Organization of this manual

This manual describes the features and operation of the Sensor Controller KZ-70. The controller is designed to be used with other equipment to configure a measurement system. To ensure safe use and accurate results, be sure to carefully read the documentation of the other components as well.

This manual contains the following sections.

Outline
  Gives basic information on the unit.

Controls and Features
  Briefly identifies and explains all parts of the unit.

Reading the Display
  Identifies and explains display of the unit.

Preparations
  Explains installation and connections of cables.

Settings
  Describes the settings before measurement.

Measurement
  Describes the basic procedures for measurement.

System Configuration
  Describes connection for multi-point sensor monitoring system.

Specifications
  Lists the technical specifications of the unit.

-------------------------------------------------------------

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FOR SAFETY

In this manual, important safety instructions are specially marked as shown below. To prevent the risk of death or injury to persons and severe damage to the unit or peripheral equipment, make sure that all instructions are fully understood and observed.

**Caution**

Disregarding instructions printed here incurs the risk of injury to persons and/or damage to peripheral equipment.

**Important**

Disregarding instructions printed here incurs the risk of damage to the product.

**Note**

Mentioned about the tips to use this unit properly. (This messages do not have to do with safety.)
Precautions

- Operate the unit only as described in this manual.
- **Usage and Storage**
  - The permissible ambient temperature range for operation is +10 to +40°C, at a relative humidity of no more than 85%.
  - The permissible ambient temperature range for storage is -10 to +50°C, at a relative humidity of no more than 85%.
  - Avoid exposure to direct sunlight and water.
  - Avoid exposure to high temperatures, high humidity, high levels of dust, air with high salt or sulphur content, chemicals, or to gases.
  - Protect the unit from vibrations and shock.
- Before use, make sure that all cable connections are correctly and safely established.
- Power the unit only from the specified AC adapter.
  - Be sure to connect the protective grounding terminal of the unit to a proper ground.
- When disconnecting cables, always hold the plug or connector and do not pull the cable.
- Do not disassemble the unit or attempt internal alterations.
- In case of malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.
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This unit is designed to be used as a measurement controller in conjunction with particle counters equipped with a multi-purpose interface (DATA LINK connector). Particle counters in such a measurement system are referred to as "nodes" in this document.

When using the KZ-70 to control the entire operation of a node including measurement time settings etc., only one node can be connected.

When using the KZ-70 in a Rion multi-point monitoring system, the KZ-70 can serve to display measurement data. In such a case, control of the system is carried out by other multi-point monitoring equipment (normally running software such as KF-02A), and the KZ-70 is used only to display measurement results. The node whose measurement data are to be displayed can be selected.
Controls and Features

Front Panel

**Diagram:**
- **SENSOR CONTROLLER KZ-70**
- **Display**
- **Indicator labels**
- **SELECT buttons**
- **STOP button**
- **START button**
- **CLOCK button**
- **BACKLIGHT button**
- **CONTRAST control**

**Controls and Features:**
- **Front Panel**
  - **STOP button**
  - **Display**
  - **Indicator labels**
  - **SELECT buttons**
  - **CLOCK button**
  - **BACKLIGHT button**
  - **CONTRAST control**
Controls and Features

Display
Shows the date and time, sensor information, measurement data and other information. For a detailed explanation, please refer to "Reading the Display" (page 6).

Indicator labels
Various status indicators appear on the display during operation. The meaning of these indicators is designated by these labels. For information, please refer to the section "Indicators" in "Reading the Display" (page 9).

SELECT buttons
Serve to set the date and time, measurement mode, particle size channel, etc. The use of the NEXT, +, and - button is explained in the section for the respective setting.

CLOCK button
Press to set the date and time.

CONTRAST control
Serves to adjust the display contrast. Turning the button clockwise makes the display darker and turning the button counterclockwise makes it lighter.

BACKLIGHT button
Pressing this button activates the display backlight. Pressing the button again turns it off.

START button
In control mode, this button starts the measurement.

