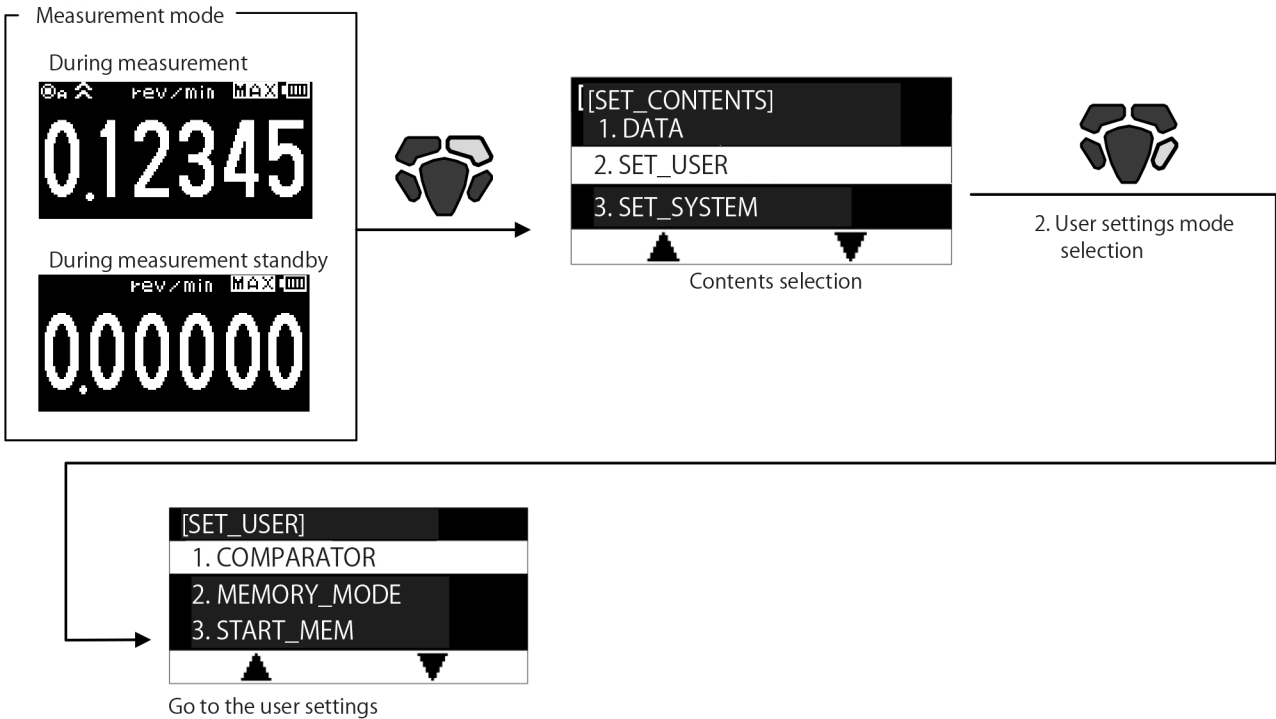
| Item |         |          | Description |
|------|---------|----------|-------------|
|      | English | Japanese |             |

| Operation key   | Operation                    |
|-----------------|------------------------------|
| Operation key 1 | Disabled                     |
| Operation key 2 | Return to No. 1              |
| Operation key 3 | Go to memory clear           |
| Operation key 4 | Return to contents selection |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Execute clear/Return to the statistics memory display                     |

(1) Operation flow

Go to the user setting mode in the following operation.



(2) User settings - Setting item selection

Select the item to set in the following item selection screen, and perform detailed settings.

English

| [SET_USER]     |  |
|----------------|--|
| 1. COMPARATOR  |  |
| 2. MEMORY_MODE |  |
| 3. START_MEM   |  |

Japanese

| [ユーザー設定]  |  |
|-----------|--|
| 1. コンパレータ |  |
| 2. メモリモード |  |
| 3. 開始メモリ  |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to the detail settings of the selected item                            |
| Operation key 4 | Return to the Contents selection  |



● List of the user settings

| Item type     | Item number | Main item title |          | Item number | Sub item title |          | Setting description                 |          | Default value | Remark   |
|---------------|-------------|-----------------|----------|-------------|----------------|----------|-------------------------------------|----------|---------------|--|
|               |             | English         | Japanese |             | English        | Japanese | English                             | Japanese |               |  |
| User settings | 1           | COMPARATOR      | コンパレータ   | 1-1         | UPPER_LIMIT    | 上限値      | 0.00000 ～ 999999                    |          | 0.00000       | 6-digit numerical value setting with decimal point |
|               |             |                 |          | 1-2         | LOWER_LIMIT    | 下限値      | 0.00000 ～ 999999                    |          | 0.00000       |  |
|               | 2           | MEMORY_MODE     | メモリモード   | —           |                |          | Cont                                | 連続       | Cont          | —  |
|               |             |                 |          |             |                |          | Each                                | 単独       |               |  |
|               |             |                 |          |             |                |          | Stats                               | 統計       |               |  |
|               | 3           | START_MEM       | 開始メモリ    | —           |                |          | Group_1                             | グループ_1   | Group_1       | —  |
|               |             |                 |          |             |                |          | Group_2                             | グループ_2   |               |  |
|               |             |                 |          |             |                |          | Group_3                             | グループ_3   |               |  |
|               |             |                 |          |             |                |          | Group_4                             | グループ_4   |               |  |
|               |             |                 |          |             |                |          | Group_5                             | グループ_5   |               |  |
|               | 4           | GRAPH_DISP      | グラフ表示    | —           |                |          | Normal                              | 通常表示     | Normal        | —  |
|               |             |                 |          |             |                |          | Graph_1                             | グラフ 1    |               |  |
|               |             |                 |          |             |                |          | Graph_2                             | グラフ 2    |               |  |
|               |             |                 |          |             |                |          | Graph_3                             | グラフ 3    |               |  |
|               | 5           | SAVE            | 設定保存     | 5-1         | SEL_USER       | 設定グループ   | User <input type="checkbox"/> Set_1 | 設定_1     | —             | —  |
|               |             |                 |          |             |                |          | User <input type="checkbox"/> Set_2 | 設定_2     |               |  |
|               |             |                 |          | 5-2         | R/W            | 読出 / 保存  | User <input type="checkbox"/> Set_3 | 設定_3     | —             | —  |
|               |             |                 |          |             |                |          | Used                                | 読出       |               |  |
|               | 6           | UNIT            | 単位       | —           |                |          | Over <input type="checkbox"/> Write | 保存       | rev/min       | —  |
|               |             |                 |          |             |                |          |                                     |          |               |  |
|               |             |                 |          |             |                |          | rev/min                             |          |               |  |
|               |             |                 |          |             |                |          | m/min                               |          |               |  |
|               |             |                 |          |             |                |          | cm/min                              |          |               |  |
|               |             |                 |          |             |                |          | inch/min                            |          |               |  |
|               |             |                 |          |             |                |          | feet/min                            |          |               |  |
|               |             |                 |          |             |                |          | yards/min                           |          |               |  |
|               |             |                 |          |             |                |          | rev/sec                             |          |               |  |
|               |             |                 |          |             |                |          | m/sec                               |          |               |  |
|               |             |                 |          |             |                |          | cm/sec                              |          |               |  |
|               |             |                 |          |             |                |          | inch/sec                            |          |               |  |
|               |             |                 |          |             |                |          | km/h                                |          |               |  |
|               |             |                 |          |             |                |          | cm                                  |          |               |  |
|               |             |                 |          |             |                |          | m                                   |          |               |  |
|               |             |                 |          |             |                |          | km                                  |          |               |  |
|               |             |                 |          |             |                |          | inch                                |          |               |  |
|               |             |                 |          |             |                |          | feet                                |          |               |  |
|               |             |                 |          |             |                |          | yards                               |          |               |  |
| STP           |             |                 |          |             |                |          |                                     |          |               |  |

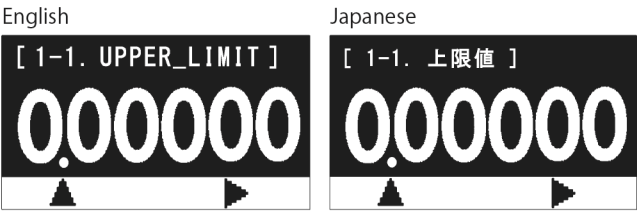
(3) Detail settings for each item

(3-1) Comparator setting

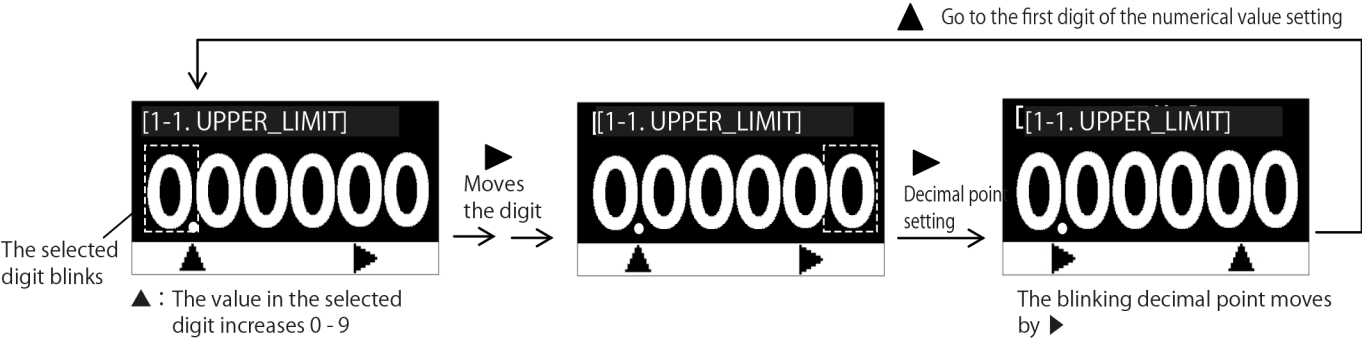
In the "COMPARATOR" setting, set the UPPER\_LIMIT and LOWER\_LIMIT.  
Compare UPPER\_LIMIT and LOWER\_LIMIT with the measurement display value, and display the judgment result in the screen.

