INSTRUCTION MANUAL

SOUND LEVEL METER UNIT

UN-04A

RION CO., LTD.

3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan

Organization of this manual

This manual describes the features and operation of the Sound Level Meter Unit UN-04A. The following pages contain important information on safety. Be sure to read this part.

This manual contains the following sections.

Outline

Gives basic information on the unit, and contains a block diagram.

Controls and Features

Briefly identifies and explains all parts of the unit.

Connections and Setup

Explains how to connect the unit to the power supply, microphones, preamplifiers and other equipment. Also explains how to set the selector switches.

Measurement

Describes the steps for measurement.

RS-232-C Interface

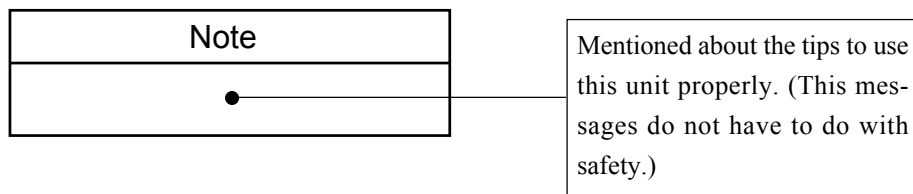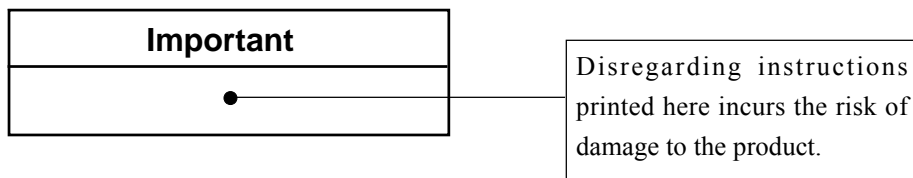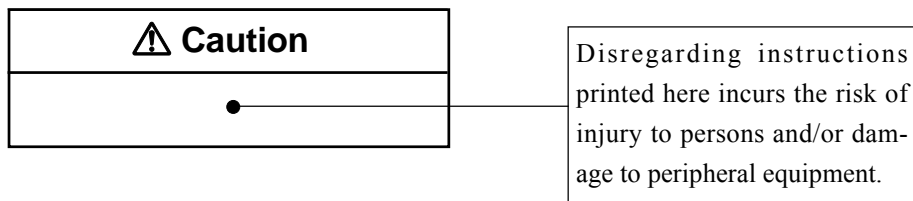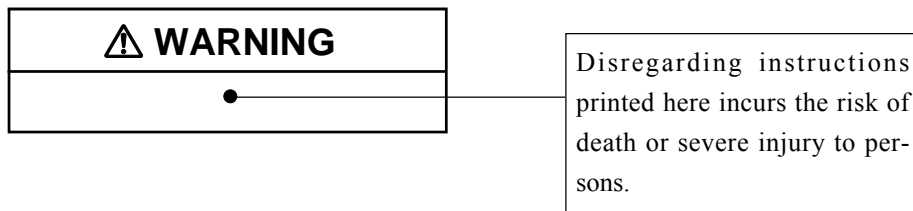Describes how to use the serial interface for connection to a computer.

Specifications

Lists the technical specifications of the unit.

*　All company names and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.

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.

⚠ **WARNING**
●

Disregarding instructions printed here incurs the risk of death or severe injury to persons.

⚠ **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 as described in this manual.

● Take care not to drop the unit or subject it to shock and vibrations.

● The permissible ambient temperature range for operation of the unit is -10 to +50°C. Relative humidity must be below 90%.

● Do not store or use the unit in locations which
    1) may be subject to high levels of dust or splashes of water, or
    2) may be subject to high temperature, humidity, or to direct sunlight, or
    3) may be subject to gases or air with high salt or sulphur content, or are in the vicinity of stored chemicals, or
    4) may be subject to vibrations or shock, or
    5) may be subject to strong magnetic fields or strong radiation.

● Always switch off the power after using the unit.
When disconnecting cables, always hold the plug and do not pull the cable.

● Clean the unit only by wiping it with a soft, dry cloth or, when necessary, with a cloth lightly moistened with water. Do not use any solvents, cleaning alcohol or cleaning agents.

● Do not disassemble the unit or attempt internal alterations.

● Take care that no conductive objects such as wire, metal scraps, conductive plastics etc. can get into the unit.

● Use only the specified AC adapter NC-11 and NC-97 to prevent the risk of overheating, smoking, fire and other accidents caused by incorrect supplied voltage.

Contents

Outline

The UN-04A is a sound level meter unit suitable for use with all major measurement microphones and preamplifiers from Rion. It has switchable front-panel and rear-panel inputs. By selecting the appropriate microphone, the UN-04A can be used for general as well as for precision sound level measurements, in compliance with applicable standards.

The AC and DC outputs allow the use of equipment such as a data recorder or analyzer, and a separate I / O connector serves for connection to the printer DPU-414 or to a computer for data transfer and external measurement control (RS-232-C interface).

The optional add-on units listed below allow the creation of a measurement system tailor-made for specific needs.

- AC adapter NC-11 / NC-97, battery unit BP-07
  The UN-04A can be powered from the AC adapter NC-11 / NC-97 or the battery unit BP-07. It is also possible to use an AC adapter and the battery unit together, so that power is normally provided by the adapter while the battery unit acts as a backup power supply.

- Printer DPU-414
  Can be used to generate a record of measurement results every five seconds.

- Display unit UV-12 / UV-12A
  Up to ten UN-04A units can be connected to a UV-12 / UV-12A, and the display can be switched to show the measurement results of any desired sound level meter unit. The UV-12 / UV-12A incorporates a GP-IB and an RS-232-C interface, allowing the use of a computer to control measurement operation of connected UN-04A units and to gather measurement data.

• Rack-mount base UV-05-091
Several UN-04A units can be linked, and standard rack mounting is possible using the rack-mount base UV-05-091. A single base supports up to twelve UN-04A units.

Block diagram
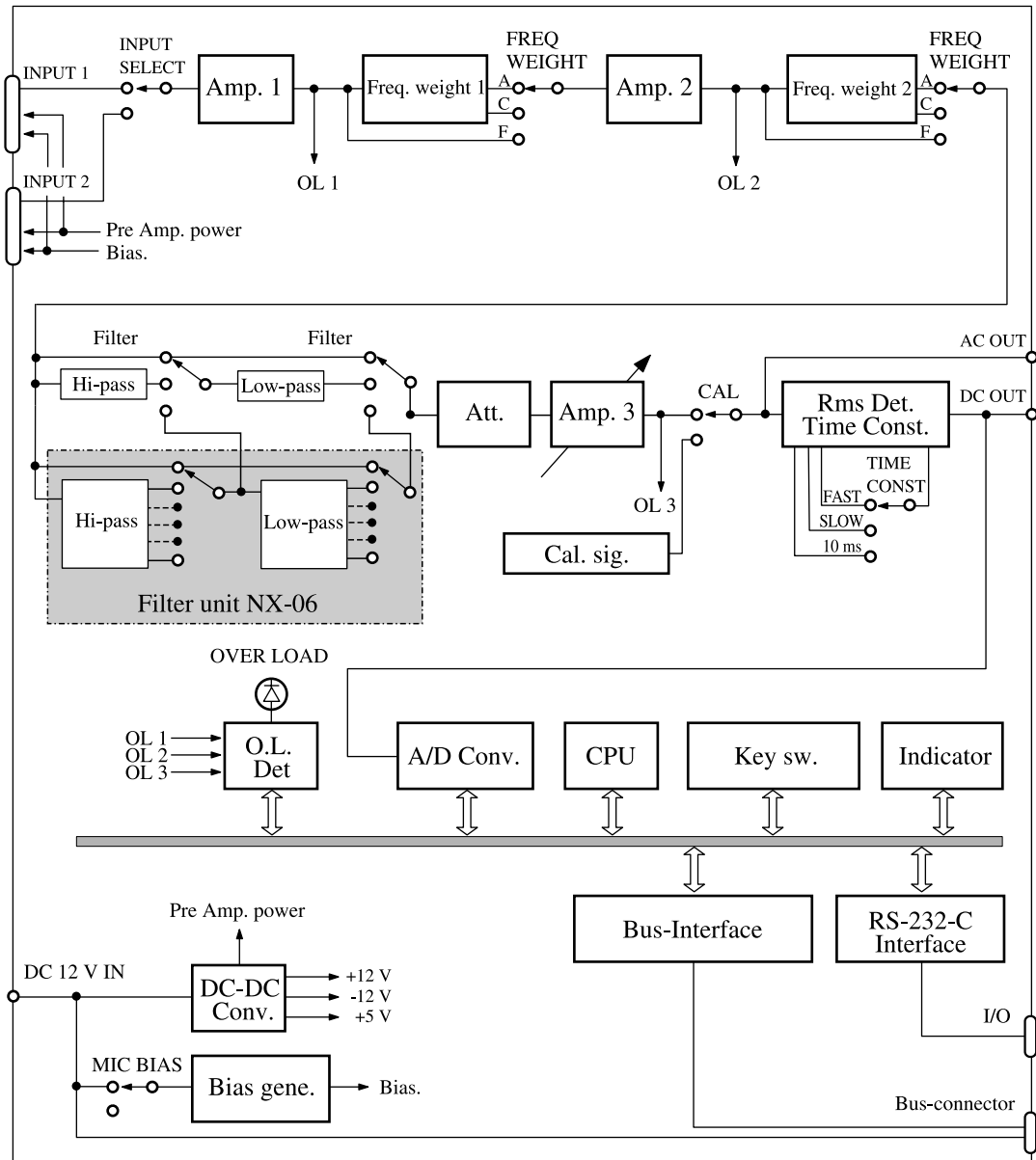
Controls and Features

Front Panel

Front panel
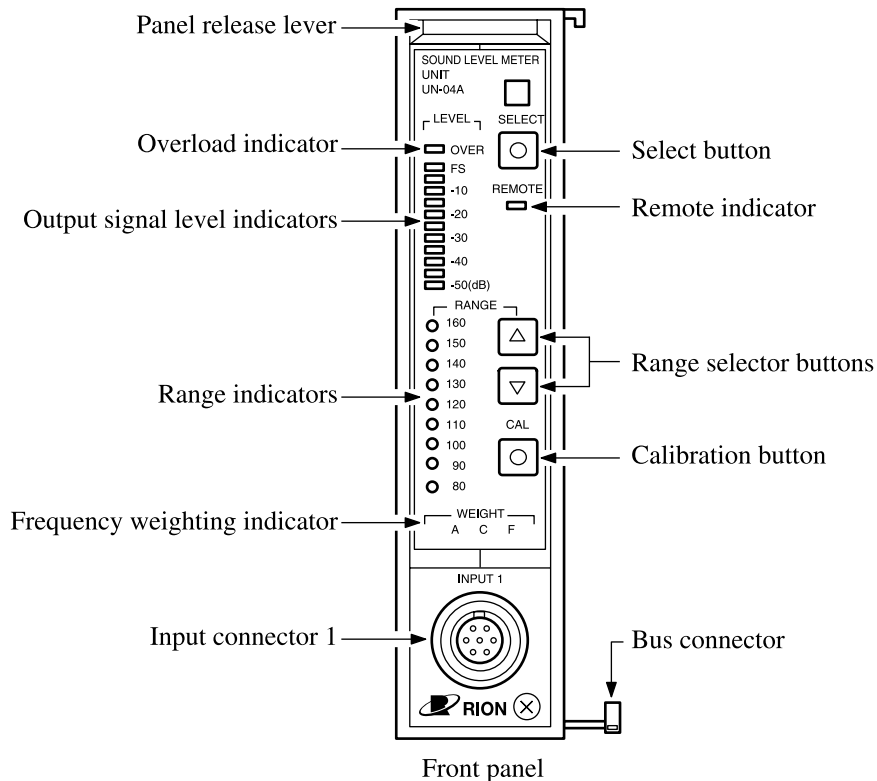
Select button [SELECT]

When the UN-04A is connected to the display unit UV-12 / UV-12A, pressing this button will cause the measurement data from this UN-04A to be shown on the display unit. In this case, the indicator of the button lights up. If the UN-04A is not connected to a display unit, this button has no effect.