STOP button
In control mode, this button stops the measurement.
**Bottom Panel**

![Bottom Panel Diagram]

**Protective grounding terminal**
Serves to ground the unit.

**DATA LINK connectors**
Serve to connect the unit to the bus line or to another node. Use the separately available sub line cable for this connection.
If only one connector is used, the supplied terminator must be inserted in the other connector.
For information, please refer to "System Configuration" (page 30).

**PRINTER connector**
Serves to connect the unit to a printer, using the separately available printer cable CC-61DP. For information, please refer to "Cable Connection" (page 10) and "Measurement Data Recording" (page 27).

**Backup battery compartment**
The backup battery (CR-1/3N) inserted here preserves measurement mode settings and keeps the internal clock running also when the power is switched off.

**DC 12 V connector**
The output of the supplied AC adapter (100 to 240 V AC) is connected here.

**POWER switch**
Pressing the ON side of this switch turns the unit on and pressing the OFF side turns it off.
Rear Panel

Wall-mounting holes

These holes allow mounting the unit to a wall. For information, please refer to "Wall Mounting" (page 11).

Operation mode/address setting switch

This DIP switch bank serves to set the operation mode (controller/monitor) and node address. For information, please refer to "Operation Mode Setting" (page 13) and "Node Address Setting" (page 14).
Reading the Display

When the unit is turned on, the indication shown below appears on the display. If required, use the CONTRAST control to adjust the display for best readability. Pressing the BACKLIGHT button once turns backlighting on, and pressing the button once more turns it off.

Node address
Shows the address of the node whose data are being displayed. For information, please refer to "Node Address Setting" (page 14).

Date/time
Shows the date and time as kept by the internal clock (year, month, day, hour, minute). For information, please refer to "Setting the Date and Time" (page 18).

Selected sensor
Shows information about the node type, sample flow rate, and current operation status. For example, if the light source is currently off, the indication LASER OFF is shown. If the sensor is operating normally, the indication NORMAL is shown. For more information, please refer to "If node address is incorrect" (page 16).
**Measurement data**

The measurement volume, measurement error information, particle size, and particle count are shown on the display. These data apply to the node whose address is shown in the node address field. Data shown are either from the current measurement if a measurement is in progress, or from the immediately preceding measurement if measurement is stopped.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>For some sensor types, the data are not reported while a measurement is in progress. In such a case, only &quot;-------&quot; is shown for the measurement volume and &quot;----------&quot; for the particle count until the measurement is completed. When the KZ-70 is in monitor mode and no information is obtained from a node for more than 3 minutes, the node is considered not to be connected, and no data will be displayed until the next data are obtained.</td>
</tr>
</tbody>
</table>

**Measurement volume (VOLUME)**

Indicates the measurement volume setting. For information, please refer to "Volume Conversion Setting" (page 20). The actual measurement volume is shown in brackets. Until the first measurement data are obtained from the sensor, "------" is shown.

**Measurement error information**

Shows if a problem has occurred during sensor operation.

Example

- **LASER NG**: Light source output error
- **CELL NG**: Cell contaminated
Particle size

Shows the particle size set for the sensor.

The KZ-70 can handle up to six particle size channels, and channels can be switched for display. For information, please refer to "Particle Size Selection" (page 19).

Particle count

The particle count for the selected particle size (see previous paragraph) is shown here (up to 9 digits).

If the volume conversion setting is RAW, the actual number of particles is shown. If a setting other than RAW is selected, the number of particles converted for a certain volume is shown. If an error has occurred, the following indication is shown.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO DATA</td>
<td>Measurement has been stopped for some reason, or sensor has become disconnected. No data are available.</td>
</tr>
<tr>
<td>OVER FLOW</td>
<td>Particle count has exceeded the upper limit (determined by sensor specifications), or number of particles after volume conversion has exceeded 9 digits.</td>
</tr>
<tr>
<td>MEAS ERROR</td>
<td>During measurement, a sensor error has occurred.</td>
</tr>
<tr>
<td></td>
<td>---------- Measurement has started, but initial data have not yet been obtained from the sensor. Sensor connection is not verified.</td>
</tr>
</tbody>
</table>

**Operation mode, measurement mode**

Depending on the operation mode, the following information is shown.