- UPPER\_LIMIT ≥ Measurement display value ≥ LOWER\_LIMIT : OK judgment
- UPPER\_LIMIT < Measurement display value : NG judgment
- LOWER\_LIMIT > Measurement display value : NG judgment

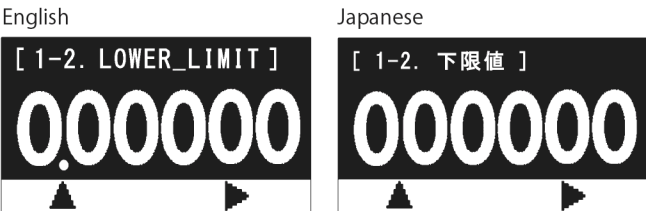
(1) Upper limit value



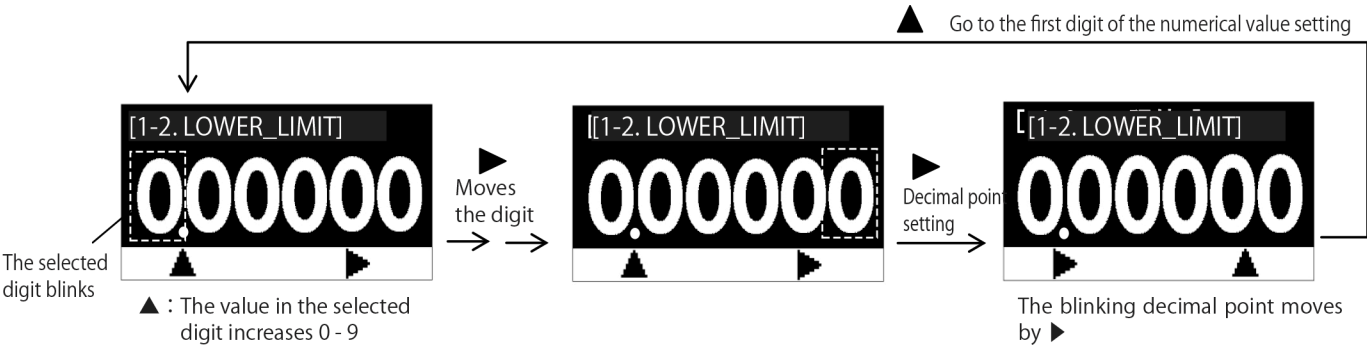
| Operation key   | Operation   |   |
|-----------------|---|---|
|                 | When setting the numerical value  | When setting the decimal point  |
| Operation key 1 | Increases the numerical value in the selected digit<br>Press and hold for 1 second to increase continuously | Return to the numerical value setting                                       |
| Operation key 2 | Moves the digit<br>Press and hold for 1 second to move continuously   | Moves the decimal point<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 1-2   |   |
| Operation key 4 | Return to the user setting  |   |



(2) Lower limit value



| Operation key   | Operation   |   |
|-----------------|---|---|
|                 | When setting the numerical value  | When setting the decimal point  |
| Operation key 1 | Increases the numerical value in the selected digit<br>Press and hold for 1 second to increase continuously | Return to the numerical value setting                                       |
| Operation key 2 | Moves the digit<br>Press and hold for 1 second to move continuously   | Moves the decimal point<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enables the setting, and returns to the user settings.  |   |
| Operation key 4 | Return to 1-1   |   |



\*When both "UPPER\_LIMIT" and "LOWER\_LIMIT" are 0, judgment will be disabled, and the upper and lower limit judgment is not performed.

## (3-2) Memory mode

Set the memory mode.

English

| [ 2. MEMORY_MODE ] |   |
|--------------------|---|
| 1. Cont            |   |
| 2. Each            |   |
| 3. Stats           |   |
| ▲                  | ▼ |

Japanese

| [ 2. メモリモード ] |   |
|---------------|---|
| 1. 連続メモリ      |   |
| 2. 単独メモリ      |   |
| 3. 統計メモリ      |   |
| ▲             | ▼ |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to memory clear  |
| Operation key 4 | Return to the user setting  |

| Item |         |          | Description            |
|------|---------|----------|------------------------|
|      | English | Japanese |                        |
| 1    | Cont    | 連続メモリ    | Continuous memory mode |
| 2    | Each    | 単独メモリ    | Each memory mode       |
| 3    | Stats   | 統計メモリ    | Statistics memory mode |

## Memory clear confirmation

When changing the memory mode, the memory data currently registered will be cleared.

When selecting "2. Yes" in the confirmation screen below, the memory data will be cleared.

When selecting "1. No", the change will not be reflected, and the display will return to the previous screen.

English

| Data Clear? |   |
|-------------|---|
| 1. No       |   |
| 2. Yes      |   |
| ▲           | ▼ |

Japanese

| メモリデータを消去しますか? |   |
|----------------|---|
| 1. いいえ         |   |
| 2. はい          |   |
| ▲              | ▼ |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Execute clear/Return to the memory mode setting without executing clear   |
| Operation key 4 | Return to the memory mode setting   |

| Item |         |          | Description                         |
|------|---------|----------|-------------------------------------|
|      | English | Japanese |                                     |
| 1    | No      | いいえ      | Memory data all clear not permitted |
| 2    | Yes     | はい       | Memory data all clear permitted     |

\*When changing the memory mode, the setting value of the number of registered memory sets for each memory group ("4. MEM\_GROUP" of "3. SET\_SYSTEM" in contents selection) is initialized to the value that corresponds to the memory mode.

### (3-3) Start memory group setting

Select the memory group to start memory registration.

English

| [ 3. START_MEM ] |  |
|------------------|--|
| 1. Group_1       |  |
| 2. Group_2       |  |
| 3. Group_3       |  |
| ▲ ▼              |  |

Japanese

| [ 3. 開始メモリ ] |  |
|--------------|--|
| 1. グループ 1    |  |
| 2. グループ 2    |  |
| 3. グループ 3    |  |
| ▲ ▼          |  |

| Item |         |          | Description  |
|------|---------|----------|--|
|      | English | Japanese |  |
| 1    | Group_1 | グループ 1   | Specifies the memory group to start memory registration as group 1 |
| 2    | Group_2 | グループ 2   | Specifies the memory group to start memory registration as group 2 |
| 3    | Group_3 | グループ 3   | Specifies the memory group to start memory registration as group 3 |
| 4    | Group_4 | グループ 4   | Specifies the memory group to start memory registration as group 4 |
| 5    | Group_5 | グループ 5   | Specifies the memory group to start memory registration as group 5 |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the user settings.                |
| Operation key 4 | Return to the user setting  |

### (3-4) Graph display

The display can be switched to the graph display.

English

| [ 4. GRAPH_DISP ] |  |
|-------------------|--|
| 1. Normal         |  |
| 2. Graph_1        |  |
| 3. Graph_2        |  |
| ▲ ▼               |  |

Japanese

| [ 4. グラフ表示 ] |  |
|--------------|--|
| 1. 通常表示      |  |
| 2. グラフ 1     |  |
| 3. グラフ 2     |  |
| ▲ ▼          |  |

| Item |         |          | Description                            |
|------|---------|----------|--|
|      | English | Japanese |  |
| 1    | Normal  | 通常表示     | Display change: Normal display         |
| 2    | Graph_1 | グラフ _1   | Display change: Graph 1 (Line graph)   |
| 3    | Graph_2 | グラフ _2   | Display change: Graph 2 (Needle graph) |
| 4    | Graph_3 | グラフ _3   | Display change: Graph 3 (Bar graph)    |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the user settings.                |
| Operation key 4 | Return to the user setting  |

(3-5) Setting save

(1) Setting group

The setting description can be saved in three patterns.  
The saved setting description can be read by selecting "Used".

