



Environmental Sound Monitor  
(For Environmental Measurement)

# **NA-37**

# Easily Monitor Road Traffic Noise, Factory Noise, Construction Noise

It complies with the manual of the Evaluation of Environmental Quality Standards for Noise.

Environmental Sound Monitor

## NA-37

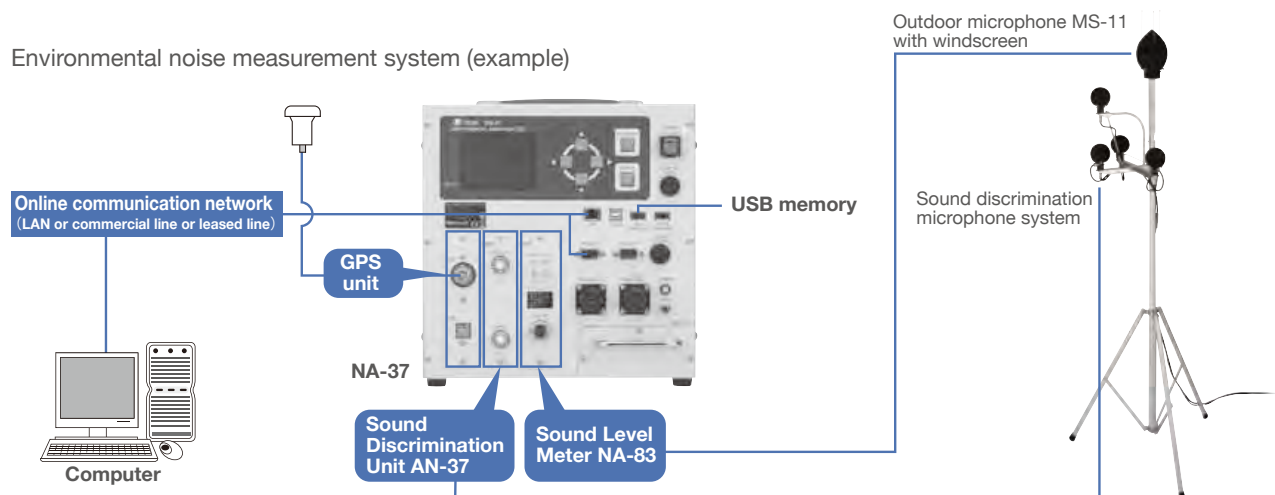
The NA-37 is capable of determining the sound source position based on sound arrival direction.

Compact dimensions make the unit suitable also for use in mobile monitoring systems.

Measurement is fully automatic, and continuous 365-day all-weather operation is supported.



Environmental noise measurement system (example)



# NA-37 Related Products

## Sound Level Meter NA-83

The NA-83 conforms to the requirements of IEC 61672-1:2002 Class 1 (The conditions of the microphone attached the window screen and 30 m connected them with the specialized cable.)

■ CE mark, EMC directive compliant  
(reduction of influence on an external electromagnetic noise)

## Outdoor Microphone System

### Outdoor Microphone MS-11

MS-11 has a built-in heater and a built-in sound source for automatic calibration, and is suitable for long-term outdoor use.

### All-Weather Windscreen WS-13

WS-13 has bird spikes to keep birds away.

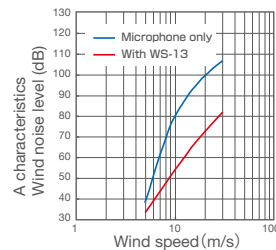


MS-11

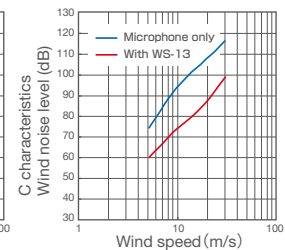


WS-13

### Wind noise reduction effect of WS-13



Performance of the A Frequency weighting data.



Performance of the C Frequency weighting data.

## Sound Discrimination Unit AN-37

The AN-37 allows discrimination between factory noise and peripheral noise from outside the site, and displays sound source direction. This is used in case of measurement of only the target factory noise.