<table>
<thead>
<tr>
<th>Operation mode</th>
<th>Measurement mode</th>
<th>Display indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor</td>
<td></td>
<td>MONITOR</td>
</tr>
<tr>
<td>Controller</td>
<td>Manual measurement</td>
<td>MENU</td>
</tr>
<tr>
<td></td>
<td>Automatic measurement</td>
<td>AUTO XXXX sec SINGLE</td>
</tr>
<tr>
<td></td>
<td>Repeated automatic measurement</td>
<td>AUTO XXXX sec REPEAT XXXXsec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(measurement time) (10 to 9999 seconds)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Pause time) (1 to 9999 seconds)</td>
</tr>
</tbody>
</table>
For information, please refer to "Operation Mode Setting" (page 13) and "Measurement Mode Settings" (page 24).

**Previous measurement data**
The measurement result (particle count, measurement volume, error information) of the previous measurement is shown. The particle count is calculated with the current volume conversion setting (not the setting at the time of measurement).

**Indicators**
Show the operation status of the KZ-70.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNT</td>
<td>Appears during actual measurement (out during the pause interval of repeated automatic measurement)</td>
</tr>
<tr>
<td>MEASURE</td>
<td>Appears when measurement mode is activated (including pause interval of repeated automatic measurement)</td>
</tr>
<tr>
<td>MEASURABLE</td>
<td>Appears when measurement is possible.</td>
</tr>
</tbody>
</table>

**Note**
Also while the MEASURABLE indicator is out (sensor error has occurred), the START button can be pressed, but correct measurement will not be carried out.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATA LINK</td>
<td>Appears when normal communication is being carried out between particle counter and KZ-70.</td>
</tr>
</tbody>
</table>

**Version information**
Normally, the version number of the KZ-70 will be shown here. If a communication error has occurred, one of the following indications is shown.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME OVER</td>
<td>Sensor connection is interrupted.</td>
</tr>
<tr>
<td>PARITY</td>
<td>A parity error has occurred during communication.</td>
</tr>
<tr>
<td>ERROR</td>
<td>Other error has occurred during communication.</td>
</tr>
<tr>
<td>MESSAGE</td>
<td>A communication content mismatch has occurred.</td>
</tr>
</tbody>
</table>
Preparations

Cable Connection

Verify that the POWER switch is set to OFF. Then establish sensor and AC adapter connections as shown below.

Important
Be sure to use the supplied AC adapter. Turn power off when connecting sensor.

Cable Connection

1. Use a sub line cable (option) to connect a DATA LINK connector of the KZ-70 to the bus line. Alternatively, connect a DATA LINK connector of the KZ-70 directly to a DATA LINK connector on a sensor or control unit, using a sub line cable. Any of the two DATA LINK connectors can be used. For information on connection of a control unit or sensor, refer also to the Instruction manual of the respective unit.
2. When using only one DATA LINK connector, insert the supplied terminator into the other connector.

3. To output measurement data to a printer, connect the PRINTER connector on the KZ-70 to the printer DPU-414 (option), using the printer cable CC-61DP (option).

4. Use the supplied grounding cable to connect the protective grounding terminal to a good ground.

5. Connect the supplied AC adapter to the DC 12 V connector on the KZ-70 and to an AC outlet.

⚠️ WARNING

To avoid shock hazards, be sure to connect the protective grounding terminal of the unit to a proper ground.

Wall Mounting

This unit can be mounted on a wall or other vertical surface, using the supplied wall-mounting bracket. Use two of the supplied M4 × 6 screws to attach the bracket to the wall-mounting holes on the rear of the KZ-70, and use the two remaining screws to fasten the bracket to a wall or similar.

For use on a desk or on the floor or similar, an optional stand is available. Please contact the supplier.
Backup Battery

The internal backup battery preserves measurement mode settings and keeps the internal clock running also while the unit is turned off. If the backup battery is removed while the unit is turned off, all stored data are lost.