English

|                                   |            |  |
|-----------------------------------|------------|--|
| [ 5-1. SEL_USER ]                 |            |  |
| 1.                                | User_Set_1 |  |
| 2.                                | User_Set_2 |  |
| 3.                                | User_Set_3 |  |
| <div><div></div><div></div></div> |            |  |

Japanese

|                                   |      |  |
|-----------------------------------|------|--|
| [ 5-1. 保存グループ ]                   |      |  |
| 1.                                | 設定 1 |  |
| 2.                                | 設定 2 |  |
| 3.                                | 設定 3 |  |
| <div><div></div><div></div></div> |      |  |

| Operation key   | Operation  |
|-----------------|--|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second<br>to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second<br>to move continuously |
| Operation key 3 | Go to 5-2  |
| Operation key 4 | Return to the user setting   |

| Item |            |          | Description                           |
|------|------------|----------|---------------------------------------|
|      | English    | Japanese |                                       |
| 1    | User_Set_1 | 設定 1     | Go to READ/WRITE in the saved group 1 |
| 2    | User_Set_2 | 設定 2     | Go to READ/WRITE in the saved group 2 |
| 3    | User_Set_3 | 設定 3     | Go to READ/WRITE in the saved group 3 |

(2) Read/Write

English

|                                   |            |  |
|-----------------------------------|------------|--|
| [ 5-2. READ/WRITE ]               |            |  |
| 1.                                | Used       |  |
| 2.                                | Over Write |  |
| <div><div></div><div></div></div> |            |  |

Japanese

|                                   |    |  |
|-----------------------------------|----|--|
| [ 5-2. 読出/保存 ]                    |    |  |
| 1.                                | 読出 |  |
| 2.                                | 保存 |  |
| <div><div></div><div></div></div> |    |  |

| Operation key   | Operation  |
|-----------------|--|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second<br>to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second<br>to move continuously |
| Operation key 3 | Perform read/write, and<br>return to the user settings                       |
| Operation key 4 | Return to 5-1  |

| Item |            |          | Description   |
|------|------------|----------|---|
|      | English    | Japanese |   |
| 1.   | Used       | 読出       | Reads the setting description from the<br>settings 1 to 3 selected in (1) |
| 2.   | Over Write | 保存       | Writes the setting description to the settings<br>1 to 3 selected in (1)  |

\*The setting description to be saved includes the contents in "3. SET\_SYSTEM" in contents selection.

### (3-6) Unit

The display unit of the measurement value can be selected.

English

| [ 6. UNIT ] |  |
|-------------|--|
| 1. rev/min  |  |
| 2. m/min    |  |
| 3. cm/min   |  |

Japanese

| [ 6. 単位 ]  |  |
|------------|--|
| 1. rev/min |  |
| 2. m/min   |  |
| 3. cm/min  |  |

| Item (common to Japanese and English) |           |    |         |
|---------------------------------------|-----------|----|---------|
| 1                                     | rev/min   | 11 | km/h    |
| 2                                     | m/min     | 12 | miles/h |
| 3                                     | cm/min    | 13 | cm      |
| 4                                     | inch/min  | 14 | m       |
| 5                                     | feet/min  | 15 | km      |
| 6                                     | yards/min | 16 | inch    |
| 7                                     | rev/sec   | 17 | feet    |
| 8                                     | m/sec     | 18 | yards   |
| 9                                     | cm/sec    | 19 | STP     |
| 10                                    | inch/sec  |    |         |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the user settings.                |
| Operation key 4 | Return to the user settings   |

#### ● Unit type

- The units of items 1 to 12 are for speed measurement. They are used to measure the rotation speed and distance speed.
- The units of items 13 to 18 are for distance measurement. They are used to measure the distance value.
- The unit of item 19 STP is for manual measurement. It can be used to manually measure time required for one rotation, like using the stopwatch, and display the converted value in the rev/min unit.

#### ● About operation using the STP unit (manual measurement)

- When measuring in the STP unit, the measurement display is as follows. The display can be switched using the operation key 3.

(1) Time display



Displays time in second.



(2) rev/min conversion display



Displays the converted value into rev/min when measurement time is for one rotation.



(3) rev/min conversion display (after prescale)



Displays the prescaled value of (2).



Return to (1)

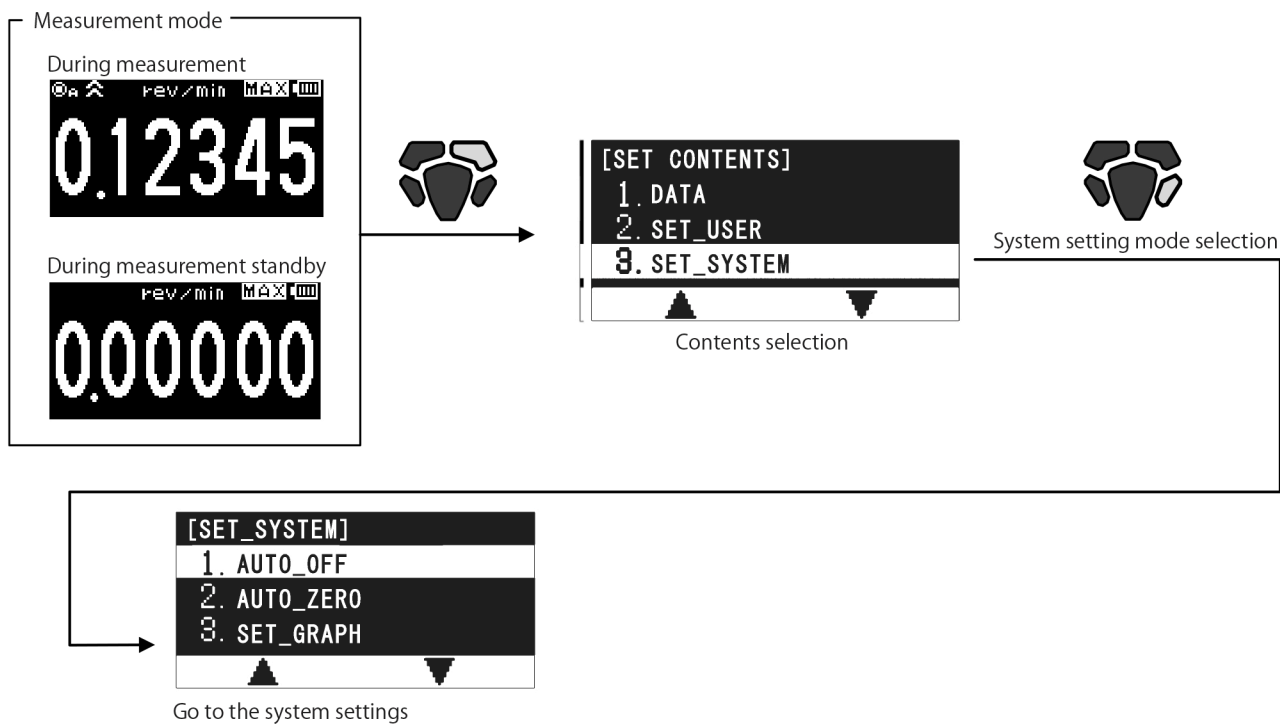
#### ● Limitations for each function due to unit selection

When selecting units other than the speed measurement units, there are differences in operation as follows.

|                      | Cases when the display can be switched      | Graph display | Memory registration                             |   |                                     | Auto zero |
|----------------------|---|---------------|---|---|-------------------------------------|-----------|
|                      |   |               | Continuous memory                               | Statistics memory                                     | Each memory                         |           |
| Speed measurement    | Normal display                              | ○             | Stores the normal display value in the memory   | Calculates statistics from the normal display value   | Registers the current display value | Enabled   |
|                      | Maximum value display                       |               |   |   |                                     |           |
|                      | Minimum value display                       |               |   |   |                                     |           |
|                      | Average value display                       |               |   |   |                                     |           |
|                      | Acceleration rate display                   |               |   |   |                                     |           |
|                      | Prescale display                            |               | Stores the prescale display value in the memory | Calculates statistics from the prescale display value | Registers the current display value |           |
|                      | Prescale maximum value display              |               |   |   |                                     |           |
|                      | Prescale minimum value display              |               |   |   |                                     |           |
|                      | Prescale average value display              |               |   |   |                                     |           |
|                      | Prescale acceleration rate display          |               |   |   |                                     |           |
| Distance measurement | Normal display                              | ×             | ×   | ×   | Registers the current display value | Disabled  |
|                      | Prescale display                            |               |   |   |                                     |           |
| Manual measurement   | Normal display (time)                       | ×             | ×   | ×   | Registers the current display value | Disabled  |
|                      | rev/min conversion display                  |               |   |   |                                     |           |
|                      | rev/min conversion display (after prescale) |               |   |   |                                     |           |

## (1) Operation flow

Go to the system setting mode in the following operation.



## (2) System settings - Setting item selection

Select the item to set in the following item selection screen, and perform detailed settings.