Remote indicator [REMOTE]

Lights up when the UN-04A is set to the remote mode via the RS-232-C interface. In remote mode, the controls on the panel of the UN-04A are inactive.

Range selector buttons [RANGE △ / ▽]

Select the measurement range (full-scale value) with the range selector buttons. Pushing the [△] button increases the range, and pushing the [▽] button decreases it. The corresponding indicator lights up.

Range indicators [RANGE 80 to 160]

The range selector buttons serve to set the full-scale point, and the range indicators show which range is selected.

Calibration button [CAL]

Activates the internal signal generator for calibration of equipment connected to the AC or DC output. The indicator lights up when the button is pressed.

Bus connector

Serves for connection to the display unit UV-12 / UV-12A. The connector also serves to supply power when several UN-04A / UN-04 units are linked.

Input connector 1 [INPUT 1]

Serves for connection of the microphone preamplifier. The sensitivity selector on the inner panel must be set to a position that matches the connected microphone.

Frequency weighting indicator [WEIGHT]

Shows which weighting curve is selected: A, C or F (flat). The weighting circuit setting can be changed on the inner panel ($\Rightarrow$ p. 7).

Output signal level indicators [LEVEL FS to -50 (dB)]

Show the output signal level.

Overload indicator [LEVEL OVER]

Lights up when the input signal exceeds the currently selected range, causing amplifier saturation.

Panel release lever

Push this lever down and pull it out to gain access to the inner panel for changing various measurement settings ($\Rightarrow$ p. 7).

Rear Panel
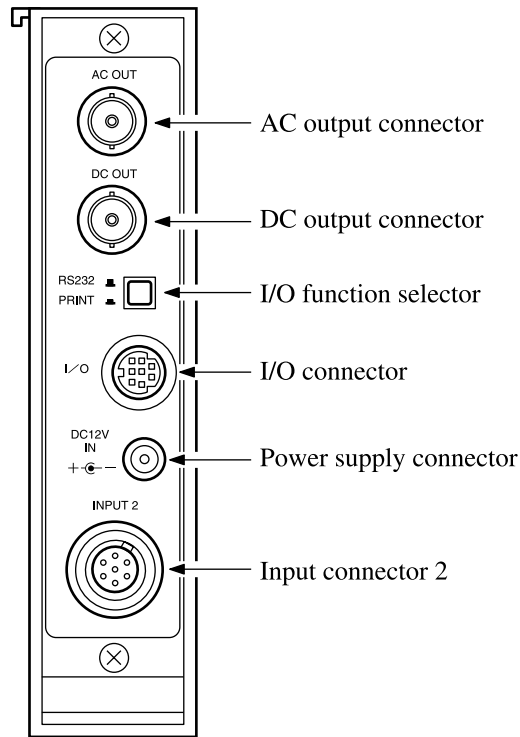
Rear panel

AC output connector [AC OUT]

AC signals corresponding to the measurement result are supplied here.

DC output connector [DC OUT]

DC signals corresponding to the measurement result are supplied here.

I / O function selector [RS232 / PRINT]

This selector must be set to the appropriate position, depending on which type of equipment is connected to the I / O connector.

RS232:   RS-232-C interface for connection of a computer

PRINT: Data output to the printer DPU-414

I / O connector [I / O]

Serves either as output for connection of the printer DPU-414 or as RS-232-C interface for data transfer to and input of control signals from a computer. The I / O function selector must be set to the appropriate position.

Note
When the UN-04A is connected to the display unit UV-12 / UV-12A, this connector is inactive.

Power supply connector [DC 12 V IN]

The output from the AC adapter is connected here.

Input connector 2 [INPUT 2]

Serves for connection of the microphone preamplifier. The sensitivity selector on the inner panel must be set to a position that matches the connected microphone.

Inner Panel

Latch

Frequency weighting selector

Input selector

Filter unit installation slot

MIC BIAS
ON   OFF — Bias selector

5 0 5 — Sensitivity selector
SENSITIVITY
(× 0.1dB)

FREQ WEIGHT

INPUT SELECT

HPF (20Hz)
ON   OFF ← High-pass filter switch

C
A   F
INPUT 1   INPUT 2

ADDRESS

TIME CONST
SLOW

FAST   10ms

LPF (20kHz)
ON   OFF ← Low-pass filter switch

Time weighting selector

Address selector

Panel release lever

Inner panel flipped open (side view)

Frequency weighting selector [FREQ WEIGHT]

Serves to select the frequency weighting curve: A, C or F (flat).

Input selector [INPUT SELECT]

Serves to select the input that is to be used.

INPUT 1:   Signal from input connector 1 on the front panel

INPUT 2:   Signal from input connector 2 on the rear panel

Latch

This latch secures the inner panel when it is open. To close the inner panel, press the top section of the latch to release it, and push the panel in.

Filter unit installation slot

The optional filter unit NX-06 can be installed here. (⇒ p. 25)

Bias selector [MIC BIAS]

When using a condenser microphone requiring bias, this switch must be set to ON. For prepolarized condenser microphones and ceramic microphones, the switch must be set to OFF.

Sensitivity selector [SENSITIVITY (× 0.1 dB)]

Serves to set the sensitivity of the unit, to match the sensitivity of the microphone. The value is set with a three-digit digital switch.

High-pass filter switch [HPF (20 Hz)]

Activates the high-pass filter which cuts off signal components below 20 Hz.

Low-pass filter switch [LPF (20 kHz)]

Activates the low-pass filter which cuts off signal components above 20 kHz.

Time weighting selector [TIME CONST]

Serves to set the time weighting characteristics (time constant).

Address selector [ADDRESS]

Serves to set the unit address when the UN-04A is connected to the display unit UV-12 / UV-12A. Up to ten UN-04A units can be connected to a UV-12 / UV-12A, and the address serves to distinguish between the connected units. When the UN-04A is not connected to a UV-12 / UV-12A, there is no need to set the address, and the address selector may be left at any position.

Panel release lever

To open the inner panel, press down this lever and pull it out.

Connections and Setup

Power Supply Connections

The UN-04A can be powered from the AC adapter NC-11 (100 V AC), NC-11A (120 V AC), NC-11B (220 V AC), NC-11D (240 V AC), NC-97 (100 to 240 V AC) or from the battery unit BP-07.

Important
The UN-04A does not have a power switch. Consequently, you should plug the AC adapter into an AC outlet only after the microphone and all other equipment connections are completed. When using the battery unit, set the power switch on the battery unit to "Off" before making connections.

Note
AC Adaputer models NC-79 (100 to 250 VAC), NC-79U (100 to 240 VAC) and NC-95 (100 to 240 VAC), can also be used with UN-04A, although they already discontinuous for sale.

AC Adapter

Connect the AC adapter to the power supply connector.

When using several UN-04A units in a linked configuration, connect the AC adapter to the first unit, and use the bus connector located in the bottom panel for subsequent units. Up to two units can be powered by the AC adapter NC-11, and up to twelve units by the AC adapter NC-97 which has a higher current capacity rating.

You can combine UN-04 and UN-04A units without problems.
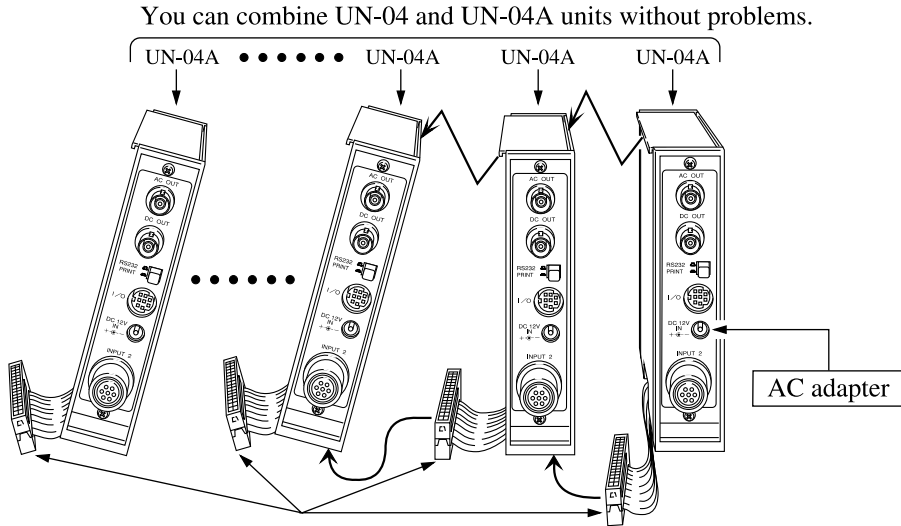
Bus connector
Remove the four screws of the connector cover, pull the connector out and plug it into the next UN-04A.

Linking several UN-04A units
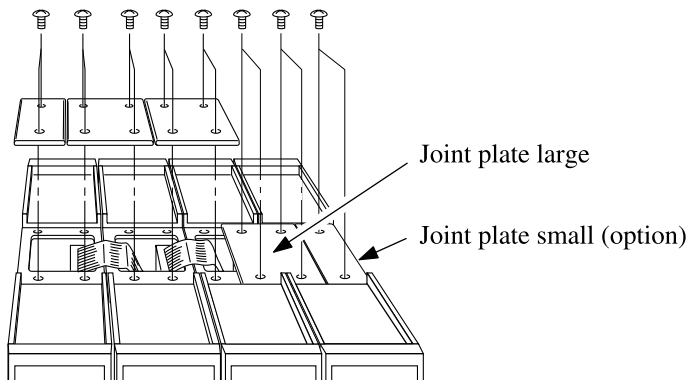
Joint plate large

Joint plate small (option)

Use the joint plates to link the bottom panels of the units. The small joint plate may be omitted.
Large joint plate: Connector cover
Small joint plate: Optional accessory

Linking several UN-04A units

Battery Unit

When using the battery unit BP-07, establish connections as shown below. If several UN-04A units are used in a linked configuration, connect the battery unit to the first unit and use the bus connector for subsequent units.

The battery unit BP-07 holds eight size "C" batteries (IEC R14). When using alkaline batteries, the BP-07 can power three UN-04A units for about eight hours. When the voltage meter on the battery unit enters the red zone, replace all batteries as soon as possible.

It is also possible to connect the AC adapter NC-11 / NC-97 to the battery unit. In this case, power is normally provided by the adapter, but in case of a power failure the battery unit serves as a backup power supply.

You can combine UN-04 and UN-04A units without problems.