Battery life

The life of the backup battery is approximately one year. Replace the battery in intervals of one year or earlier if it is exhausted.

Battery type : CR-1/3N (3 V)

Replacing the battery

1. Remove the Phillips screw of the battery compartment on the bottom panel of the KZ-70.
2. Pull out the battery holder.
3. Remove the old battery and insert a new battery. Make sure that battery polarity is correct.
4. Return the battery to the original position.
5. Tighten the Phillips screw.
Operation Mode Setting

The KZ-70 has two operation modes: controller mode and monitor mode. Select the appropriate mode, referring to the section "Node Connection".

The setting is made with the MONITOR switch on the rear panel of the unit (as shown below).

![MONITOR switch diagram]

(Switches 4 to 8 serve to set the node address. Switches 2 and 3 are not used.)

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn power to the unit off before making any switch settings. If the setting of a switch is changed while the unit is turned on, correct operation is not assured.</td>
</tr>
</tbody>
</table>

Control mode

In this mode, the unit is connected to one sensor and serves to control its operation and display measurement data. The display is updated every 3 seconds.

To use the KZ-70 in control mode, set the MONITOR switch to OFF.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>If another control unit is operating at the same time, malfunction will occur.</td>
</tr>
</tbody>
</table>

Monitor mode

When connected to a multi-point sensor monitoring system, the KZ-70 shows measurement data for one sensor in the system. Because the display is driven by monitoring the control unit/node communication, the display update frequency depends on the communication situation.

To use the KZ-70 in monitor mode, set the MONITOR switch (DIP switch) to MONITOR.

In either case, the node address selected for the KZ-70 (see page 14) and the node address of the sensor to be controlled or displayed must match.
Node Address Setting

Node address
The node address is a unique number that serves to identify the node (sensor). When the KZ-70 is set to a certain node address, the sensor with the same address will be controlled or displayed. The node address setting range is 0 to 19.

Note

<table>
<thead>
<tr>
<th>Within a multi-point sensor monitoring system, each node must have a unique address.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The node address as set at the KZ-70 is the node address of the sensor to be controlled or displayed. The KZ-70 itself does not have a node address of its own. The reference to node address setting in this manual should be understood in this way.</td>
</tr>
</tbody>
</table>

Node address setting of 31 is possible
When the unit is set to monitor mode operation, the node address can also be set to 31. For details, please refer to "RP Monitor Use" (page 17).
Setting the node address

The node address is set with the ADDRESS switches (switches 4 to 8 of the DIP switch bank on the rear panel).

Each switch is ON when set to the right side. The number printed at right (1, 2, 4, 8, 16) is then added to the node address.

Power to the unit must be turned off when setting the node address.

Changing the node address

In control mode

The node address setting cannot be changed while the unit is powered. Turn power off, change the setting of the ADDRESS switches, and turn power on again.

In monitor mode

The node address can be changed on the display screen. Press the NEXT button until the indication "NODE x" is highlighted. Then use the + and - buttons until the desire node address is shown. The setting range is 0 to 19.

When the unit is next turned off and then on again, the setting made with the ADDRESS switches will be active.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn power to the unit off before making any ADDRESS switch settings. If the setting of a switch is changed while the unit is turned on, correct operation is not assured.</td>
</tr>
</tbody>
</table>
**If node address is incorrect**

The indication shown below appears in the top left section of the display. Check the node connection and change the node address to the correct setting. (If the unit is in monitor mode and 31 is selected, refer to "RP Monitor Use" (page 17).

- When node address was set to a number higher than 19

```
NODE 21 WRONG ADDRESS
SENSOR
```

- When the specified address is not connected

```
NODE 5 NOT CONNECTED
SENSOR CONNECTED SENSORS : 0 4 10
```

- If no node is connected

```
NODE 5 NOT CONNECTED
SENSOR NO SENSOR
```

**Note**

The KZ-70 determines whether a node is connected by reading measurement data from that node. If no measurement data are obtained from a node for more than 3 minutes, the node is considered to be not connected. If data for that address were displayed, no more data are displayed until the next data are obtained.