English

| [SET_SYSTEM] |   |
|--------------|---|
| 1. AUTO_OFF  |   |
| 2. AUTO_ZERO |   |
| 3. GRAPH SET |   |
| ▲            | ▼ |

Japanese

| [システム設定] |   |
|----------|---|
| 1. オートオフ |   |
| 2. オートゼロ |   |
| 3. グラフ   |   |
| ▲        | ▼ |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to the detail settings of the selected item                            |
| Operation key 4 | Return to the measurement mode  |



● List of the system settings

| Item type       | Item number | Main item title |           | Item number      | Sub item title |          | Setting description                                |          | Default value | Remark  |
|-----------------|-------------|-----------------|-----------|------------------|----------------|----------|--|----------|---------------|---|
|                 |             | English         | Japanese  |                  | English        | Japanese | English  | Japanese |               |   |
| System settings | 1           | AUTO_OFF        | オートオフ     | —                |                |          | 1 min  | 1 分      | 1 min         | —   |
|                 |             |                 |           |                  |                |          | 10 min   | 10 分     |               |   |
|                 |             |                 |           |                  |                |          | 30 min   | 30 分     |               |   |
|                 | 2           | AUTO_ZERO       | オートゼロ     | —                |                |          | 1 sec  | 1 秒      | None          | —   |
|                 |             |                 |           |                  |                |          | 10 sec   | 10 秒     |               |   |
|                 |             |                 |           |                  |                |          | 30 sec   | 30 秒     |               |   |
|                 |             |                 |           |                  |                |          | 60 sec   | 60 秒     |               |   |
|                 |             |                 |           |                  |                |          | None   | 無効       |               |   |
|                 | 3           | SET_GRAPH       | グラフ       | 3-1              | GRAPH_FLOW     | グラフ方向    | Right  | 右方向      | Right         | —   |
|                 |             |                 |           |                  |                |          | Left   | 左方向      |               |   |
|                 |             |                 |           | 3-2              | GRAPH_TIME     | グラフ時間    | 1 sec  | 1 秒      | 1 sec         | —   |
|                 |             |                 |           |                  |                |          | 10 sec   | 10 秒     |               |   |
|                 |             |                 |           |                  |                |          | 50 sec   | 50 秒     |               |   |
|                 |             |                 |           |                  |                |          | 100 sec  | 100 秒    |               |   |
|                 | 3-3         | GRAPH_MAX       | グラフ MAX 値 | 0.00001 ～ 999999 |                | 000100.  | 6-digit numerical value setting with decimal point |          |               |   |
|                 | 3-4         | GRAPH_MIN       | グラフ MIN 値 | 0.00001 ～ 999999 |                | 0.00000  |  |          |               |   |
|                 | 4           | MEM_GROUP       | メモリグループ   | 4-1              | MEM_GROUP      | メモリグループ  | Group_1  | グループ_1   | —             | Select the memorygroup to be set in 4-2                       |
|                 |             |                 |           |                  |                |          | Group_2  | グループ_2   |               |   |
|                 |             |                 |           |                  |                |          | Group_3  | グループ_3   |               |   |
|                 |             |                 |           |                  |                |          | Group_4  | グループ_4   |               |   |
|                 |             |                 |           |                  |                |          | Group_5  | グループ_5   |               |   |
|                 |             |                 |           | 4-2              | Group_ □       | グループ_ □  | 0 ～ 1000   |          | 0             | when setting group other than group 1 in the cont memory mode |
|                 |             |                 |           |                  |                |          | 0 ～ 100  |          | 0             | when setting group other than group 1 in the cont memory mode |
|                 |             |                 |           |                  |                |          | 0 ～ 100  |          | 0             | when setting group other than group 1 in the cont memory mode |
|                 | 5           | CONTACT         | 接触 / 非接触  | —                |                |          | Contact  | 接触       | Non Contact   | —   |
|                 |             |                 |           |                  |                |          | Non Contact  | 非接触      |               |   |
|                 |             |                 |           |                  |                |          | Auto   | 自動検出     |               |   |
|                 |             |                 |           |                  |                |          | Contact (Low)                                      | 接触 (低速)  |               |   |
|                 | 6           | DISP_CYCLE      | 表示更新周期    | —                |                |          | 100 msec   |          | 1sec          | —   |
|                 |             |                 |           |                  |                |          | 500 msec   |          |               |   |
|                 |             |                 |           |                  |                |          | 1 sec  |          |               |   |
|                 |             |                 |           |                  |                |          | 5 sec  |          |               |   |
|                 | 7           | PRESCALE        | プリスケール    | —                |                |          | 0.00001 ～ 999999.                                  |          | 000001.       | 6-digit numerical value setting with decimal point            |
|                 | 8           | DIAMETER        | 直径        | 8-1              | DIA_UNIT       | 直径単位     | mm   |          | mm            | —   |
|                 |             |                 |           |                  |                |          | cm   |          |               |   |
|                 |             |                 |           |                  |                |          | m  |          |               |   |
|                 |             |                 |           |                  |                |          | inch   |          |               |   |
|                 |             |                 |           |                  |                |          | feet   |          |               |   |
|                 |             |                 |           |                  |                |          | yards  |          |               |   |
|                 |             |                 |           | 8-2              | DIAMETER       | 直径値      | 0.00001 ～ 999999.                                  |          | 48.5104       | 6-digit numerical value setting with decimal point            |
|                 | 9           | DIST/PULSE      | 距離 / パルス  | 9-1              | DIST_UNIT      | 距離単位     | mm   |          | mm            | —   |
|                 |             |                 |           |                  |                |          | cm   |          |               |   |
|                 |             |                 |           |                  |                |          | m  |          |               |   |
|                 |             |                 |           |                  |                |          | inch   |          |               |   |
|                 |             |                 |           |                  |                |          | feet   |          |               |   |
|                 |             |                 |           |                  |                |          | yards  |          |               |   |
|                 |             |                 |           | 9-2              | DIST/PULSE     | 距離 / パルス | 0.00001 ～ 999999.                                  |          | 000001.       | 6-digit numerical value setting with decimal point            |
|                 | 10          | BRIGHTNESS      | 画面明るさ     | —                |                |          | 20%  |          | 60%           | —   |
|                 |             |                 |           |                  |                |          | 40%  |          |               |   |
|                 |             |                 |           |                  |                |          | 60%  |          |               |   |
|                 |             |                 |           |                  |                |          | 80%  |          |               |   |
|                 |             |                 |           |                  |                |          | 100%   |          |               |   |
|                 | 11          | REVERSE_LCD     | 逆転表示      | —                |                |          | OFF  |          | OFF           | —   |
|                 |             |                 |           |                  |                |          | ON   |          |               |   |
|                 | 12          | LANGUAGE        | 言語        | —                |                |          | 日本語  |          | English       | —   |
|                 |             |                 |           |                  |                |          | English  |          |               |   |
|                 | 13          | MEAS_OPR        | 計測スイッチ    | —                |                |          | Momemetary   | モーメンタリ   | Momentary     | —   |
|                 |             |                 |           |                  |                |          | Continuous   | オルタネイト   |               |   |

### (3) Detail settings for each item

#### (3-1) Auto OFF

Set a period of time until the power is automatically turned OFF.

The power is turned OFF when the unoperated status continues for the specified auto off time.

English

| [ 1. AUTO_OFF ] |   |
|-----------------|---|
| 1. 1 min        |   |
| 2. 10 min       |   |
| 3. 30 min       |   |
| ▲               | ▼ |

Japanese

| [ 1. オートオフ ] |   |
|--------------|---|
| 1. 1 分       |   |
| 2. 10 分      |   |
| 3. 30 分      |   |
| ▲            | ▼ |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item |         |          | Description   |
|------|---------|----------|---|
|      | English | Japanese |   |
| 1.   | 1 min   | 1 分      | Power OFF when the unoperated status continues for 1 minute   |
| 2.   | 10 min  | 10 分     | Power OFF when the unoperated status continues for 10 minutes |
| 3.   | 30 min  | 30 分     | Power OFF when the unoperated status continues for 30 minutes |

- When performing communication using the optional USB cable, the auto off function is disabled.

#### (3-2) Auto zero

Set a period of time until the display is turned to 0 during measurement.

During measurement, when the rotation undetected status continues longer than the specified auto zero time, the measurement value display is reset to "0".

English

| [ 2. AUTO_ZERO ] |   |
|------------------|---|
| 1. 1 sec         |   |
| 2. 10 sec        |   |
| 3. 30 sec        |   |
| ▲                | ▼ |

Japanese

| [ 2. オートゼロ ] |   |
|--------------|---|
| 1. 1 秒       |   |
| 2. 10 秒      |   |
| 3. 30 秒      |   |
| ▲            | ▼ |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item |         |          | Description   |
|------|---------|----------|---|
|      | English | Japanese |   |
| 1    | 1 sec   | 1 秒      | During measurement, when no input pulse status continues for 1 second, the display is turned to 0   |
| 2    | 10 sec  | 10 秒     | During measurement, when no input pulse status continues for 10 seconds, the display is turned to 0 |
| 3    | 30 sec  | 30 秒     | During measurement, when no input pulse status continues for 30 seconds, the display is turned to 0 |
| 4    | 60 sec  | 60 秒     | During measurement, when no input pulse status continues for 60 seconds, the display is turned to 0 |
|      | None    | 無効       | Auto zero disabled  |

### (3-3) Graph display

Set various graph settings.

#### (1) Graph flow

Set the line graph direction.

This setting is enabled only for Graph\_1 (line graph).

English

| [ 3-1. GRAPH_FLOW ] |  |
|---------------------|--|
| 1. Right            |  |
| 2. Left             |  |
|                     |  |

Japanese

| [ 3-1. グラフ方向 ] |  |
|----------------|--|
| 1. 右方向         |  |
| 2. 左方向         |  |
|                |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 3-2   |
| Operation key 4 | Return to the system settings   |

| Item |         |          | Description                   |
|------|---------|----------|-------------------------------|
|      | English | Japanese |                               |
| 1.   | Right   | 右方向      | Graph update direction: Right |
| 2.   | Left    | 左方向      | Graph update direction: Left  |

Graph flow: Right direction



New

Old

Graph flow: Left direction



Old

New

#### (2) Graph time

Set the graph time.