Linking several UN-04A units with the battery unit

UN-04A UN-04A UN-04A BP-07

Use the joint plates to link the bottom panels of
the units. The small joint plate may be omitted.
Large joint plate: Connector cover
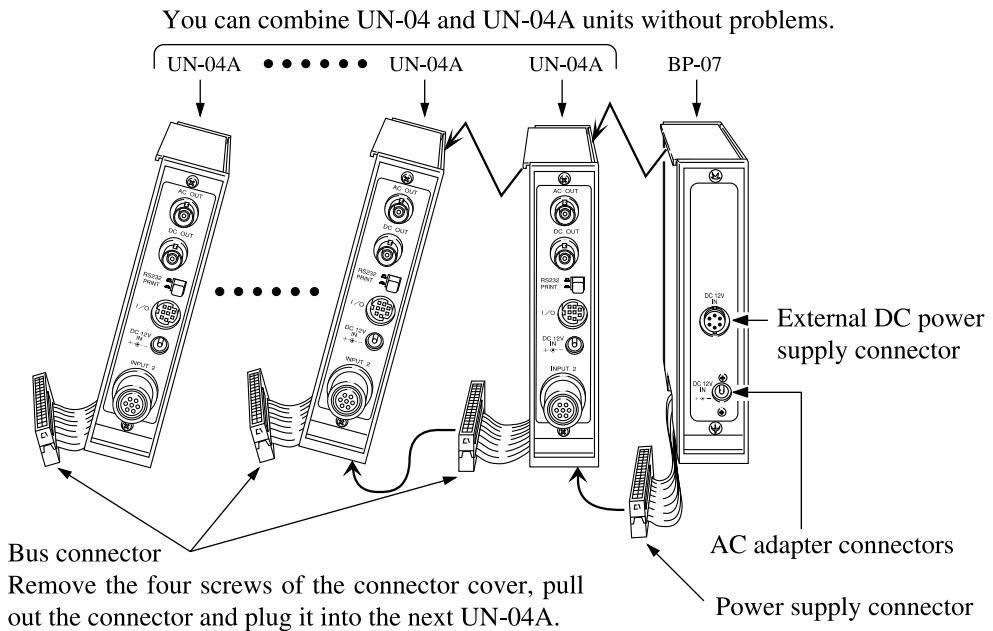Small joint plate: Optional accessory

Linking several UN-04A units with the battery unit
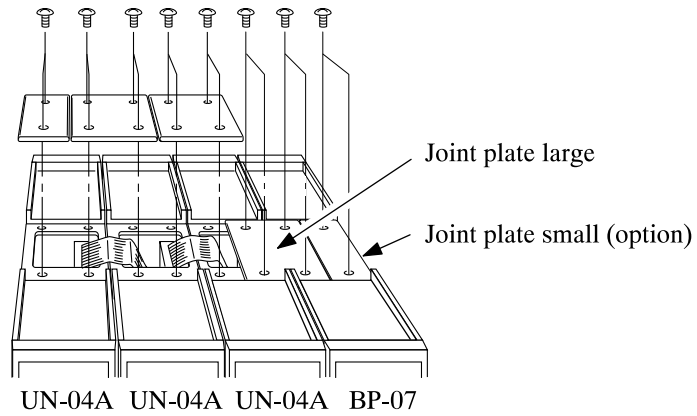
Input Connector

The input connector serves for connection of the microphone (optional). The possible combinations of microphones, preamplifiers, and accessories that can be used with the UN-04A are listed on page 16, 17.

The pin assignment of the input connector is shown below.
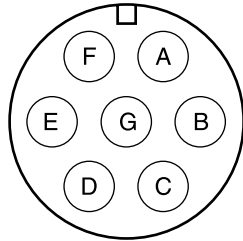
Tajimi Electronics connector TC1108-23A10-7F
Suitable plug: TC1108-12A10-7M

Input connector 1 and 2

A: Preamplifier power supply output (+12 V)
B: Ground
C: Signal input
D: Preamplifier power supply output (-12 V)
E: Bias voltage output (30 V)
F: Bias voltage output (60 V)
G: Bias voltage output (200 V)

Pins E, F, and G carry the polarization bias voltage for condenser microphones. When the bias selector is set to OFF, no output appears at these pins.

Microphone Selection and Mounting Method

Connect the microphone to the preamplifier, the preamplifier to the extension cable, and the extension cable to the input connector 1 or 2 on the UN-04A.

When mounting the microphone on a tripod, fasten the microphone holder EC-03-001 (supplied with the extension cable) to the tripod, then insert the extension cable connector into the microphone holder.
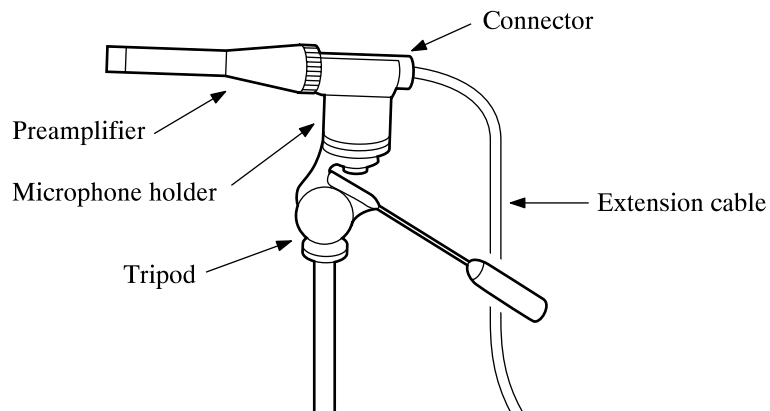
When using the preamplifier models NH-11, NH-12, or NH-17, the microphone holder UA-90 is required to insert the preamplifier.

Preamplifier

Microphone holder
UA-90

Tripod
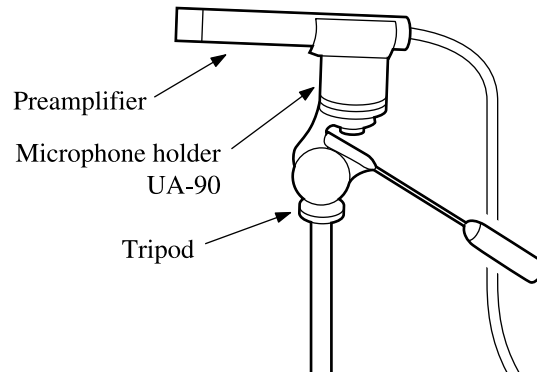
Usable Microphone and Preamplifier Combinations

Pistonphone and sound calibrator	Windscreen and nose cone	Microphone	Adapter

UA-30

NC-72

WS-01

UC-27

NC-74

UC-32P

UA-10

UC-28

UC-30

UA-31

UC-31

NC-72-S16

UC-33P

NC-72

UC-52H

WS-02

NC-74   NC-74-002

UC-53AH

WS-05

NC-72   NC-72-S06

UC-29

UA-12
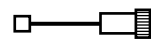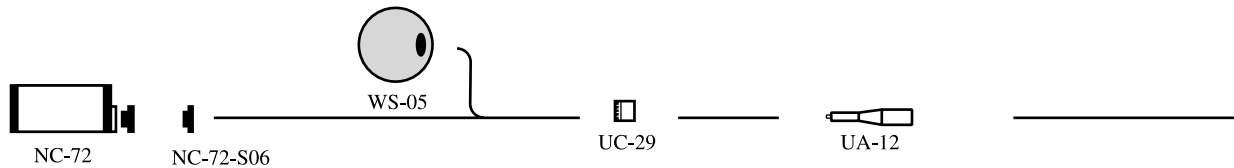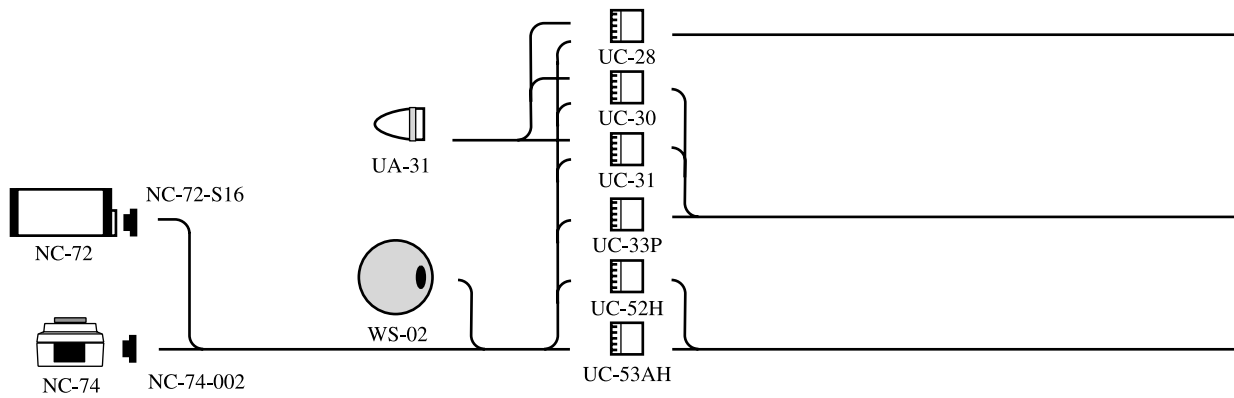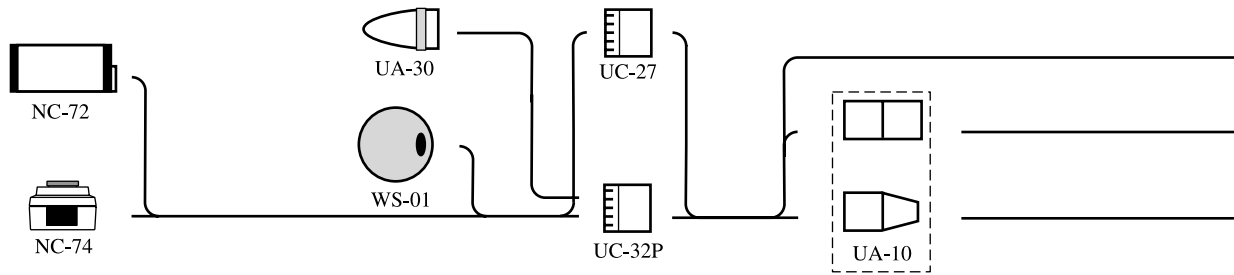
UC-90 series (2 m)
(UC-91H, UC-91V)

Flexible rod   Preamplifier   Extension cable

NH-06

NH-04

UA-20

NH-12 (2.5 m)

UA-20

NH-01

NH-04

UA-20

NH-12 (2.5 m)

NH-17A

UA-20

NH-17 (5 m)

EC-04 (2 m)

EC-04A (5 m)

EC-04B (10 m)

EC-04C (30 m)

UA-20

EC-04D (50 m)

NH-05

EC-04E (100 m)

Sound level
meter unit
UN-04A

INPUT 1
or
INPUT 2

By combining several extension cables,
cable runs over 100 m are also possible.