(If the unit is in monitor mode and 31 is selected, refer to "RP Monitor Use" (page 17).)
RP Monitor Use

When the KZ-70 is to be used in a multi-point monitoring system with RP monitor-multi mode, make the following settings before turning the unit on.

- Operation mode : Monitor mode
- Node address : 31

After startup, the NODE field on the display will show "0". To change it, proceed as described in "Changing the node address" (page 15).

Operation when node address is set to 31

When the operation mode is set to monitor mode, the unit can be started up with the node address set to 31. This will be regarded as equivalent to a node address of 0, but unlike a setting from the 0 to 19 range, the unit will not determine non-connection if no data are received for more than 3 minutes (see note on preceding page). The NOT CONNECTED or NO SENSOR indication therefore does not appear.
Setting the Date and Time

This unit incorporates a clock which is kept running by the backup battery also when power is switched off.

The date and time are set by Rion before shipping, but if the backup battery is removed for replacement or other reasons, the date and time will revert to the default setting (1997 1/1 8:30).

**In monitor mode**

Date and time can be set whenever desired.

**In control mode**

Date and time cannot be set while a measurement is in progress.

**Setting procedure**

Year, month, day, hour, and minute can all be set individually.

The year range is 1990 to 2089.

The hour range is 0 to 23.

1. Press the CLOCK button.
   The "year" field on the display is highlighted.
2. Pressing the NEXT button moves the highlight to the next field.
3. Pressing the + button increases the item setting by "1". Pressing the - button decreases the item setting by "1".
4. Repeat steps 2 and 3 until the required items are set.
5. Pressing the CLOCK button once more turns the highlight off and starts the clock with the new setting. The seconds are set to 00.

<table>
<thead>
<tr>
<th><strong>Note</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>When an invalid date is set, the closest possible date is automatically selected. (For example 1998 4/31 results in a setting of 1998 4/30.)</td>
</tr>
</tbody>
</table>

**When the entire date and time indication flashes**

This indicates that the backup battery is almost exhausted. Replace the battery with a new one (CR-1/3N) and set the date and time again.
Particle Size Selection

This unit has six channels which can accommodate six particle size channels of the sensor. The channel to be shown on the display can be switched freely, without affecting the measuring performance.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>The actual number of channels and the particle size allocation depends on the sensor.</td>
</tr>
</tbody>
</table>

Selection procedure

1. Pressing the NEXT button moves the highlighted item. Press the button repeatedly, until the CHANNEL field of the DATA section is highlighted.

2. Use the + and - buttons to select the desired channel. The count for the particle size in the selected channel is shown on the display. When the unit is turned on, the smallest particle size channel of the selected sensor is chosen.
Volume Conversion Setting

The particle count obtained by the various nodes can be converted into particles per volume, using a pre-selected volume quantity. This is useful for comparing particle concentration.

The following seven settings are available:

- **RAW**: No conversion is carried out. Actual particle count is shown as measured.
- **1mL to 1CF**: The measured particle count is converted into the selected particles per volume count. The first decimal point after the comma is rounded.

This setting can be changed at any time. It then applies to measurement data obtained after the setting was changed.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CF is converted into 28.3 L.</td>
</tr>
</tbody>
</table>

Setting procedure

1. Pressing the NEXT button moves the highlighted item. Press the button repeatedly, until the VOLUME field of the DATA section is highlighted.
2. Use the + and - buttons to select the desired volume. The VOLUME indication changes in the order
   - RAW → 1 mL → 10 mL → 1 CF
   (reverse order when - button is pressed).
Press the button repeatedly until the desired setting is shown.
When using the KZ-70 as a controller, it can manage the operation of one sensor (as specified by the node address). For more information, please refer to "Operation Mode Setting" (page 13) and "Node Address Setting" (page 14).