This setting is for time width of the graph for Graph\_1 (line graph).

Also, it represents the update time when the measurement display "AVE", "ACC", "P.AVE", or "P.ACC" is indicated.

English

| [ 3-2. GRAPH TIME ] |  |
|---------------------|--|
| 1. 1 sec            |  |
| 2. 10 sec           |  |
| 3. 50 sec           |  |
|                     |  |

Japanese

| [ 3-2. グラフ時間 ] |  |
|----------------|--|
| 1. 1 秒         |  |
| 2. 10 秒        |  |
| 3. 50 秒        |  |
|                |  |

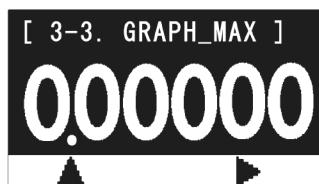
| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 3-3   |
| Operation key 4 | Return to 3-1   |

| Item |         |          | Description                     |
|------|---------|----------|---------------------------------|
|      | English | Japanese |                                 |
| 1    | 1 sec   | 1 秒      | Graph time setting: 1 second    |
| 2    | 10 sec  | 10 秒     | Graph time setting: 10 seconds  |
| 3    | 50 sec  | 50 秒     | Graph time setting: 50 seconds  |
| 4    | 100 sec | 100 秒    | Graph time setting: 100 seconds |

### (3) Graph maximum value

Set the maximum value in the graph display.

English

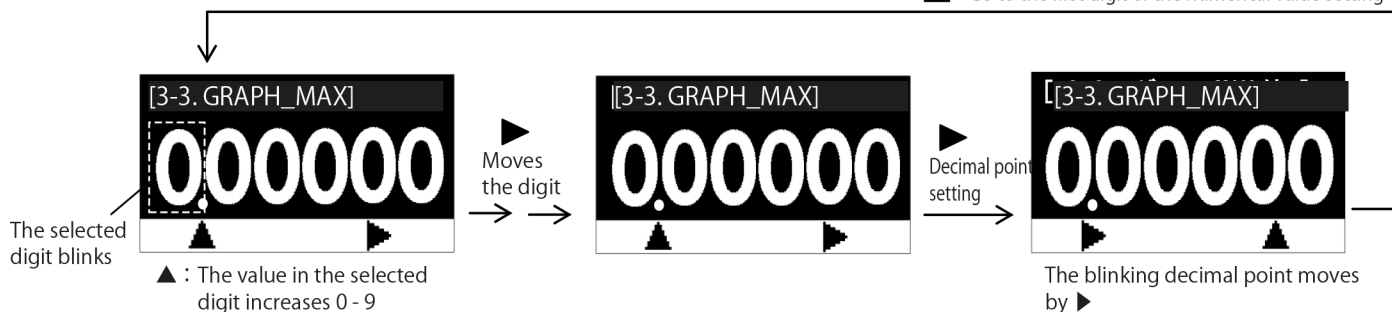


Japanese



| Operation key   | Operation  |  |
|-----------------|--|--|
|                 | When setting the numerical value   | When setting the decimal point   |
| Operation key 1 | Increases the numerical value in the selected digit. Press and hold for 1 second to increase continuously. | Return to the numerical value setting.                                     |
| Operation key 2 | Moves the digit. Press and hold for 1 second to move continuously.   | Moves the decimal point. Press and hold for 1 second to move continuously. |
| Operation key 3 | Go to 3-4  |  |
| Operation key 4 | Return to 3-2  |  |

▲ Go to the first digit of the numerical value setting



### (4) Graph minimum value

Set the minimum value in the graph display.

English

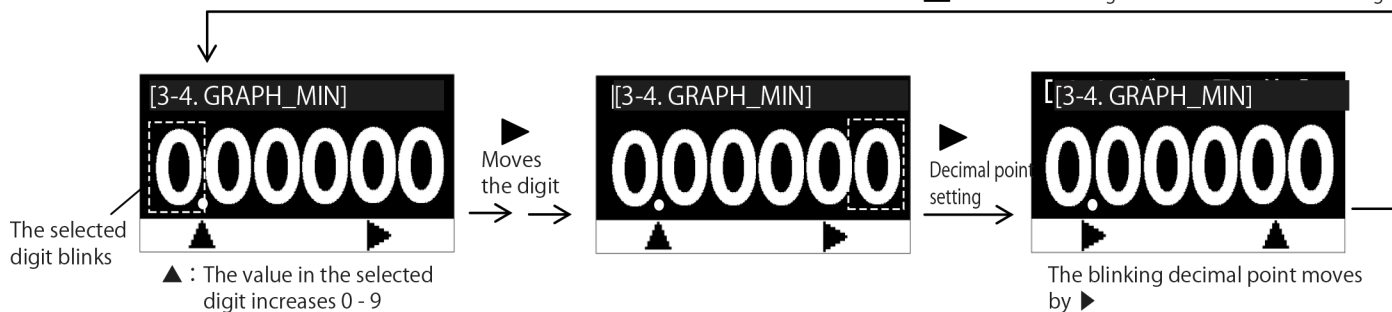


Japanese

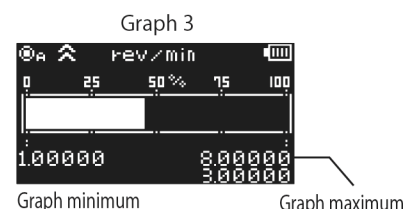
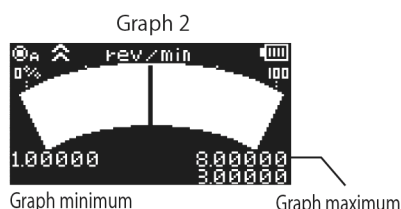
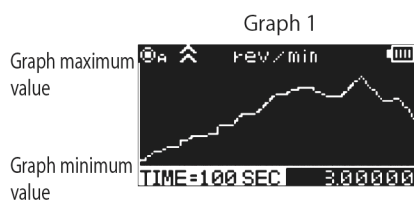


| Operation key   | Operation  |  |
|-----------------|--|--|
|                 | When setting the numerical value   | When setting the decimal point   |
| Operation key 1 | Increases the numerical value in the selected digit. Press and hold for 1 second to continuously increase. | Return to the numerical value setting.                                     |
| Operation key 2 | Moves the digit. Press and hold for 1 second to move continuously.   | Moves the decimal point. Press and hold for 1 second to move continuously. |
| Operation key 3 | Enable the setting, and return to the system settings.   |  |
| Operation key 4 | Return to 3-3  |  |

▲ Go to the first digit of the numerical value setting



### About the graph maximum/minimum values



### (3-4) Memory group

Set the number of memory data registration sets for each memory group.

#### (1) Setting memory group selection

Select the memory group to set.

English

| [ 4-1. MEM_GROUP ] |  |
|--------------------|--|
| 1. Group_1         |  |
| 2. Group_2         |  |
| 3. Group_3         |  |
|                    |  |

Japanese

| [ 4-1. メモリグループ ] |  |
|------------------|--|
| 1. グループ 1        |  |
| 2. グループ 2        |  |
| 3. グループ 3        |  |
|                  |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 4-2   |
| Operation key 4 | Return to the system settings   |

| Item |         |          | Description                         |
|------|---------|----------|-------------------------------------|
|      | English | Japanese |                                     |
| 1.   | Group_1 | グループ 1   | Go to the setting of memory group 1 |
| 2.   | Group_2 | グループ 2   | Go to the setting of memory group 2 |
| 3.   | Group_3 | グループ 3   | Go to the setting of memory group 3 |
| 4.   | Group_4 | グループ 4   | Go to the setting of memory group 4 |
| 5.   | Group_5 | グループ 5   | Go to the setting of memory group 5 |

#### (2) Group setting

Set the number of memory data registration sets for the memory group selected in (1).

English

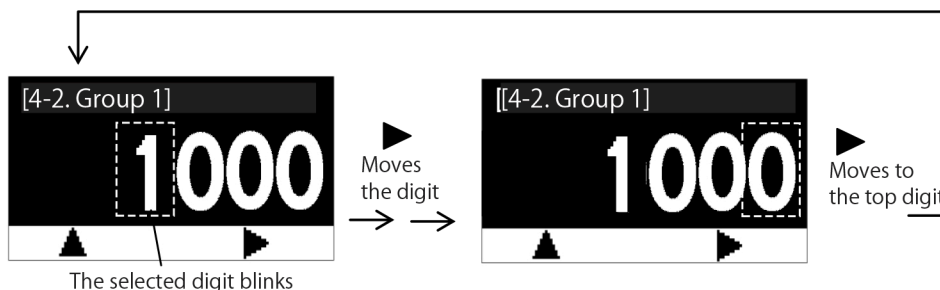
| [ 4-2. GROUP_1 ] |  |
|------------------|--|
| 1000             |  |
|                  |  |

Japanese

| [ 4-2. グループ 1 ] |  |
|-----------------|--|
| 000000          |  |
|                 |  |

| Operation key   | Operation   |
|-----------------|---|
|                 | When setting the numerical value  |
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to delete the registration memory data for each memory group           |
| Operation key 4 | Return to 4-1   |

\*No decimal point setting



▲ : The value in the selected digit increases 0 - 9

\*Set the value for each memory mode within the setting range in the table below.