## Features of NA-37

- Long-term data storage to internal memory
- Data transfer via LAN
- Support for data copy to USB flash drives
- Support for using GPS (option) for automatic time correction and acquisition of position information useful for mobile use.
- Real sound recording program NX-37WR (factory option) allows sound recording in two format types:
  - Compressed (for long-term recording)
  - PCM (for analysis)
- Color LCD screen provides good outdoor visibility
- Battery backup power supply ensures continued operation also during a power failure

## Option

### Carrying Case for NA-37 EF-37

Convenient for transfer of system amongsites.



### Outdoor Microphone stand ST-81





Facility with noise and atmospheric measurement equipment, located next to a highway

## Great for environmental noise measurements along highways

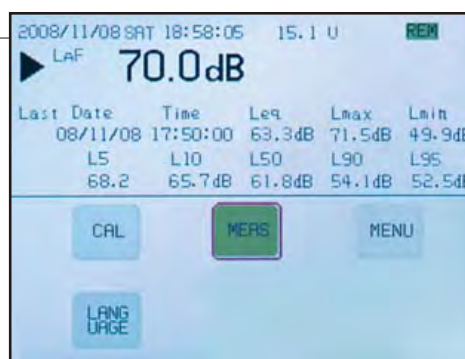
- ① Anemometer measuring wind speed and wind direction
- ② Highway
- ③ Air intake for atmospheric measurements
- ④ Cubicle for housing noise and atmospheric measurement equipment
- ⑤ Outdoor microphone



Microphone installation example

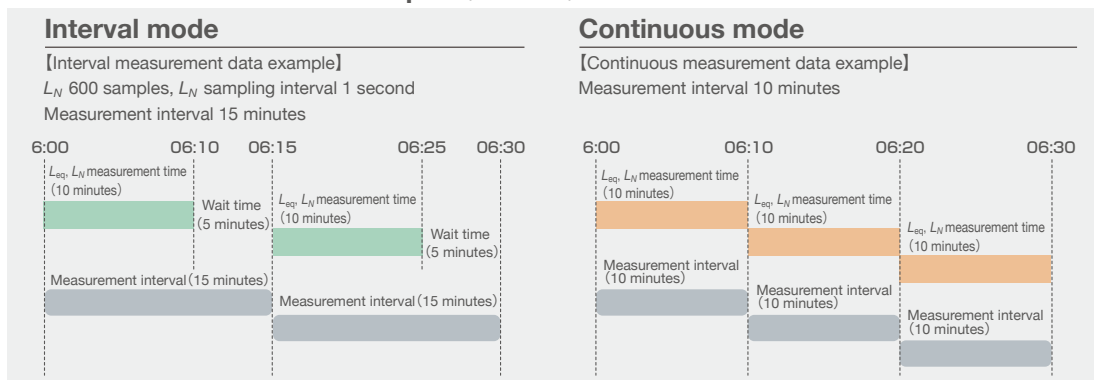
## Environmental Noise Processing Program NX-37A

- Allows automated measurement of basic data for environmental noise assessment, such as  $L_{eq}$  and  $L_N$
- Choice of interval mode with pauses between measurements and continuous mode where measurements are repeated for designated time span, enables automated round-the-clock evaluation.
- Measurement data are stored in internal memory and can be retrieved by a computer in a central observation base.
- Real Sound Monitor Program NX-37WR (factory option) allows recording of actual target sounds. Recorded sounds can be played back later for use in identifying sound sources.
- Sound Discrimination Unit AN-37 (option) can be used to obtain sound arrival direction data, to differentiate between noise originating on site and off site.