The following three measurement modes are available:
- Manual measurement (see below)
- Single automatic measurement (page 22)
- Repeated automatic measurement (page 23)

**Manual Measurement**

Measurement starts when the START button is pressed and ends when the STOP button is pressed. The measurement time is the interval between pressing the START button and pressing the STOP button.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait at least 5 seconds after ending a measurement before starting the next one. Otherwise the result of the previous measurement may not be output to the printer.</td>
</tr>
</tbody>
</table>

If the measurement mode is changed while a measurement is in progress, the measurement is terminated, and measurement results are not printed. During manual measurement, the indication MANU is shown on the display.
Single Automatic Measurement

Measurement starts when the START button is pressed and a single measurement is carried out for the preset measurement time.

If the STOP button is pressed while a measurement is in progress, the measurement is terminated, and measurement results are not printed. The same applies when the measurement mode is changed.

During single automatic measurement, the indications AUTO, (measurement time), SINGLE are shown on the display.
Repeated Automatic Measurement

Measurement starts when the START button is pressed and is carried out repeatedly, using the preset measurement time and pause interval. If the STOP button is pressed, the repeated automatic measurement mode is terminated. If the button is pressed while a measurement is in progress, that measurement is terminated, and measurement results are not printed. The same applies when the measurement mode is changed.

During repeated automatic measurement, the indications AUTO, (measurement time), REPEAT, (pause interval) are shown on the display.
Measurement Mode Settings

The measurement parameters of the sensor can be set only when the KZ-70 is in controller mode (when the measurement mode indication is either MANU or AUTO). When the unit is in monitor mode, (measurement mode indication is MONITOR), the setting cannot be made.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the measurement parameters (measurement mode, SINGLE/REPEAT, measurement time, pause interval) are changed while a measurement is in progress, the measurement is terminated, and measurement results are not printed.</td>
</tr>
<tr>
<td>If one of the measurement parameter indications is still highlighted, pressing the + or - button by mistake will terminate the measurement. To prevent inadvertent operation, move the highlighted item to another position after the setting is completed.</td>
</tr>
</tbody>
</table>

1. Pressing the NEXT button moves the highlighted item. Press the button repeatedly, until one of the items shown below is highlighted.

```
| MEAS. MODE | AUTO 60sec REPEAT 10sec |
```

The items for measurement time, SINGLE/REPEAT, and pause interval appear only when the measurement mode is AUTO. In MANU mode, these items need not be set.

2. Use the + and - buttons to change the highlighted item. The available settings are shown below.

- **Measurement mode**: AUTO (automatic measurement), MANU (manual measurement)
- **Measurement time**: 10 to 9999 seconds in 1-second steps
- **SINGLE/REPEAT**: SINGLE (single automatic measurement), REPEAT (repeated automatic measurement)
- **Pause interval**: 1 to 9999 seconds in 1-second steps
The measurement mode is changed at the point that the + or - button is pressed. If a measurement is currently being carried out, it will be terminated. Take care not to inadvertently terminate a measurement.

3. Repeat steps 1 to 2 until all required items are set.

**Measurement Procedure**

1. **Power-on**
   
   Set the POWER switch to ON. Due to the backup function, the same measurement parameters that were used the previous time will be established.

   **Important**

   Be sure to connect the sensor first, before turning on the KZ-70. Do not disconnect the sensor while the KZ-70 is turned on.

   If the power has been turned off, wait at least 2 seconds before turning it back on again. Otherwise normal operation is not assured.

2. **Display adjustment**
   
   Use the CONTRAST control to adjust the display for best readability. For use in dark locations, press the BACKLIGHT button. Pressing the button once more turns backlighting off.

3. **Setting measurement parameters**
   
   Check the settings of the measurement parameters and make changes if necessary. For information, please refer to "Measurement Mode Settings" (page 24). Select the particle size whose count is to be shown on the display. For information, please refer to "Particle Size Selection (page 19)."
4. **Measurement start**

Press the START button to initiate the measurement.

The measurement starts immediately when the START button is pressed, and the particle count (count in progress) is shown on the display. (Depending on the type of the connected sensor, the count may not be displayed until the measurement is completed.)

The measurement data are retained until the next measurement is started. During this period, the indication LAST DATA is shown.

5. **Measurement end**

The measurement end depends on the measurement mode.