\*When the total number of memory data registration sets for memory groups exceeds the maximum value in the table below, it cannot be set.

\*When the total number of memory data registration sets for memory groups is 0, it cannot be set.

\*When changing the memory mode, the setting value of the number of registered memory sets for each memory group ("4. MEM\_GROUP" of "3. SET\_SYSTEM" in contents selection) is initialized to the value that corresponds to the memory mode.

| Memory mode | Maximum number of registration sets | Setting range                     |                                |                                |                                |                                | Setting condition   |
|-------------|-------------------------------------|-----------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---|
|             |                                     | Memory group 1                    | Memory group 2                 | Memory group 3                 | Memory group 4                 | Memory group 5                 |   |
| Continuous  | 1000 sets                           | 0 - 1000<br>(Default value: 1000) | 0 - 1000<br>(Default value: 0) | 0 - 1000<br>(Default value: 0) | 0 - 1000<br>(Default value: 0) | 0 - 1000<br>(Default value: 0) | Set the total number of data sets for memory groups 1 to 5 to be within |
| Each        | 100 sets                            | 0 - 100<br>(Default value: 100)   | 0 - 100<br>(Default value: 0)  | 0 - 100<br>(Default value: 0)  | 0 - 100<br>(Default value: 0)  | 0 - 100<br>(Default value: 0)  |   |

## ● Registration memory data deletion in each memory group

When the number of memory data registration sets for each memory group has been changed, the memory data registered in the corresponding memory group needs to be deleted.

English

**Group\_□ Clear?**

1. No

2. Yes

▲ ▼

Japanese

**グループ 1 を消去しますか?**

1. いいえ

2. はい

▲ ▼

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously         |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously         |
| Operation key 3 | Execute clear/Return to the number of memory sets setting without executing clear |
| Operation key 4 | Return to the number of memory sets setting                                       |

| Item |         |          | Description  |
|------|---------|----------|--|
|      | English | Japanese |  |
| 1.   | No      | いいえ      | Registration memory data deletion in the current memory group: not permitted |
| 2.   | Yes     | はい       | Registration memory data deletion in the current memory group: permitted     |

\*When the registration memory data is not deleted, the number of memory data registration sets in the memory group will not be changed.

### (3-5) Contact/Non-contact

The measurement method can be selected from contact and non-contact. Automatic detection can be also performed.

English

**[ 5. CONTACT ]**

1. Contact

2. Non Contact

3. Auto

▲ ▼

Japanese

**[ 5. 接触/非接触 ]**

1. 接触

2. 非接触

3. 自動検出

▲ ▼

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item |              |           | Description   |
|------|--------------|-----------|---|
|      | English      | Japanese  |   |
| 1    | Contact      | 接触        | Select when the contact adapter is attached               |
| 2    | Non Contact  | 非接触       | Select when the contact adapter is not attached           |
| 3    | Auto         | 自動検出      | Automatic detection mode                                  |
| 4    | Contact(Low) | 接触 ( 低速 ) | Select when the contact adapter for low speed is attached |

\*Select "4. Contact (Low)" when using the optional contact adapter for low speed.

\*When "3. AUTO DETECT" is selected, contact attachment may not be automatically detected correctly depending on the environment. In that case, select 1 to 2 manually. In addition, for automatic detection, contact attachment is detected when measurement starts. The measurement value may not be displayed correctly from measurement start to completion of automatic detection.

\*If using a low-speed contact adapter, do not select "3. Auto".

### (3-6) DISP\_CYCLE Display update cycle

The display update cycle of the measurement value can be selected.

The measurement value is updated every time the period of time selected in this setting is reached.

English

**[ 6. DISP\_CYCLE ]**

1. 100 msec

2. 500 msec

3. 1 sec

▲ ▼

Japanese

**[ 6. 表示更新周期 ]**

1. 100 msec

2. 500 msec

3. 1 sec

▲ ▼

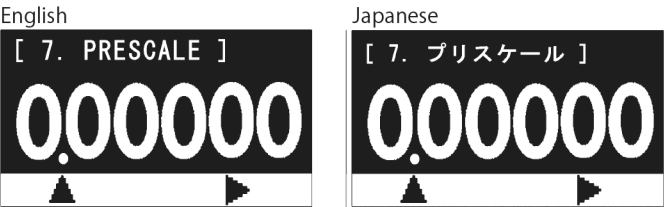
| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) |         | Description                   |
|---------------------------------------|---------|-------------------------------|
| 1                                     | 100msec | Display update cycle: 100msec |
| 2                                     | 500msec | Display update cycle: 500msec |
| 3                                     | 1sec    | Display update cycle: 1sec    |

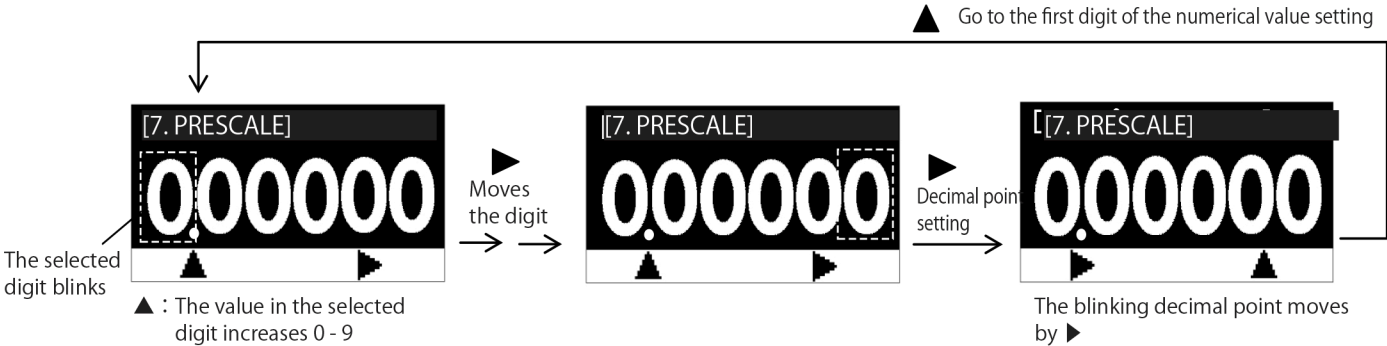
(3-7) Prescale

The prescale value can be set. Prescale is a user defined mathematical correction of the values displayed. This can be helpful when a scaling of the point measured has more significant meaning to the user taking the measurement.

The measurement value display of "PRE", "P.MAX", "P.MIN", "P.AVE", and "P.ACC" is influenced by the prescale value.



| Operation key   | Operation   |   |
|-----------------|---|---|
|                 | When setting the numerical value  | When setting the decimal point  |
| Operation key 1 | Increases the numerical value in the selected digit<br>Press and hold for 1 second to increase continuously | Return to the numerical value setting                                       |
| Operation key 2 | Moves the digit<br>Press and hold for 1 second to move continuously   | Moves the decimal point<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the setting, and return to the system settings.  |   |
| Operation key 4 | Return to the system settings   |   |



\*The setting range is between 0.00001 and 999999.0 cannot be set.

• About prescale

Set the prescale value to the number of pulses per rotation (for contact measurement, the number of measurement shaft rotations), and perform the following calculation for measurement display

When the measurement value is 100.0,  
and the prescale value is 2.00,  $100.0 / 2.00 = \text{Display: } 50$

\*The accuracy depends on the measurement value before applying prescale.



## (3-8) Diameter

Set the diameter value of the speed measurement wheel when using the speed measurement in contact measurement.

\*These setting contents are not applied to non-contact measurement.

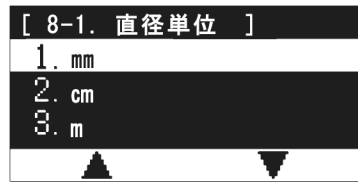
### (1) Diameter unit

Set the diameter value unit.

English



Japanese



| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 8-2   |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) | Description          |
|---------------------------------------|----------------------|
| 1 mm                                  | Diameter unit: mm    |
| 2 cm                                  | Diameter unit: cm    |
| 3 m                                   | Diameter unit: m     |
| 4 inch                                | Diameter unit: inch  |
| 5 feet                                | Diameter unit: feet  |
| 6 yards                               | Diameter unit: yards |

### (2) Diameter

Set the diameter value.