17
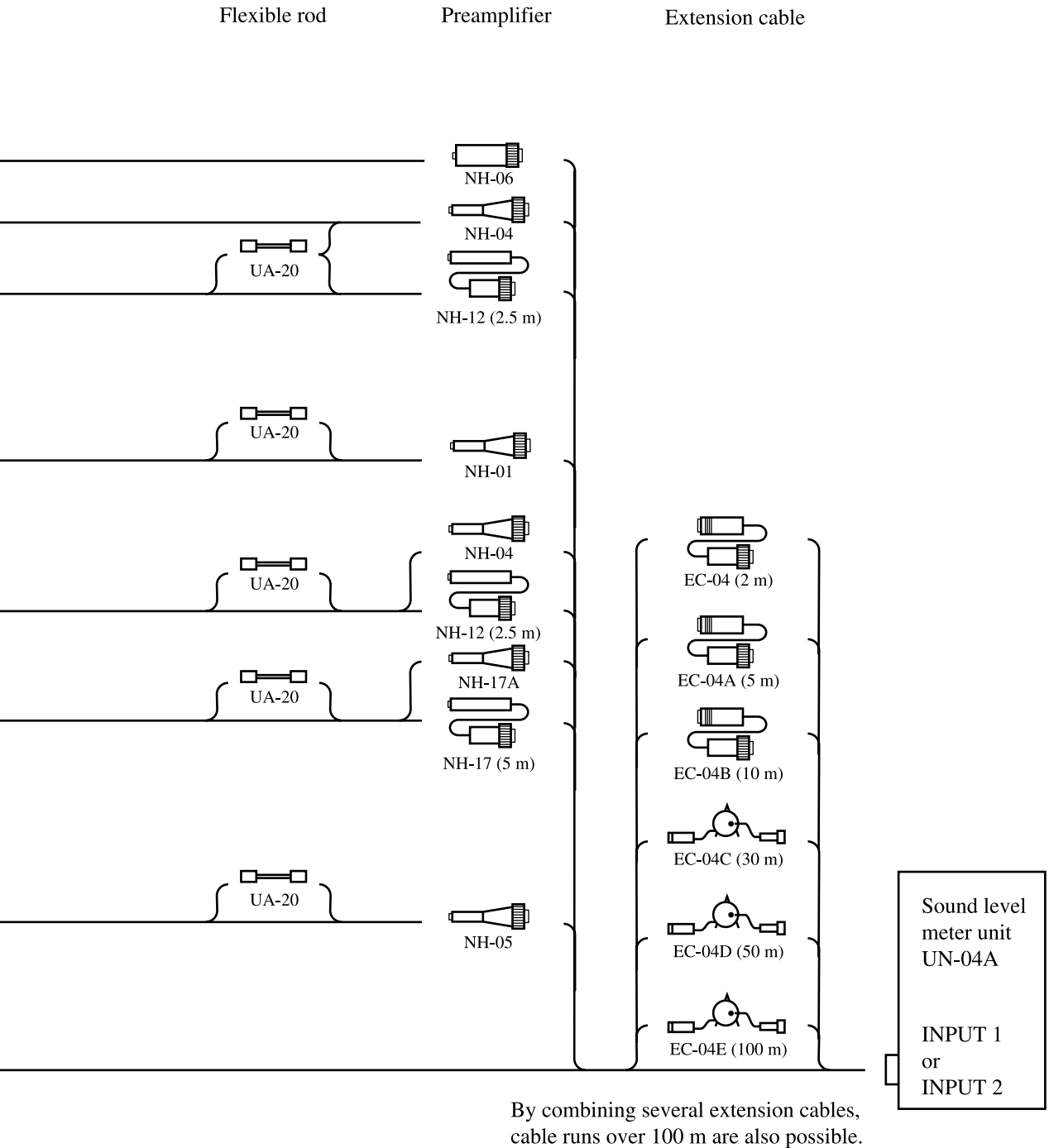
Output Connections

Output connections of the UN-04A include data output to the printer DPU-414, communication with a computer, AC and DC output to other equipment, and data output to the display unit UV-12 / UV-12A. This section describes the printer connection and the AC and DC output connection. Regarding connection to a computer, please refer to the chapter starting on page 31, and regarding connection of the display unit UV-12 / UV-12A, please refer to the instruction manual of the UV-12 / UV-12A.

Printer DPU-414

1. Connect the printer to the I / O connector on the UN-04A, using the RS-232-C interface cable CC-87. (Refer to the below illustration)

2. Set the I / O function selector on the UN-04A to "PRINT".
   The setting of the I / O function selector is checked only once when the UN-04A is turned on. If you are already using the UN-04A and want to change the setting, choose the new position, turn the power supply off and then on again.

Note
Printer models CP-10 and CP-11 can also be used with UN-04A, although they already became discontinuous for sale.

AC OUT

DC OUT

RS232
PRINT
Set I/O function selector to "PRINT"

I/O
To I/O connector   RS-232-C interface cable   To serial interface connector of printer DPU-414

DC12V
IN

INPUT 2

Connection to printer DPU-414
CC-87+ (25-pin female - 9-pin male adapter) ⟶ DPU-414
(9-pin female)

Interface cable   Supplied with DPU-414

Rear panel
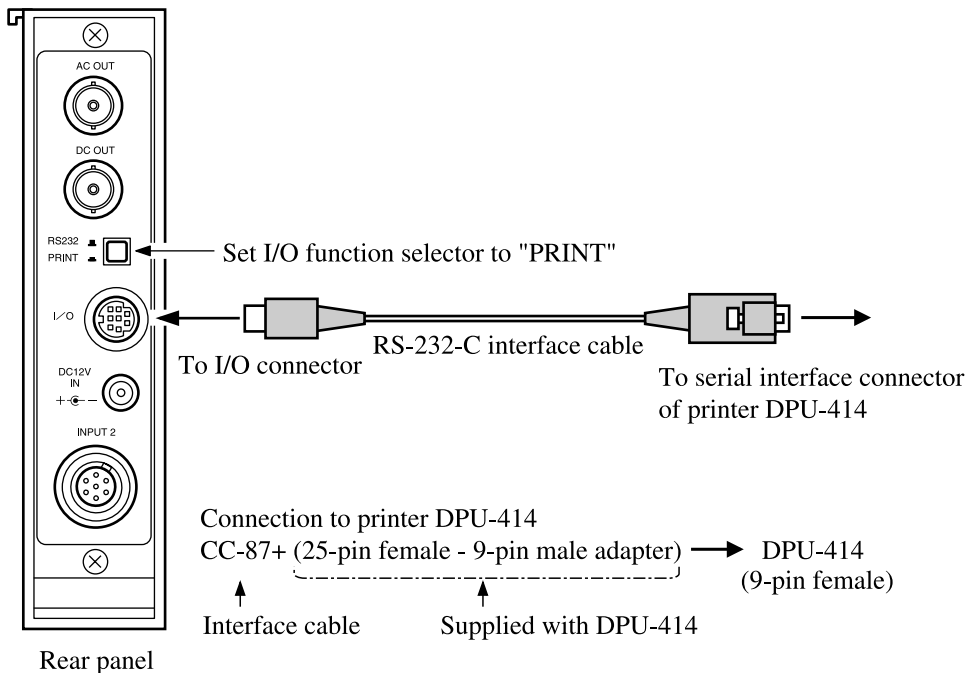
AC Output and DC Output

The AC output and DC output connectors provide a signal corresponding to the measured sound pressure level. This signal can be supplied for example to a level recorder for level recording, or to a data recorder or frequency analyzer.

AC output
connector

DC output
connector

BNC plug

Equipment using the AC output:
LR-07
LR-20A
SA-29/30
SA-76
SA-79
SA-01
SV-76
Data recorder
Other equipment

Equipment using the DC output:
Recorder
Other equipment

Rear panel
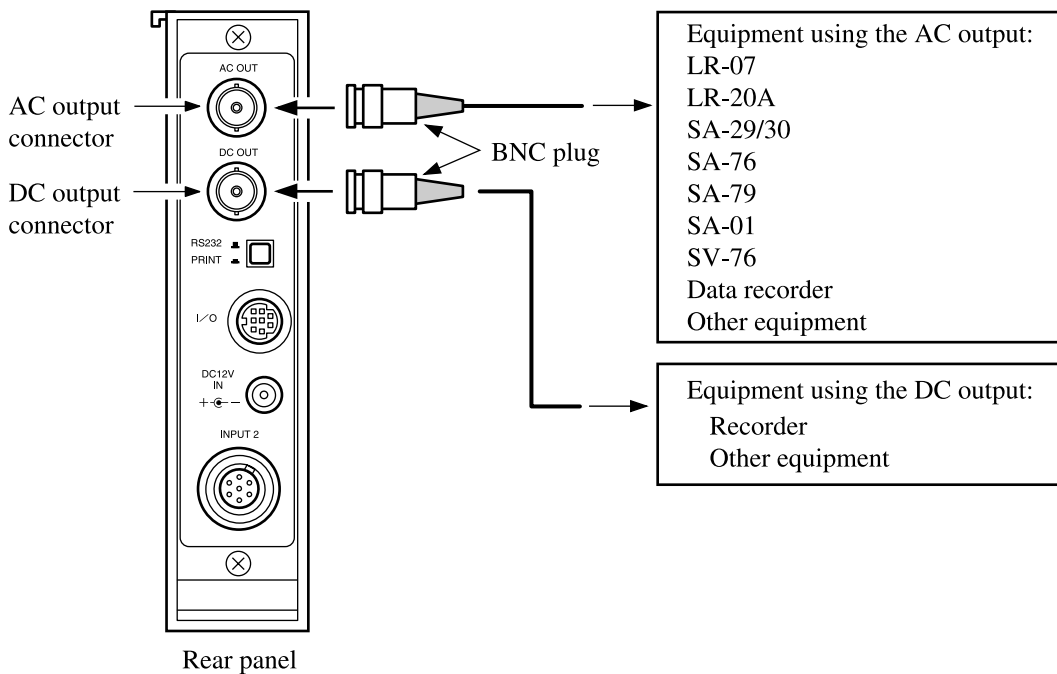
AC output and DC output specifications

Output	AC output	DC output
Connector type	BNC	BNC
Output impedance	Approx. 600 Ω	Approx. 50 Ω
Output voltage (Note)	1 V rms ± 20%	+3.5 V ± 1%, 0.5 V/10 dB
Maximum output voltage	± 5 V peak (no overload)	+5 V (no overload)
Load impedance	10 kΩ or more	10 kΩ or more

(Note): full-scale output voltage

Setup

The controls for measurement settings are located on the inner panel. To access this panel, push down the panel release lever and pull the panel out. Set the controls as shown below, and then push the panel back into the unit.

Latch

Frequency weighting selector

Input selector

MIC BIAS
ON — OFF

Bias selector

3 2 9

Sensitivity selector

SENSITIVITY
(×0.1dB)

FREQ WEIGHT

INPUT SELECT

HPF (20Hz)
ON — OFF

High-pass filter switch

C

INPUT 1 — INPUT 2

A   F

ADDRESS

TIME CONST

LPF (20kHz)
ON — OFF

Low-pass filter switch

SLOW

FAST   10ms

Time weighting selector

Address selector

Panel release lever

Inner panel flipped open (side view)

Input setting

Set the input selector to the appropriate position, depending on which input is to be used.

INPUT 1:   Input connector 1 on front panel

INPUT 2:   Input connector 2 on rear panel

Bias setting

When using a condenser microphone that requires a bias voltage, the bias switch must be set to ON. When using the ceramic microphone, or the prepolarized condenser microphones UC-52, UC-53A, or the UC-90 series, the switch must be set to OFF.

Sensitivity setting

The sensitivity selector serves to set the sensitivity of the unit to match the sensitivity of the microphone. The required value is calculated by adding up the microphone open circuit sensitivity and the preamplifier loss.