Environmental sound measurement screen example

### Noise measurement data examples (NX-37A)



## Real Sound Monitor Program NX-37WR

- Allows automatic recording of actual sound during sound pressure level measurement.
- Generic file formats allow easy transfer and playback on a computer.
- Two types of automatic recording:
  - ① Record while specified trigger level is exceeded
  - ② Record for a specified period at constant intervals

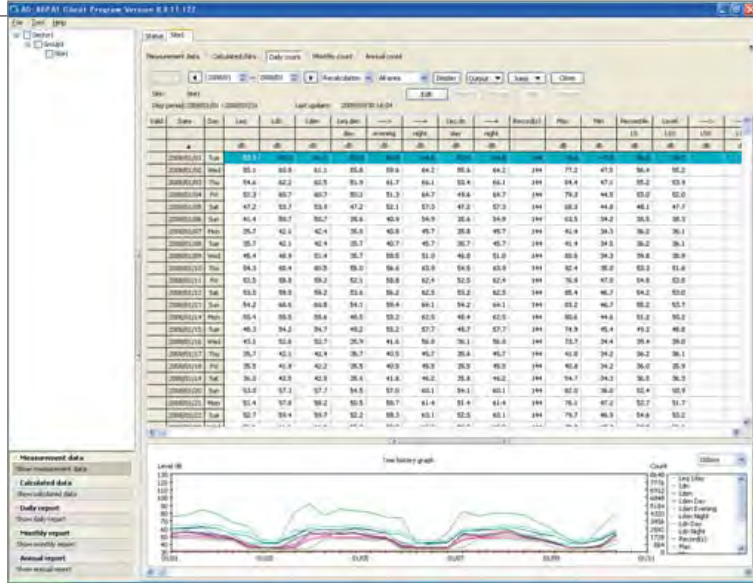
### Recording time capacity (internal memory)

• Compressed format (for long-time recording) : about 50 hours • PCM format (for Analysis) : about 4 hours

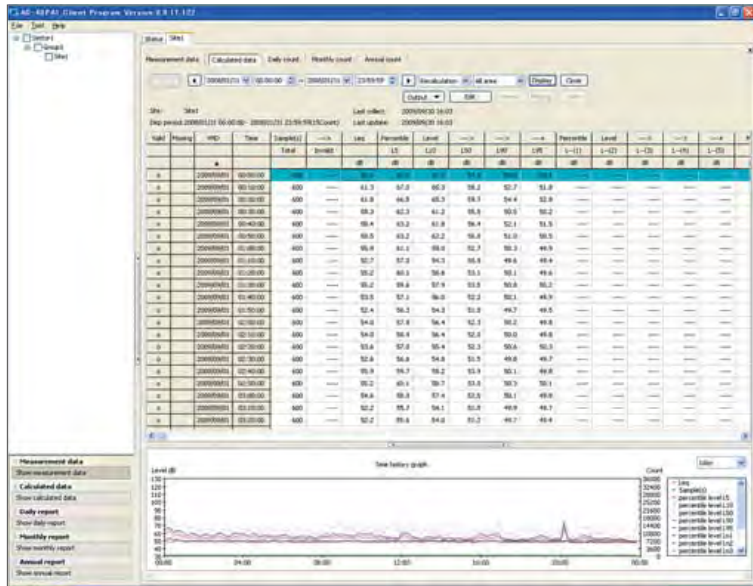
# Environmental Noise Data Processing Software AS-40PA1

(Supported operating systems: Microsoft Windows 2000/XP/Vista)

- Collects data measured by NX-37A and allows saving, editing, and report creation.
- Data stored in internal memory of NA-37 can be collected online via a commercial telephone line or leased line, network (LAN), or offline via USB flash drives.
- Multiple measurement locations can be registered, and collected data can be managed in a database for tabulation and report creation.
- Actual sound data can be played, and tabulated data can be exported as tab separated text files, useful for creating reports.
- Data from NA-37 installed at a local station can be collected regularly or constant using communication line. Remote control function supports NA-37 setting change, and automatic acoustic calibration.



Daily report screen (example)