**Manual measurement mode**

Press the STOP button.

**Single automatic measurement**

Measurement ends automatically when the preset measurement time has elapsed.

**Repeated automatic measurement**

Measurement period (measurement and pause) continues until the STOP button is pressed.

For details, please refer to pages 21 to 23.

**Power-off and laser light source**

When the KZ-70 is operating in control mode, turning the KZ-70 will cause the laser light source in the sensor to be turned off also.
Measurement Data Recording

Connecting the printer DPU-414 (option) to the KZ-70 allows printing out measurement data.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>The printer cable CC-61DP (option) is also required.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leave an interval of at least 5 seconds between the end of a measurement and the start of the next measurement. Otherwise measurement results may not be printed correctly.</td>
</tr>
</tbody>
</table>

Printer settings

DPU-414

Set the DIP switches (DIP SW1 to SW3) of the printer DPU-414 as follows:

<table>
<thead>
<tr>
<th>Dip SW1 settings</th>
<th>Dip SW2 settings</th>
<th>Dip SW3 settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Settings</td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>OFF</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>OFF</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>8</td>
</tr>
</tbody>
</table>

As for the setting procedure of the DIP switches, please refer to the instruction manual of DPU-414.
CP-11

Set the DIP switches on the bottom of the printer as follows.

<table>
<thead>
<tr>
<th>Serial input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data word length</td>
</tr>
<tr>
<td>Parity enabled</td>
</tr>
<tr>
<td>Even parity</td>
</tr>
<tr>
<td>Data transfer rate</td>
</tr>
</tbody>
</table>

DIP switch bank 1

DIP switch bank 2

DIP switches 7 and 8 of bank 2 must be left in the factory default position.
**Format of printout (for 1 measurement)**

Date and time: 1997/06/30 15:30

Equipment model name: KS-16

Measurement volume: 10mL (50mL)

<table>
<thead>
<tr>
<th>Particle size</th>
<th>Particle Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1μm</td>
<td>4298</td>
</tr>
<tr>
<td>0.15μm</td>
<td>567</td>
</tr>
<tr>
<td>0.2μm</td>
<td>12</td>
</tr>
<tr>
<td>0.3μm</td>
<td>1</td>
</tr>
<tr>
<td>0.5μm</td>
<td>0</td>
</tr>
</tbody>
</table>

**If an error has occurred**

Date and time: 1997/07/30 16:30

Equipment model name: KS-16

Measurement volume: 1L (10mL)

Error identification:
- ERROR: LASER NG
- MEAS ERROR
**System Configuration**

**Bus line connection** (Monitor mode)

The basic connection principle for a multi-point sensor monitoring system is shown below. A bus line with connectors at the required locations is used, and sub line cables run from these connectors to the DATA LINK connectors on the individual components.

For details on bus line connections, please refer to the documentation of the controller KE-80A etc.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be sure to connect the terminators to the ends of the bus line.</td>
</tr>
</tbody>
</table>

(Multi-point monitoring software)

(KF-02A)

Workstation
(UNIX)

Controller
KE-80A

KZ-70

Node
(KS-16 etc.)

Node

Terminator

DATA LINK

Sub line cable

max. 50 m

max. 1 km

(Monitoring system software)

(RP Monitor)

Computer
(Windows 3.1/95/98)

RS-232-C/485
Converter
KS485PT

KZ-70

Node
(KS-16 etc.)

Node

Terminator

DATA LINK

Sub line cable

max. 50 m

max. 1 km
**Simplified connection (Monitor mode)**

For certain requirements, components may be directly linked using only sub line cables (KZ-44-S01 to KZ-44-S06) without a bus line. In such a case, the combined length of the sub line cables may not exceed 300 meters.

This method is suitable when using a fairly small number of nodes within a narrow area. Note that special care is required because the system will cease to operate normally if even one link is disconnected.

This method is possible only with nodes that are equipped with two DATA LINK connectors. This is true for most node components from Rion.
Note

Be sure to insert terminators in the open DATA LINK connectors of the nodes at each end of the chain.