The microphone sensitivity is shown on the calibration chart accompanying each microphone. An example is reproduced below.
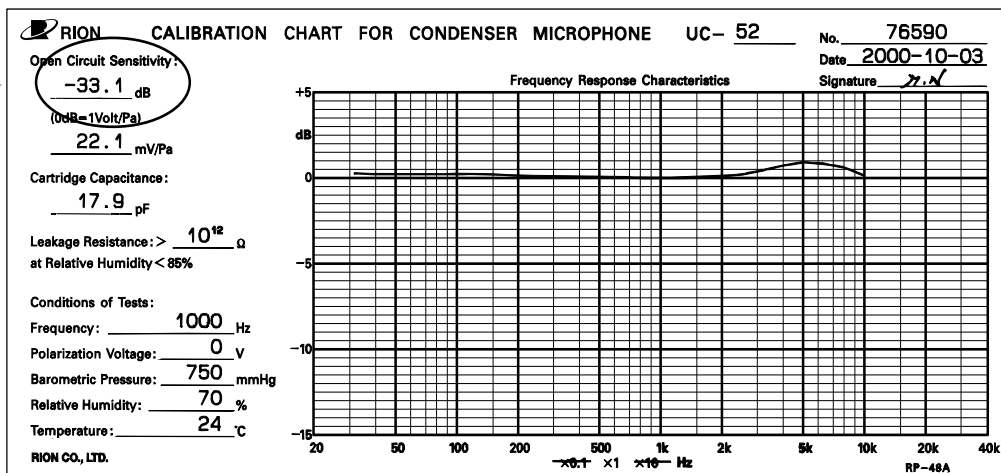
Calibration chart

The preamplifier loss (due to the capacitance of microphone and preamplifier) can be determined using the table below.

Microphone / Preamplifier	1-inch	1/2-inch			1/4-inch
	UC-27 UC-32P	UC-30 UC-31 UC-33P	UC-26 UC-28	UC-52 UC-53A	UC-29
NH-04 NH-12	-0.1	-0.4			
NH-06	-0.3				
NH-01			-0.4		
NH-17 NH-17A				-0.3	
NH-05					-0.9

Example

When using the 1 / 2-inch condenser microphone UC-52 (sensitivity -32.9 dB) and the preamplifier NH-17A (loss -0.3), the required sensitivity setting is

$$(-32.9) + (-0.3) = -33.2$$

The digital switch therefore must be set to "332".

Frequency weighting

For normal measurements, the "A" setting should be used. When wishing to measure the physical sound pressure level, set the frequency weighting selector to "F". Depending on the microphone, measurements up to a frequency of 100 kHz are possible in this setting. The "C" setting also yields nearly flat response, but the influence of components below 31.5 Hz and above 8 kHz is reduced.

Time weighting

For normal measurements, the "FAST" setting should be used. If the noise level fluctuations are mild, the "SLOW" setting may also be selected.

High-pass and low-pass filter setting

The high-pass filter cuts off components below 20 Hz, and the low-pass filter components above 20 kHz.

Address setting

The address setting is required when the UN-04A is connected to the display unit UV-12 / UV-12A. Up to ten UN-04A units can be connected to a UV-12 / UV-12A, and the address serves to distinguish between the connected units. When the UN-04A is not connected to a UV-12 / UV-12A, there is no need to set the address, and the address selector may be left at any position.

Filter Unit NX-06 (optional)

The UN-04A is supplied with internal high-pass filter (20 Hz) and low-pass filter (20 kHz), but it is also possible to install the optional filter unit NX-06.

Latch

Do not remove this screw.

Screw

Knob

Do not remove this screw.

MIC BIAS
ON | OFF

3 2 9
SENSITIVITY
(×0.1dB)
INPUT SELECT
INPUT 1 | INPUT 2

FREQ WEIGHT
C
A   F

HPF (20Hz)
ON | OFF

ADDRESS

TIME CONST
SLOW
FAST   10ms

LPF (20kHz)
ON | OFF

Panel release lever

Inner panel flipped open (side view)
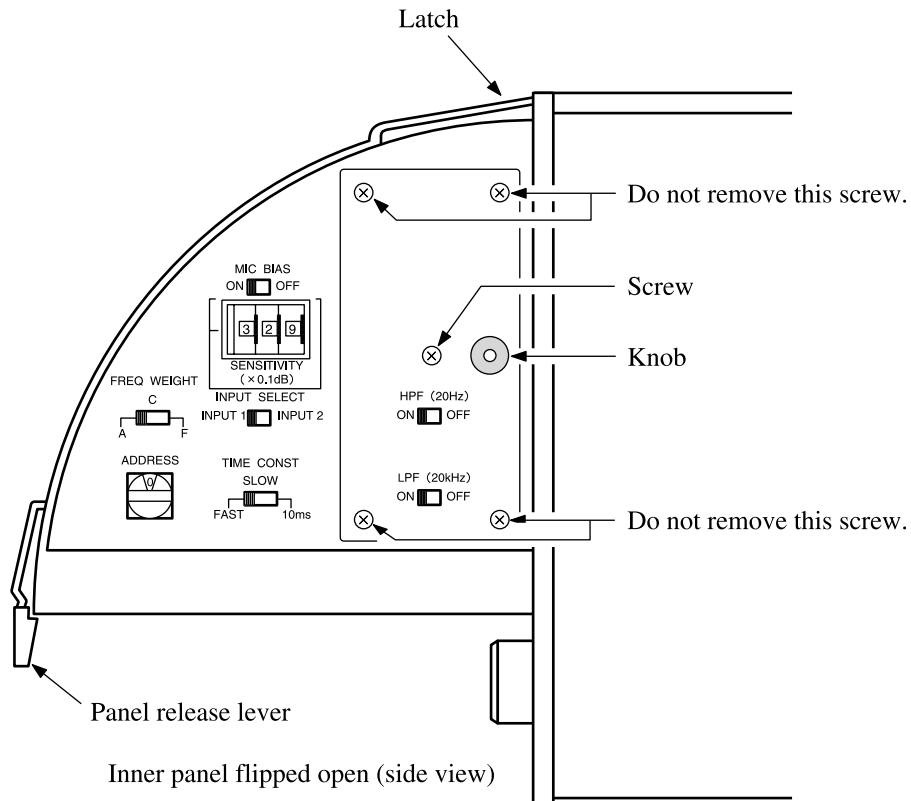
To install the filter unit, remove the screw and pull the panel out by grasping the knob (see illustration). Then insert the filter unit.

Note
When the NX-06 is installed, internal high-pass and low-pass filters are set to off. RS-232-C interface command, however, can be used to activate these filters (see page 32).

Measurement

Power-on

If an AC adapter is used to power the unit, plug the adapter into an AC outlet. If the battery unit BP-07 is used to power the unit, set the power switch on the battery unit to "On".

Next, turn on connected equipment such as the printer DPU-414 and equipment connected to the AC or DC output.

When the unit is turned on, the same settings as used before the unit was turned off are reestablished.

Range Selection

Select the measurement range (full-scale value) with the range selector buttons. The corresponding indicator lights up.

Pushing the [△] button increases the range, and pushing the [▽] button decreases it. Normally, you should select the range so that the overload indicator does not light. If the input signal is too high, causing amplifier saturation, the overload indicator lights up. In such a case, the measurement results will not be reliable.
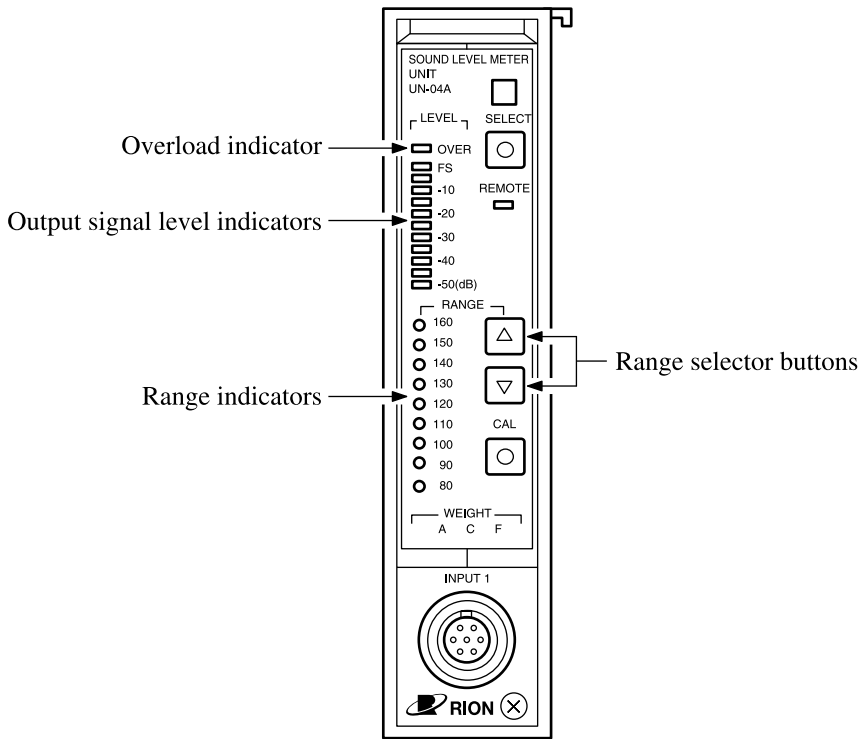
Front panel

The selectable range settings depend on the sensitivity setting (microphone sensitivity), as shown in the table below.

Microphone sensitivity (dB)	Available range setting
-20.0 to -29.9	80, 90, 100, 110, 120, 130
-30.0 to -39.9	90, 100, 110, 120, 130, 140
-40.0 to -49.9	100, 110, 120, 130, 140, 150
-50.0 to -99.9	110, 120, 130, 140, 150, 160

Recording Measurement Results on the Printer DPU-414

Press the On-line / Off-line switch of the DPU-414 to set the printer to the on-line condition. The printer then will print out the measurement results every five seconds. The printout format is as follows.

nnn. n dB, xx, y, zzzz

The items are defined as follows. An underline symbol (_) represents a space.

nnn. n Measurement value

xx Overload indication
  _ _: No overload
  OV: Overload has occurred

y Frequency weighting
  A: A weighting
  C: C weighting
  F: Flat response

zzzz Time weighting
  Fast: Fast characteristics
  Slow: Slow characteristics
  10 ms: Time constant 10 ms

Using Equipment Connected to the AC and DC Outputs

Calibration of Connected Equipment

After connecting the equipment to the AC output or DC output, carry out calibration as follows.

1. Press the calibration button.
   The indicator of the button lights up. In this condition, a 3.2-V signal is supplied at the DC output and a 1000 Hz, 0.5 V rms signal at the AC output.

2. Use the calibration signal to calibrate the connected equipment. The signal corresponds to a measurement value 6 dB below the full-scale point.