English

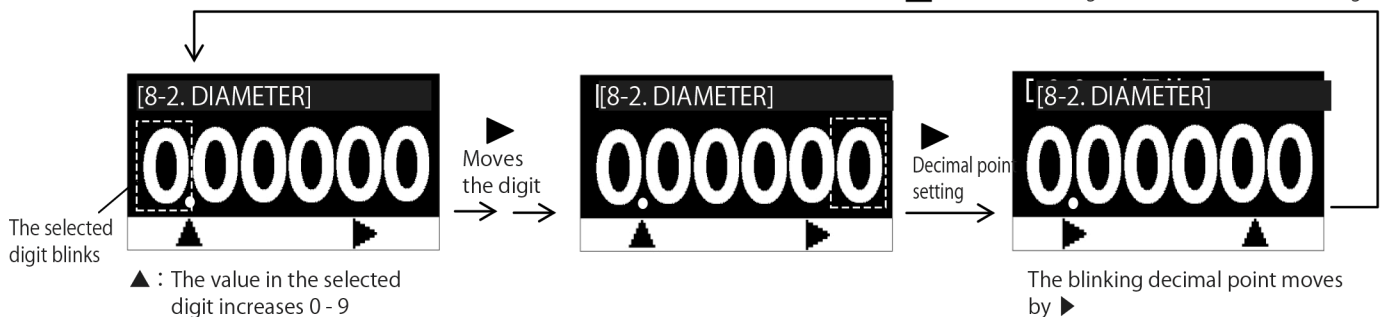


Japanese



| Operation key   | Operation   |   |
|-----------------|---|---|
|                 | When setting the numerical value  | When setting the decimal point  |
| Operation key 1 | Increases the numerical value in the selected digit<br>Press and hold for 1 second to increase continuously | Return to the numerical value setting                                       |
| Operation key 2 | Moves the digit<br>Press and hold for 1 second to move continuously   | Moves the decimal point<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the setting, and return to the system settings.  |   |
| Operation key 4 | Return to 8-1   |   |

▲ Go to the first digit of the numerical value setting



### • About diameter

From the diameter value of the speed measurement wheel, obtain the distance per rotation of the measurement shaft, and then obtain the peripheral speed and distance. This setting is enabled only when the speed measurement unit (excluding rev/min and rev/sec) and distance measurement unit are selected at the time of contact attachment.



Calculate the circumference distance from the diameter of the speed measurement wheel

### (3-9) Distance/Pulse

Set the distance value per pulse for non-contact measurement.

\*This setting contents are not applied to contact measurement.

#### (1) Distance unit

Set the distance value unit per pulse.

English

| [ 9-1. DIST_UNIT ] |    |
|--------------------|----|
| 1.                 | mm |
| 2.                 | cm |
| 3.                 | m  |

Japanese

| [ 9-1. 距離単位 ] |    |
|---------------|----|
| 1.            | mm |
| 2.            | cm |
| 3.            | m  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Go to 9-2   |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) | Description          |
|---------------------------------------|----------------------|
| 1 mm                                  | Diameter unit: mm    |
| 2 cm                                  | Diameter unit: cm    |
| 3 m                                   | Diameter unit: m     |
| 4 inch                                | Diameter unit: inch  |
| 5 feet                                | Diameter unit: feet  |
| 6 yards                               | Diameter unit: yards |

#### (2) Distance/Pulse

Set the distance value per pulse.

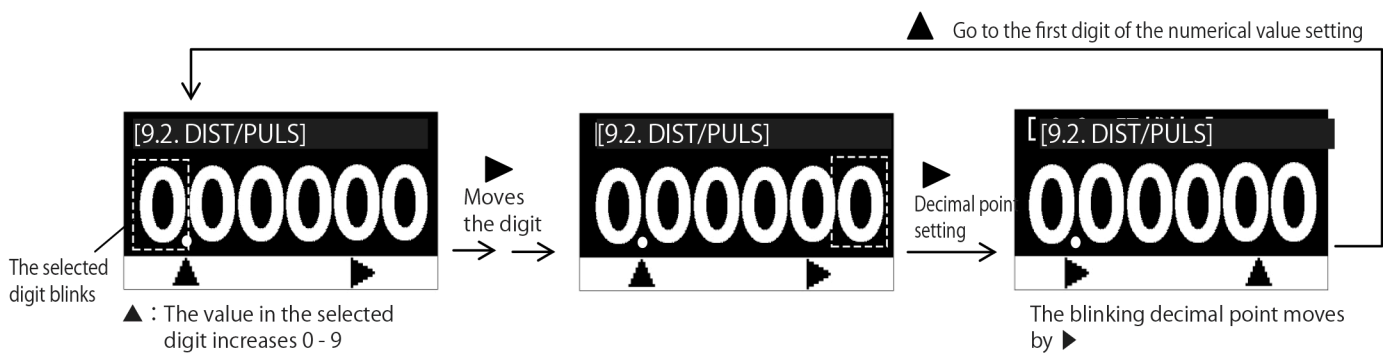
English

| [ 9-2. DIST/PULSE ] |  |
|---------------------|--|
| 0.000000            |  |

Japanese

| [ 9-2. 距離値 ] |  |
|--------------|--|
| 0.000000     |  |

| Operation key   | Operation   |   |
|-----------------|---|---|
|                 | When setting the numerical value  | When setting the decimal point  |
| Operation key 1 | Increases the numerical value in the selected digit<br>Press and hold for 1 second to increase continuously | Return to the numerical value setting                                       |
| Operation key 2 | Moves the digit<br>Press and hold for 1 second to move continuously   | Moves the decimal point<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the setting, and return to the system settings.  |   |
| Operation key 4 | Return to 9-1   |   |



#### • About distance/pulse

Obtain the peripheral speed and distance from the distance value per pulse.

This setting is enabled only when the speed measurement unit (excluding rev/min and rev/sec) and distance measurement unit are selected at the time of contact attachment.



Obtain the peripheral speed and distance from the distance value per pulse.

### (3-10) Brightness

The brightness on the screen can be set.

English

| [10. BRIGHTNESS] |  |
|------------------|--|
| 1. 20%           |  |
| 2. 40%           |  |
| 3. 60%           |  |
|                  |  |

Japanese

| [10. 画面明るさ] |  |
|-------------|--|
| 1. 20%      |  |
| 2. 40%      |  |
| 3. 60%      |  |
|             |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) |      | Description              |
|---------------------------------------|------|--------------------------|
| 1                                     | 20%  | Dark<br>↑<br>↓<br>Bright |
| 2                                     | 40%  |                          |
| 3                                     | 60%  |                          |
| 4                                     | 80%  |                          |
| 5                                     | 100% |                          |

### (3-11) Reverse display

The vertical reverse can be applied to the display items.

English

| [11. REVERSE_LCD] |  |
|-------------------|--|
| 1. OFF            |  |
| 2. ON             |  |
|                   |  |

Japanese

| [11. 逆転表示] |  |
|------------|--|
| 1. OFF     |  |
| 2. ON      |  |
|            |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) |     | Description         |
|---------------------------------------|-----|---------------------|
| 1.                                    | OFF | Reverse display OFF |
| 2.                                    | ON  | Reverse display ON  |

\*The reverse display is enabled only in the measurement mode (including the graph display).  
For various settings, and memory data display, the reverse display is disabled.

### (3-12) Language

The language to be displayed can be set.

English

| [12. LANGUAGE] |  |
|----------------|--|
| 1. 日本語         |  |
| 2. English     |  |
|                |  |

Japanese

| [12. 言語]   |  |
|------------|--|
| 1. 日本語     |  |
| 2. English |  |
|            |  |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

| Item (common to Japanese and English) |  | Description |
|---------------------------------------|--|-------------|
|                                       |  |             |

### (3-13) Measurement switch

The operation mode of the measurement switch can be set.

English

| [13. MEAS_OPR] |  |
|----------------|--|
| 1. Momentary   |  |
| 2. Continuous  |  |

Japanese

| [13. 計測スイッチ] |  |
|--------------|--|
| 1. モーメンタリ    |  |
| 2. オルタネイト    |  |

| Item |            |          | Description   |
|------|------------|----------|---|
|      | English    | Japanese |   |
| 1    | Momentary  | モーメンタリ   | Measures only while the measurement switch is pressed and held  |
| 2    | Continuous | オルタネイト   | Starts measurement when the measurement switch is pressed once<br>Ends measurement when it is pressed again |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously |
| Operation key 3 | Enable the selected item, and return to the system settings               |
| Operation key 4 | Return to the system settings   |

### (3-14) Initialization

The setting value can be initialized.

English

| Initialize really? |  |
|--------------------|--|
| 1. No              |  |
| 2. Yes             |  |

Japanese

| 本当に初期化しますか？ |  |
|-------------|--|
| 1. いいえ      |  |
| 2. はい       |  |

| Item |         |          | Description  |
|------|---------|----------|--|
|      | English | Japanese |  |
| 1    | No      | いいえ      | Return to the system settings without initialization |
| 2    | Yes     | はい       | Initializes the setting contents                     |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously   |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously   |
| Operation key 3 | Execute initialization/Return to the system settings without initialization |
| Operation key 4 | Return to the system settings   |

\*The user setting contents are also initialized.

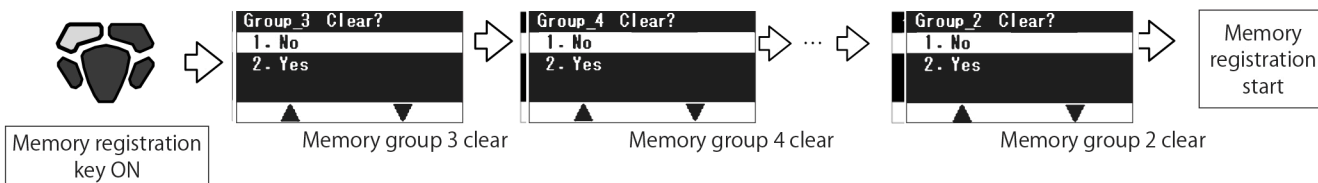
Note that the contents saved in "User\_Set\_1" to "User\_Set\_3" of "SEL\_USER" in the user settings are not initialized.

### \*Memory registration when the unit, diameter, distance/pulse have been changed

When performing memory registration after the unit, diameter, distance/pulse values have been changed, the already registered memory data needs to be deleted.