When the connected printer is controlled by RP Monitor

( Monitoring system software )

RP Monitor

Computer
(Windows 3.1/95/98)

RS-232-C/485
Converter
KS485PT

KZ-70

Node
(KS-16 etc.)

DPU-414

Sub line cable

Terminator

Total length max. 300 m

Single node connection (Control mode)

When the KZ-70 is to be used with only one node, a single sub link cable between the node and the KZ-70 is required.

This method can always be chosen when using the KZ-70 as a controller. It is only possible with a node that is equipped with two DATA LINK connectors.

Important

Be sure to insert terminators in the open DATA LINK connectors of the KZ-70 and the node.
Wiring precautions
- To protect the cables against damage by external mechanical forces and against electrical noise, each cable should be routed through a dedicated, grounded metal pipe (wiring duct).
- Avoid the proximity of power cables and of equipment that emits noise.

Sub line cable
Sub line cable is available in six different lengths, from 5 to 50 m.

<table>
<thead>
<tr>
<th>Cable designation</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>KZ-44-S01</td>
<td>5 m</td>
</tr>
<tr>
<td>KZ-44-S02</td>
<td>10 m</td>
</tr>
<tr>
<td>KZ-44-S03</td>
<td>20 m</td>
</tr>
<tr>
<td>KZ-44-S04</td>
<td>30 m</td>
</tr>
<tr>
<td>KZ-44-S05</td>
<td>40 m</td>
</tr>
<tr>
<td>KZ-44-S06</td>
<td>50 m</td>
</tr>
</tbody>
</table>
## Specifications

<table>
<thead>
<tr>
<th>Suitable sensor types</th>
<th>Particle counter equipped with DATA LINK connectors for multi-point monitoring system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operation modes</strong></td>
<td>KZ-70 serves as measurement data monitor for selected node of a multi-point sensor monitoring system. Measurement control is performed by another unit in the multi-point sensor monitoring system. KZ-70 serves only to display measurement data.</td>
</tr>
<tr>
<td>- Monitor mode</td>
<td>KZ-70 is directly connected to a particle counter with DATA LINK connectors and serves to control measurement operation of that unit. All measurement parameter settings are made at the KZ-70.</td>
</tr>
</tbody>
</table>
| - Control mode        | Control mode comprises the following three modes:  
  - **Manual measurement mode**: Measurement time is controlled manually.  
  - **Single automatic measurement mode**: One measurement is carried out automatically for the preset measurement time.  
  - **Repeated automatic measurement mode**: Measurement period (measurement and pause) is carried out repeatedly. |
| **Display**           | LCD (with backlight)  
| **Display items**     | - Date and time  
|                       | - Sensor information (node number, node type, sample flow rate, current operation status)  
|                       | - Measurement data (measurement volume, error information, particle size, particle count)  
|                       | - Previous measurement data (particle count, measurement volume, error information) |
### Specifications

**Particle size channel**
Max. 6 channels (varies by the features of node connected to KZ-70)

**Printer connector**
Allows connection of a printer for printout of measurement results

**Ambient conditions for operation**
+10 to +40°C, 85% RH max. (no condensation)

**Ambient conditions for storage**
-10 to +50°C, 85% RH max. (no condensation)

**Power requirements**
50/60 Hz, 100 to 240 V AC (±10%), approx. 20 VA

**Dimensions**
170 (W) × 201 (D) × 50 (H) mm
170 (W) × 190 (D) × 40 (H) mm
(without protruding parts)

**Weight**
Approx. 1.3 kg (main unit only)

**Supplied accessories**
- AC adapter 1
- Terminator 2
- Wall mounting bracket 1
  (with 4 M4 × 6 screws)
- Grounding cable 1
- Power cord 1
- Instruction manual 1
- Inspection certificate 1

**Optional accessories**
- Printer DPU-414
- Printer cable CC-61DP
- Sub line cable KZ-44-S01 to KZ-44-S06
- Stand
Specifications

SENSOR CONTROLLER KZ-70

Front View

Side View

Bottom View

Dimensional drawing  Unit: mm