3. Press the calibration button once more to turn off the calibration signal. The indicator of the button goes out.
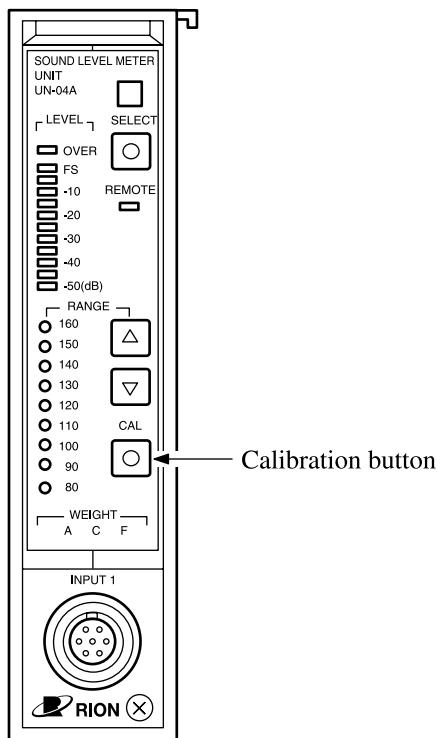
Front panel

Measurement Range

The frequency range and the level range that can be measured depend on the microphone and preamplifier combination.

Frequency Range

The measurable frequency range depends on the microphone model, as shown below.

Microphone
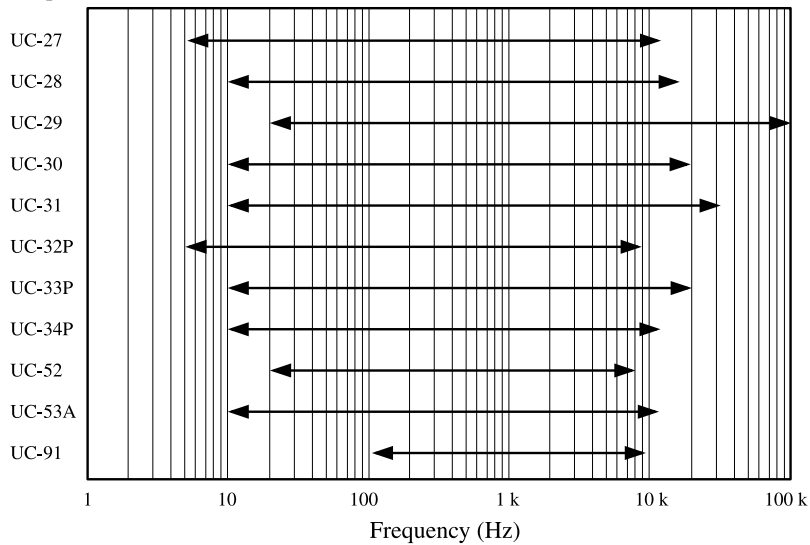
Frequency (Hz)

Measurement Level Range

The measurable level range depends on the microphone model, as shown below.

Microphone

Level (dB SPL)   0 dB = 20 μPa
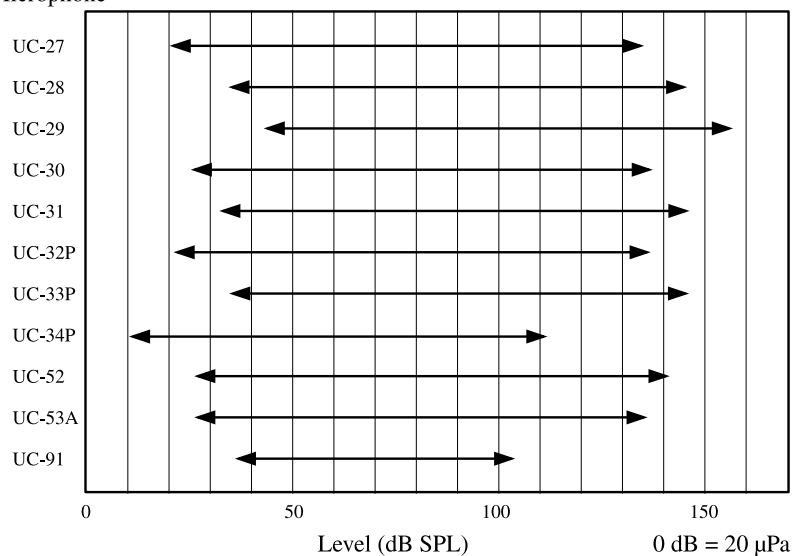
Frequency Response

The frequency response characteristics are shown below, with A weighting, C weighting, and at the flat setting.
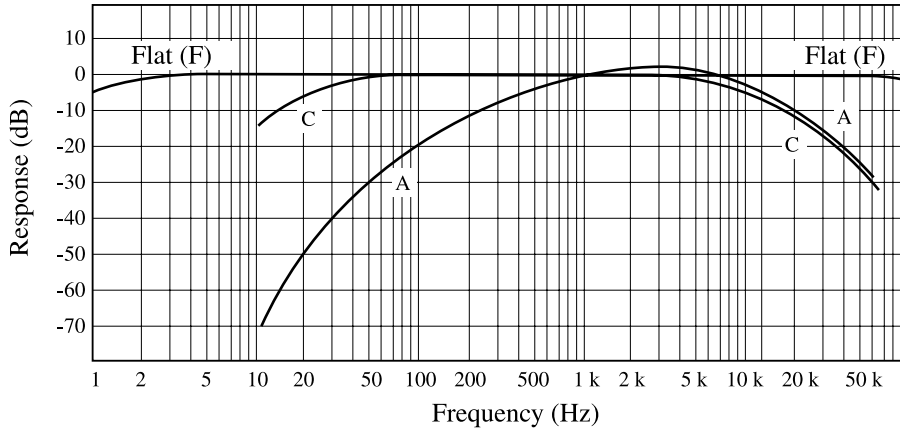
The frequency response characteristics of the low-pass filter and high-pass filter are shown below.
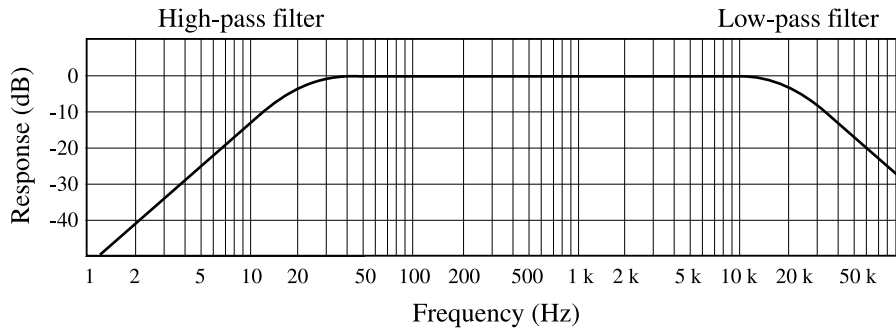
Extension Cable Influence

Due to the capacitance between signal lead and shield of the extension cable, there is a limit on maximum sound pressure level and frequency, depending on the length of the extension cable. The chart below shows the relationship between cable length, frequency, and sound pressure level.
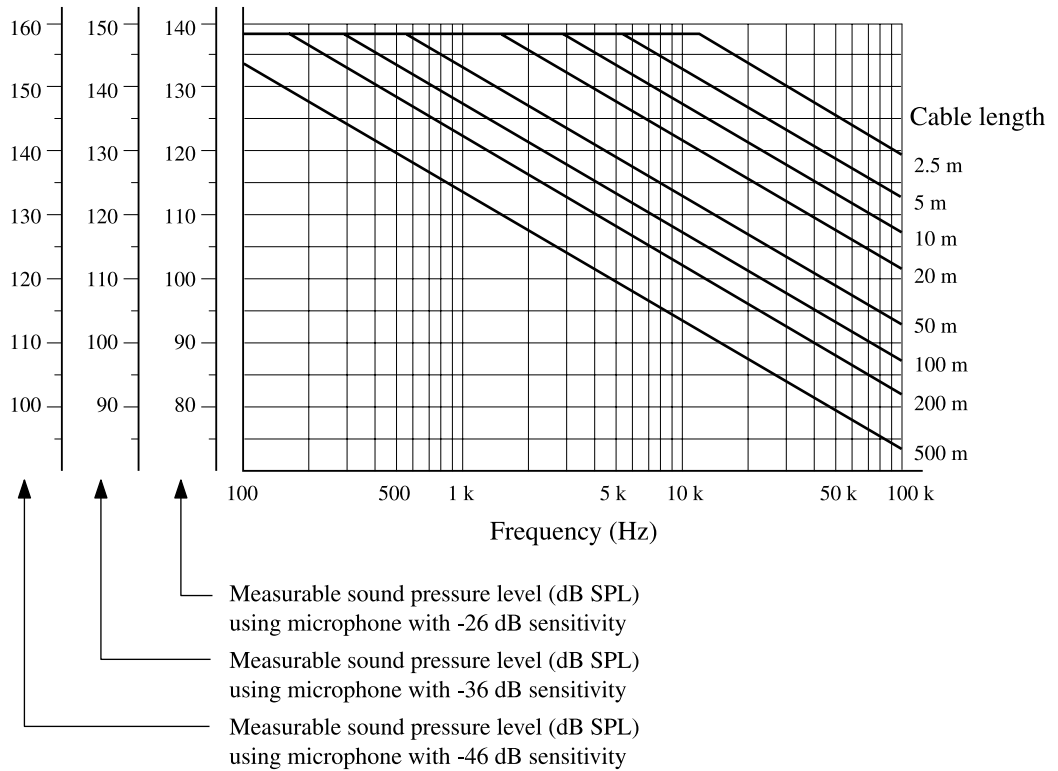
For example, when using a microphone with a sensitivity of -26 dB, and an extension cable of 50 m, measurements at 10 kHz are possible up to 110 dB.

RS-232-C Interface

The built-in RS-232-C interface allows the use of a computer to control the measurement conditions of the UN-04A and to store measurement results and measurement settings. This section explains the following points.

- Connection to a computer (⇒ p. 33)

  To connect the UN-04A to a computer, the RS-232-C interface cable CC-87E (sold separately) is required. This section explains how to use the cable and gives information about the internal cable wiring.

- Transfer protocol and transfer procedure (⇒ p. 34)

  This section describes the transfer protocol for the RS-232-C interface and explains the steps for sending data and commands.

- Commands (⇒ p. 38)

  This section describes the commands that serve to control the UN-04A. The section is divided into an explanation of the command format and a listing of commands.

- Output data format (⇒ p. 42)

  This section describes the format in which measurement data and setting data are output by the UN-04A.

Connection to a Computer

Connect the UN-04A to a computer as shown below, and set the I / O function selector of the UN-04A to "RS232".

I/O function selector: "RS232"

The setting of this selector is checked only once when the UN-04A is turned on. If you are already using the UN-04A and want to change the setting, choose the new position, turn the power supply off and then on again.

To I/O connector

RS-232-C interface cable CC-87E (option)

To computer RS-232-C

Hoshiden Electronics
TCP8080-01-020

Hirose Electric
HDE-CTH/HDEB-9S

Approx. 2.5 m

UN-04A end

Computer end
9-pin female connector

Ground
Received data
Transmitted data
Control

I/O connector of UN-04A

Transfer Protocol and Transfer Procedure

Transfer Protocol

Flow control:	Yes
Transmission:	Asynchronous, half-duplex
Data word length:	8 bit
Stop bits:	2
Parity:	None
Baud rate:	4800 bps

Remote Mode / Local Mode

- Remote mode

  In this condition, the UN-04A receives commands from the computer and the panel buttons on the UN-04A are inactive. The remote indicator of the UN-04A is lit.

- Local mode

  The UN-04A can be operated with the panel buttons and with commands from the computer. The remote indicator is out.

- Remote mode / local mode switching

  The SLK command serves to switch between local mode and remote mode ($\Rightarrow$ p. 40).