If the existing memory data is not deleted, new memory data cannot be registered.

Example: Start memory registration after changing the unit (when memory data is already registered in the start memory group 3, and memory groups 1 to 5)



| Group_□ Clear? |  |
|----------------|--|
| 1. No          |  |
| 2. Yes         |  |

| グループ□ 消去しますか？ |  |
|---------------|--|
| 1. いいえ        |  |
| 2. はい         |  |

| Item |         |          | Description  |
|------|---------|----------|--|
|      | English | Japanese |  |
| 1.   | No      | いいえ      | Memory registration disabled. Return to the measurement mode |

| Operation key   | Operation   |
|-----------------|---|
| Operation key 1 | Select the upper item<br>Press and hold for 1 second to move continuously     |
| Operation key 2 | Select the lower item<br>Press and hold for 1 second to move continuously     |
| Operation key 3 | Execute clear/Return to the continuous memory display without executing clear |
| Operation key 4 | Return to the continuous memory display                                       |

## 7. Battery Replacement

Replace batteries according to the following procedure.

### 1 When the battery level becomes low

Rear panel  
Battery cover



When the battery indicator blinks, open the battery cover on the rear panel, and replace batteries.



### 2 Replace with new batteries



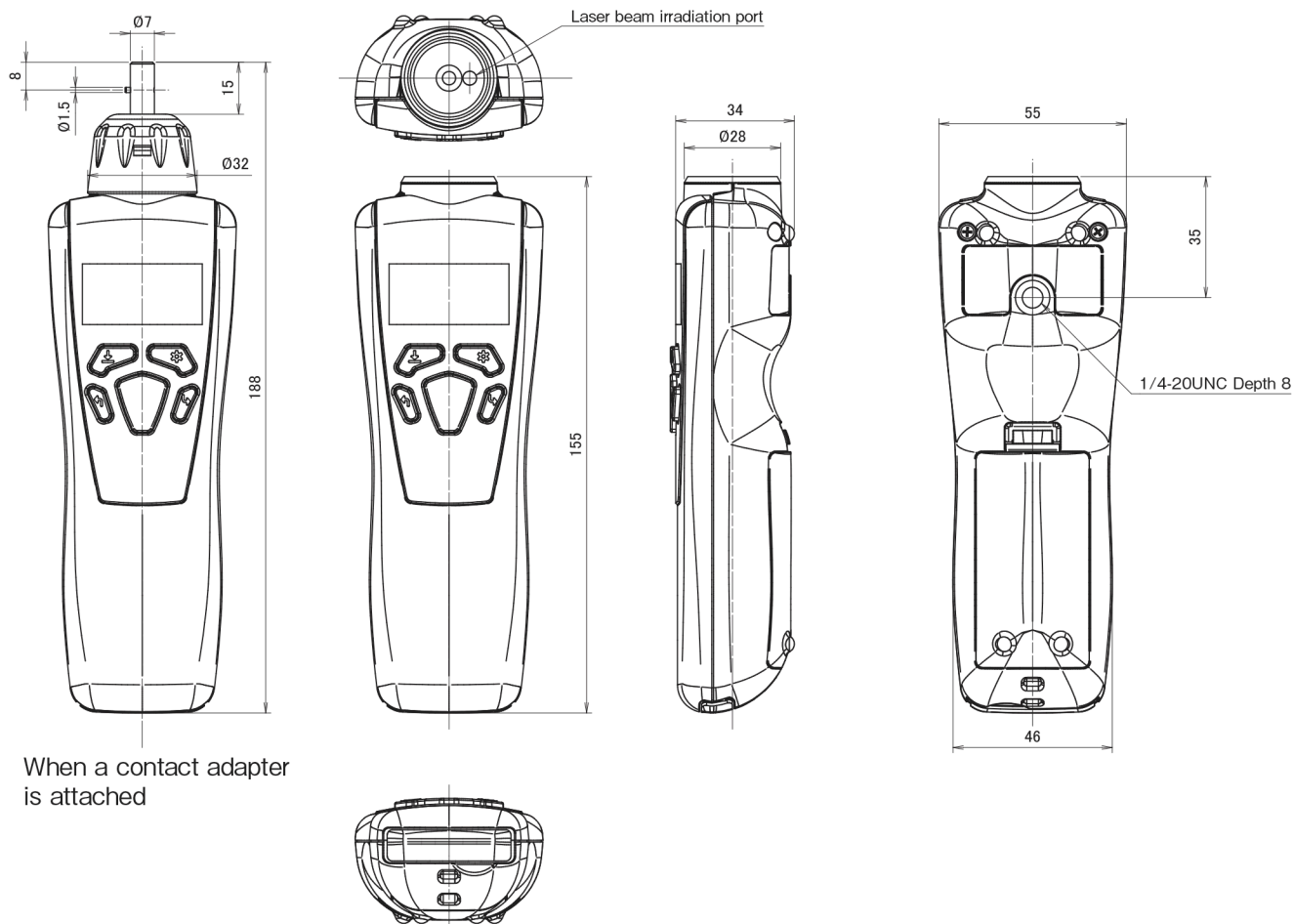
Put in two new batteries, aligning the positive and negative polarities correctly, and close the cover.

- Do not mix and use new and old batteries, or different types of batteries.
- Failure to follow this may result in injury and/or damage due to leakage. When you do not use the unit for a long period of time, remove batteries, and keep them in the carrying case.

\*Use AA type alkali or manganese batteries. When other types of batteries are used, operation cannot be guaranteed.

\*In the following cases, the settings and/or memory data may not be saved normally: when the battery level is low, when removing batteries during operation, when disconnecting the USB cable (option) during use at the time of the power supplied only through the USB cable.

## 8. Dimensional Drawing



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## 9. Specifications

| Item  | Description  |
|---|--|
| Measurement system                            | Non-contact Red laser Class2 Maximum output: 1mW Wave length: 650nm  |
| Display                                       | Organic light emitting display (OLED) (blue light emission) graphic display type   |
| Operation switch                              | 5 points   |
| Measurement range                             | 6 to 99,999rpm: Non-contact measurement<br>0.8 to 25,000rpm: Contact measurement   |
| Measurement unit                              | Speed measuremen: rev/min, m/min, cm/min, inch/min, feet/min, yards/min, rev/sec, m/sec, cm/sec, inch/sec, km/h, miles/h<br>Distance measurement: m, cm, km, inch, feet, yards<br>Manual measurement: STP  |
| Measurement accuracy                          | unit rev/ min : $\pm 0.006\%$ of the display value, and $\pm 1$ of the least significant digit<br>(Except for display update cycle :100msec & 500msec)<br>• Additional errors in the measurement accuracy may be caused by the measuring environment (hand movement, the angle of the target, etc.).<br>• In the case of contact measurements, errors due to contact slippage or from the measurement wheel may result in additional inaccuracies. |
| Measurement distance                          | 50 ~ 4,000mm (2 in. to 13 ft.)   |
| Measurement time cycle (display update cycle) | 100ms, 500ms, 1sec, 5sec   |
| Functions                                     | Auto off function, memory data registration function, prescale function, peripheral speed wheel diameter setting, comparator function, USB communication, graph display, reverse display, language selection (Japanese/English)  |
| Housing                                       | Polycarbonate resin  |
| Weight  | 125g   |
| Power supply                                  | AA alkali dry cell battery x 2 (non-charging type), and USB cable (option)   |
| Continuous operating time                     | Up to 20 hours (when the screen brightness is set to 20%)  |
| Compliance standard                           | CE, RoHS, PSC, FDA, IEC/EN 60825-1 : 2007  |
| Operating/Storage temperature                 | 0 ~ 40°C (32 to 104 °F) (No condensation)  |
| Accessories                                   | Carrying case, AA alkali dry cell battery x 2, contacts (concave and convex types), contact adapter, speed measurement wheel (circumference of 6 inches), Instruction manual, reflective tape  |
| Option  | <ul style="list-style-type: none"> <li>• PC Connect Set (Software, USB Cable)</li> <li>• Contact adapter Set [Contact adapter, 2 cone adapters, 1 funnel adapter, Master wheel (6" Cir.), Extension shaft]</li> <li>• Contact adapter Set (Low) [Contact adapter (Low), 2 cone adapters, 1 funnel adapter, Master wheel (6" Cir.), Extension shaft]</li> <li>• Master wheel (12" Cir.)</li> </ul>  |

\*Note that applying solvents such as thinner or alcohol, etc. to the main unit may result in the paint peeling and/or damage to the unit.

Only clean with cloth that is damp from water or water with a mild detergent.

\*Battery maybe have been discharged.

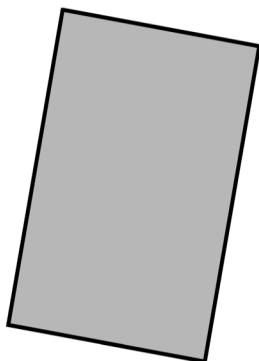
### ● Regarding reflective tape

There are two different types of reflective tape included.

Use tapes according to the application.

#### ● Standard tape (plain)

For the measurement of close range: 50mm to 1,000 mm.



#### ● High intensity reflective tape (grid pattern)

For longer distance, or other cases when the measurement doesn't go through with the standard tape.