Front panel
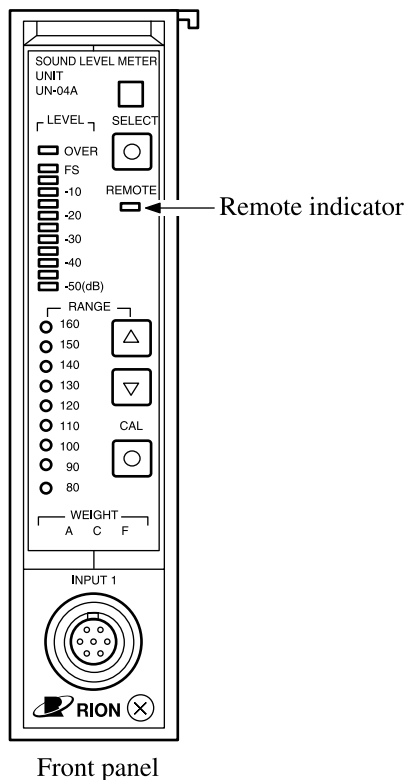
Transfer Procedure

In order to control the UN-04A from a computer or to retrieve measurement data, certain commands must be sent to the UN-04A. The data exchange must be performed according to certain rules, to ensure that both the UN-04A and the computer recognize the commands and data properly.

To send commands to the UN-04A, the following procedure must be observed.

1. The computer sends <ENQ><CR><LF> to the UN-04A.

2. When <ENQ><CR><LF> has been received, the UN-04A returns <ACK><CR><LF> to the computer.

3. The computer verifies receipt of <ACK><CR><LF> and sends a command within 4 seconds.

4. When a valid command is received by the UN-04A, it carries out the command.

   If it is a command which controls measurement settings, the appropriate setting is established, and an <ACK><CR><LF> is returned to the computer.

   If it is a command which requests data, the UN-04A returns <ACK><CR><LF> to the computer and waits for <ACK><CR><LF> from the computer. If, within 4 seconds, <ACK><CR><LF> is received by the UN-04A, it sends the appropriate data to the computer.

5. Within 4 seconds of sending the <ACK><CR><LF> or the data to the computer, the UN-04A can accept the next command. It is therefore possible to repeat steps 3 and 4, for continuous interaction with the computer. If no further commands are received within 4 seconds, timeout occurs. In this case, the procedure must be restarted from step 1.

6. When the computer sends an <EOT><CR><LF> to the UN-04A, data transfer is terminated. To send new commands, the procedure must then be restarted from step 1.

Normal transfer sequence

```
        ┌──────────────┐                              ┌──────────────┐
        │   Computer   │                              │    UN-04A    │
        └──────┬───────┘                              └──────┬───────┘
               │                                             │
               ├─ <ENQ><CR><LF> ────────────────────────────►
               │                                             │
               ◄──────────────── <ACK><CR><LF> ─┤            ┬
               │                                             │  Within 4 seconds
   (1) ──►     ├─ <STX>(command)<ETX><CR><LF> ──────────────►  ┴
               │                                             │
               ◄─────────────────── <ACK><CR><LF> ─┤        ┬
               │                                             │  Within 4 seconds
   (2) ──►     ├─ <STX>(command)<ETX><CR><LF> ──────────────►  ┴
               │                                             │
               ◄─────────────────── <ACK><CR><LF> ─┤        ┬
               │                                             │  Within 4 seconds
               ├─ <ACK><CR><LF> ────────────────────────────►  ┴
               │                                             │
               ◄──────── <STX>(data)<ETX><CR><LF> ─┤         │
               │                                             │
               ├─ <EOT><CR><LF> ────────────────────────────►  End
               │                                             │
```
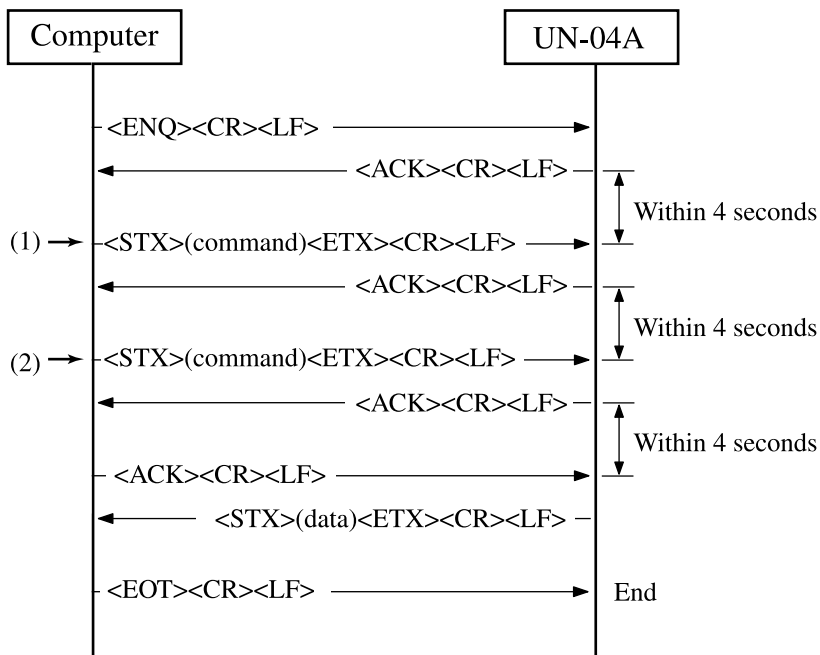
(1): Command which controls measurement setting
(2): Command which requests data

<ENQ>:   Control code 05H (enquire)

<ACK>:   Control code 06H (acknowledge)

<NAK>:   Control code 15H (not acknowledge)

<EOT>:   Control code 04H (end of transfer)

<STX>:   Control code 02H (start text)

<ETX>:   Control code 03H (end text)

<CR>:   Control code 0DH (carriage return)

<LF>:   Control code 0AH (line feed)

(command): ASCII string (command and parameters for UN-04A)

(data):   ASCII string (output by UN-04A)

Error Handling

In order to ensure correct data exchange between the UN-04A and the computer, the rules described above must be observed. If an error occurs, the following steps should be taken.

- The computer has sent <ENQ><CR><LF> but no response is received from the UN-04A.
  Send <ENQ><CR><LF> again after about 2 seconds. Repeat this several times. If there is still no response from the UN-04A, one of the following conditions may exist:
  Transfer parameters do not match.
  Interface cable is defective or not properly connected.
  UN-04A is not powered.
  I / O function selector on UN-04A is set to "PRINT", or the setting was changed to "RS232" without turning the UN-04A off and on.

- <ACK><CR><LF> from the UN-04A was received, but the computer has not completed the sending of commands within 4 seconds.
  The UN-04A terminates the data transfer condition.

- A wrong command was sent.
  When the computer has sent a wrong command (invalid string or parameter out of range), the UN-04A returns <NAK><CR><LF>. This can be repeated up to three times, but if the command is still invalid at the fourth try, the UN-04A sends <EOT><CR><LF> and terminates the data transfer condition.

- Data from UN-04A were not received properly.
  When the computer returns a <NAK><CR><LF>, the UN-04A sends the immediately preceding data (including <ACK><CR><LF> and <NAK><CR><LF>) again. This can be repeated up to three times, but if the data are still not received at the fourth try, the UN-04A sends <EOT><CR><LF> and terminates the data transfer condition.

Commands

Command Format

Commands that can be used by the UN-04A consist of 3 characters (3 bytes), usually followed by a parameter which specifies the action range of the command. Some commands do not have parameters.

<STX>			<ETX>	<CR>	<LF>

Command (3 bytes)   Parameter

In the following command description, parameters are denoted by "n".

Note
The UN-04A cannot process multiple commands sent together.

Command List

ISLn   Selects the input signal.

The action of this command corresponds to the input selector.

    n = 3:   Input connector 1 (INPUT 1)

    n = 4:   Input connector 2 (INPUT 2)

SNSn   Selects the microphone sensitivity.

The action of this command corresponds to the digital switch of the sensitivity selector.

    n = 200 to 599

If n is set to 000 to 199, it is treated as n = 200; 600 to 999, treated as n = 599

WGTn   Selects the frequency weighting characteristics.

The action of this command corresponds to the frequency weighting selector.

    n = 0:   A weighting

    n = 1:   C weighting

    n = 2:   Flat response (F)

DETn   Selects the time weighting characteristics.

The action of this command corresponds to the time weighting selector.

    n = 3:   FAST

    n = 4:   SLOW

    n = 5:   10 ms

AMPn   Selects the range.

The range specified by the parameter n depends on the microphone sensitivity setting, as shown below.

Sensitivity (dB)	Parameter n and specified range (unit:dB)					
	n = 0	n = 1	n = 2	n = 3	n = 4	n = 5
-20.0 to -29.9	80	90	100	110	120	130
-30.0 to -39.9	90	100	110	120	130	140
-40.0 to -49.9	100	110	120	130	140	150
-50.0 to -59.9	110	120	130	140	150	160

FLTn Determines the filter on / off settings.

The action of this command corresponds to the various filter switches.

n = 0: All filters off

n = 1: Internal 20-kHz LPF on

n = 2: Internal 20-Hz HPF on

n = 3: Internal 20-kHz LPF and 20-Hz HPF on

n = 4: Filter unit 1 on

n = 5: Filter unit 2 on

n = 6: Filter unit 1 and 2 on

Filter frequency of the NX-06 is set with the HPF / LPF switch of the NX-06. When the switch is set to off, n = 4, 5, and 6 are treated as n = 0.

When the NX-06 is not installed, n = 4, 5, and 6 are treated as n = 0.

SLKn Enables remote mode or local mode.

n = 0: Local mode

n = 1: Remote mode

CALn Enables or disables the calibration mode.

The action of this command corresponds to the calibration button.

n = 0: Calibration mode disabled

n = 1: Calibration mode enabled

STS Requests the current measurement settings. (This command has no parameters.)

The format of the data output in response to this command is described on page 43.

DOD Requests the current measurement data. (This command has no parameters.)

The format of the data output in response to this command is described on page 42.

MOD Requests the maximum value of the current measurement data. (This command has no parameters.)

   The maximum value is defined as the maximum value encountered since the unit was turned on or since the last MRS (maximum value reset) command.

   The format of the data output in response to this command is described on page 42.

MRS Resets the maximum value. (This command has no parameters.)

UNR Requests the address number.

Output Data Format

This section describes the format of the output data in response to the DOD, MOD, and STS commands.

Output Data in Response to DOD and MOD

The DOD command requests the current measurement value, and the MOD command the maximum measurement value. The output data format is as follows. An underline symbol (_) represents a space.

<STX>nnn. n_ _ _, xx<ETX><CR><LF>

    nnn. n   Measurement value

    xx   Overload indication

          _ _: No overload

          OV: Overload has occurred

Output Data in Response to STS

The current measurement settings are output by the UN-04A in the following format.

<STX>n1n2n2n2n3n4n5n6n7n8<ETX><CR><LF>

n_1	Input signal	
	$n_1 = 3$:	Input connector 1 (INPUT 1)
	$n_1 = 4$:	Input connector 2 (INPUT 2)

$n_2 n_2 n_2$	Sensitivity (numeric value)
	200 to 599 (-20.0 to -59.9 dB)

n_3	Filter	
	$n_3 = 0$:	All filters off
	$n_3 = 1$:	Internal 20-kHz LPF on
	$n_3 = 2$:	Internal 20-Hz HPF on
	$n_3 = 3$:	Internal 20-kHz LPF and 20-Hz HPF on
	$n_3 = 4$:	Filter unit 1 on
	$n_3 = 5$:	Filter unit 2 on
	$n_3 = 6$:	Filter unit 1 and 2 on

n_4	Frequency weighting	
	$n_4 = 0$:	A weighting
	$n_4 = 1$:	C weighting
	$n_4 = 2$:	Flat response (F)

n_5	Time weighting	
	$n_5 = 3$:	FAST
	$n_5 = 4$:	SLOW
	$n_5 = 5$:	10 ms

n6   Range
           The range specified by n6 depends on the microphone
           sensitivity, as shown below.

Sensitivity (dB)	n6 and specified range (unit: dB)					
	n6 = 0	n6 = 1	n6 = 2	n6 = 3	n6 = 4	n6 = 5
-20.0 to -29.9	80	90	100	110	120	130
-30.0 to -39.9	90	100	110	120	130	140
-40.0 to -49.9	100	110	120	130	140	150
-50.0 to -59.9	110	120	130	140	150	160

n7   Remote mode / local mode setting
           n7 = 0:   Local mode
           n7 = 1:   Remote mode

n8   Calibration mode on / off setting
           n8 = 0:   Calibration mode disabled
           n8 = 1:   Calibration mode enabled

Specifications

Applicable standards   JIS C 1505 - 1988   (electrical characteristics only)

                                    IEC 60651:1979 Type 1 (electrical characteristics only)

Inputs

     Input connectors: Font-panel input and rear-panel input (1 each)

     Input impedance: 100 kΩ

     Connector type: 7-pin

                              Microphone bias output: 30 V, 60 V, 200 V

                              Preamplifier power supply output: ±12 V, 5 mA

     Maximum input voltage:

                         ±12 V

Measurement level range (with microphone UC-53A)

     A weighting: 27 to 128 dB (JIS), 24 to 128 dB (IEC)

     C weighting: 33 to 128 dB (JIS), 30 to 128 dB (IEC)

     Flat response: 38 to 128 dB (JIS), 35 to 128 dB (IEC)

                      (Frequency range 20 Hz to 20 kHz)

Frequency range   2 Hz to 100 kHz (±3 dB)

Frequency weighting   A, C, Flat

Level range selector

   Depending on the microphone, the following range settings are available.

Microphone sensitivity range (dB)	Full-scale level (dB)
-20 to -29.9	80 to 130
-30 to -39.9	90 to 140
-40 to -49.9	100 to 150
-50 to -59.9	110 to 160

Calibration

    Gain calibration: Calibration possible for microphone sensitivity from -20 to -59.9 dB. For other ranges, conversion is required.

    Calibration signal:Generated by internal signal generator (sine wave, 1 kHz ±2%)

                AC output voltage   0.5 V rms ±2%

                DC output voltage   3.2 V ±1%

RMS detection   True rms circuit

    Time weighting: FAST, SLOW, 10 ms

    Display: 11-step LED display of instantaneous value (5-dB steps)

Overload indication   Indicator lights when signal waveform saturation occurs (full-scale point +8 dB).

Inherent noise (with inputs shorted)

                2 Hz to 100 kHz: 4 µV rms or less

                20 Hz to 20 kHz: 2 µV rms or less

                A and C weighting: 1.5 µV rms or less

Internal filter   20-Hz high-pass filter (-12 dB / oct)

                20-kHz low-pass filter (-12 dB / oct)

Outputs

 AC output (rear panel)

    Output connector type:

                BNC

    Output impedance:Approx. 600 Ω

    Output voltage: 1 V rms ±2% (at full-scale point)

    Maximum output voltage:

                ±5 V peak (no overload)

    Dynamic range: 80 dB (2 Hz to 100 kHz), 85 dB (20 Hz to 20 kHz)

    Load impedance: 10 kΩ or more

DC output (rear panel)

    Output connector type:

                BNC

    Output impedance: Approx. 50 Ω

    Output voltage: +3.5 V ±1% (at full-scale point), 0.5 V / 10 dB

    Maximum output voltage:

                +5 V

    Dynamic range: 40 dB (2 Hz to 100 kHz), 60 dB (20 Hz to 20 kHz)

    Load impedance: 10 kΩ or more

Interface

    Function: Data output and remote control

    Standard: EIA RS-232-C standard

    Transmission: Asynchronous, half-duplex

    Baud rate: 4800 bps

    Data word length: 8 bit

    Stop bits: 2

    Parity: None

Ambient conditions for operation

                -10 to +50°C, 90% RH or less

Power requirements

    Voltage: 9 to 15 V DC (120 mA)

    Suitable AC adapters:

                NC-11 (12 V, 300 mA)

                NC-97 (12 V, 3.3 A)

    Suitable battery unit:

                BP-07

Dimensions   33 (W) × 149 (H) × 210 (D) mm (without protruding parts)

Weight   Approx. 850 g

Supplied Accessories

Instruction manual	1
Inspection certificate	1

Optional Accessories

Filter unit	NX-06
AC adapter	NC-11, NC-97
Battery unit	BP-07
Printer	DPU-414
Interface cable	CC-87E, CC-87
Display unit	UV-12A
Sound calibrator	NC-74
Lack-mount base	UV-05-091
Joint plate small	
Preamplifier	See page 16, 17
Condenser microphone	See page 16, 17
Extension cable	See page 16, 17

Sound level meter unit UN-04A

Front view

Side view

33

149

210

Rear view
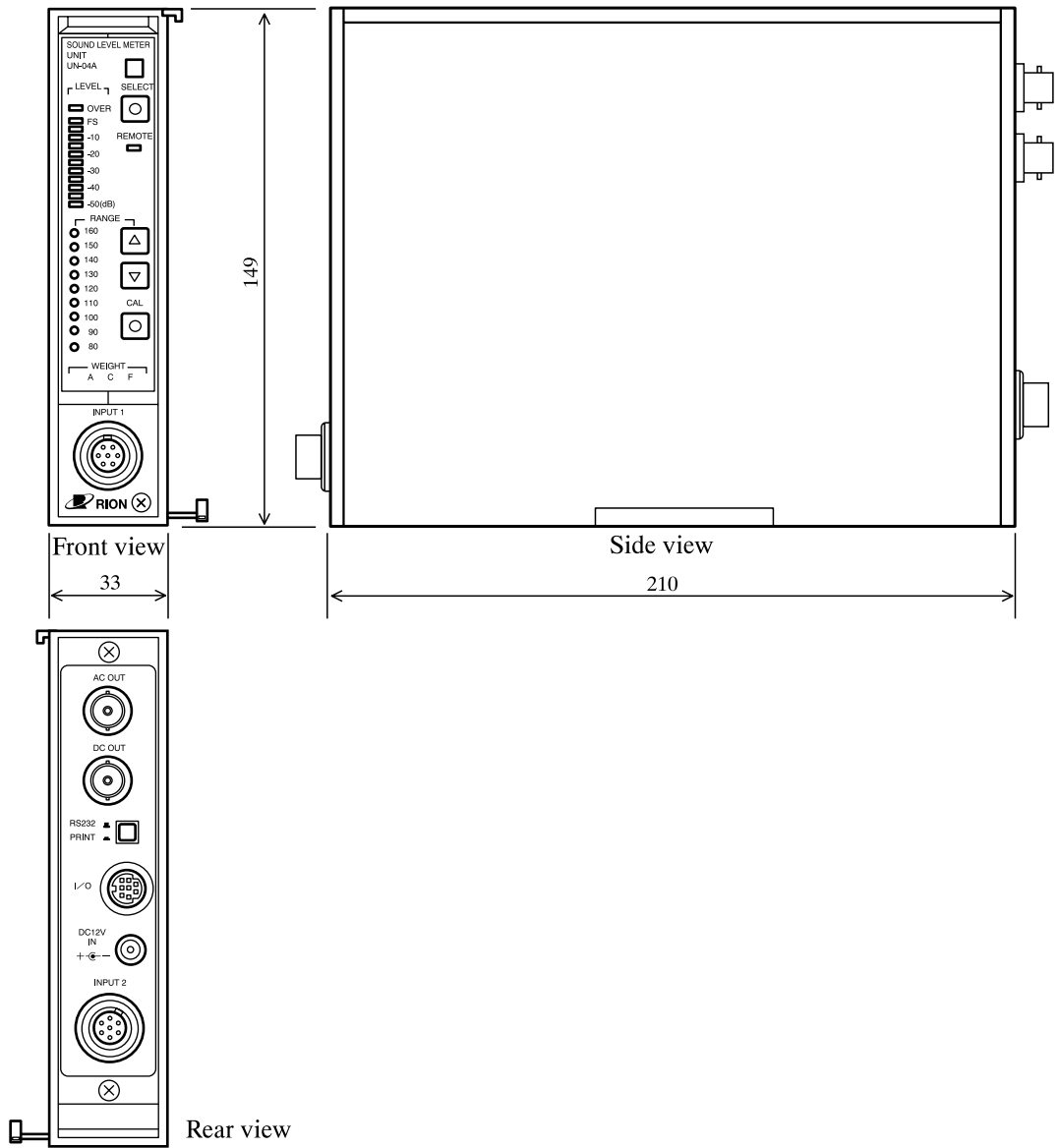
Unit: mm

Dimensional Drawings

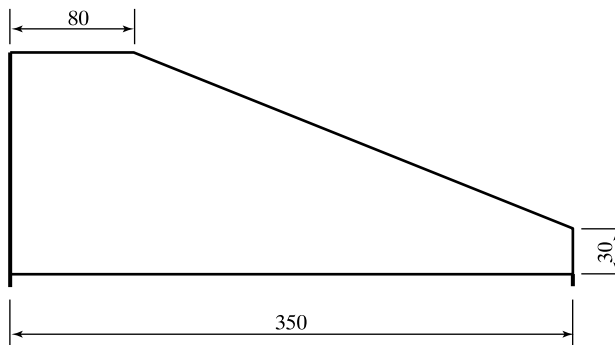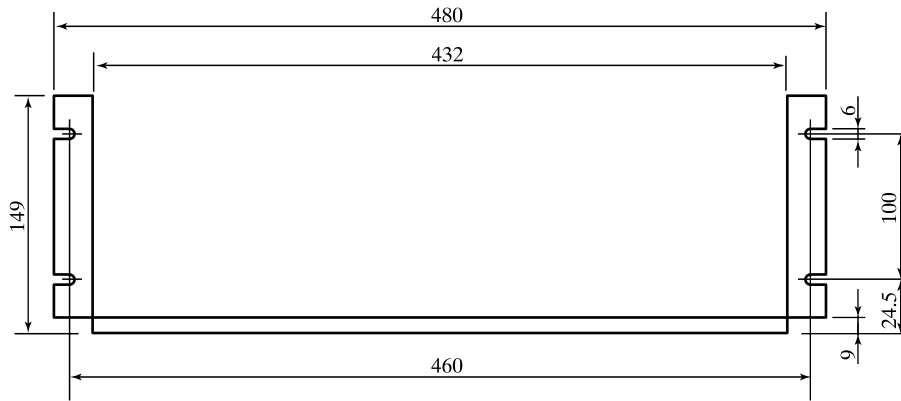Rack-mount base UV-05-091

480

432

149

6

100

24.5

9

460

80

30

350

Plate thickness: 1.6

Unit: mm

Dimensional Drawings