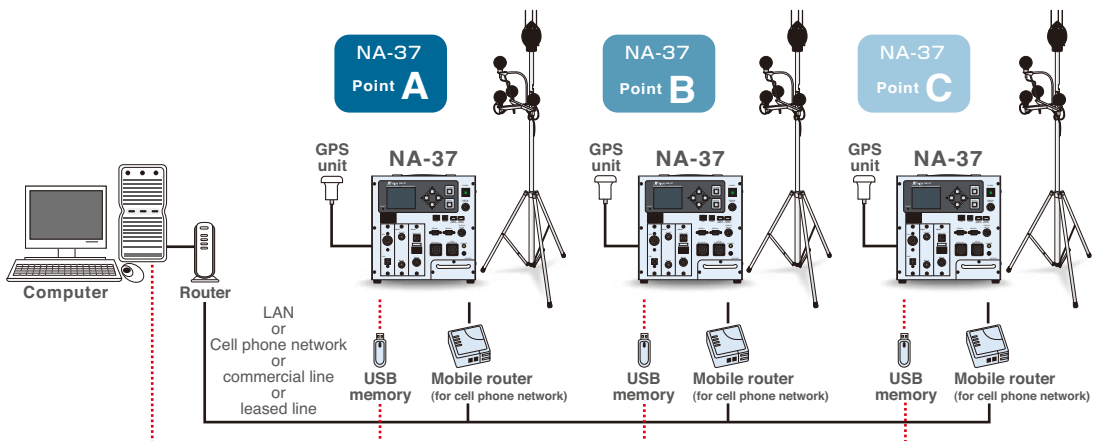


Daily count calculated data screen (example)

## Mobile measurement point monitoring system

- Data can be collected from mobile measurement points also if no network connection is available, by using one of the following methods:
  - Data transfer using cell phone network with mobile router
  - Data collection using USB memory
- GPS unit (option) can provide measurement point position information

### Monitoring system configuration example using temporary connection



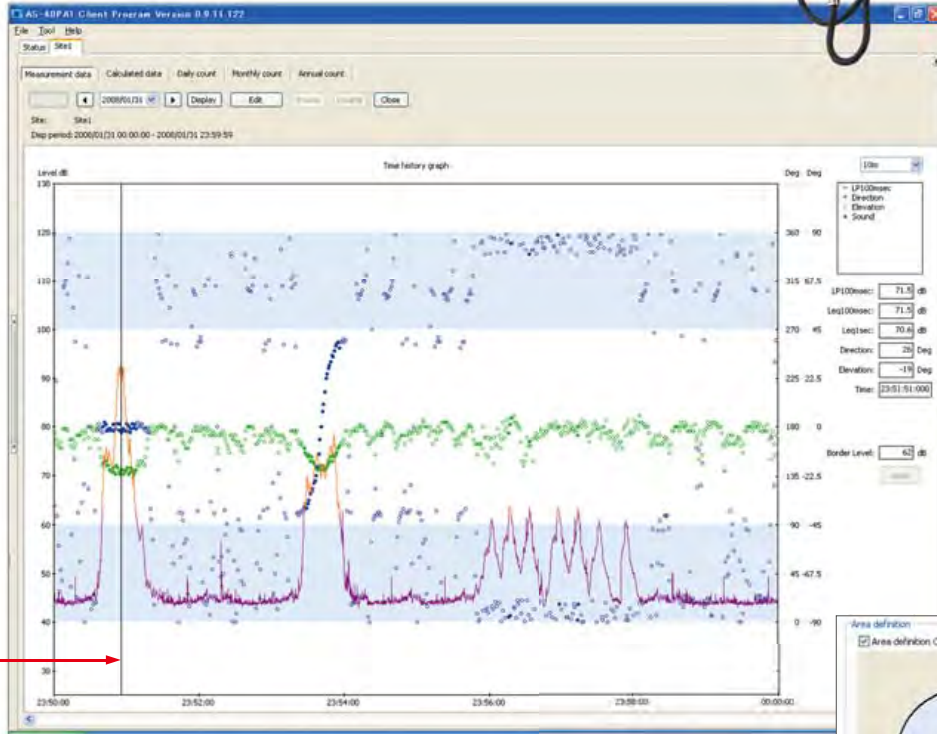
# Discrimination and Display of Sound Arrival Direction is Ideal for Factory Noise Monitoring

## Sound arrival direction discrimination system application

- The Sound Discrimination Unit AN-37 serves as a data source for the noise arrival direction discrimination system. It employs the 3-axis correction method using acoustic signals. This enables for three-dimensional capture of elevation and direction angles to be recognized.
- Noise originating on factory premises as well as outside noise events are discriminated and shown with arrival direction information. This is highly useful for monitoring factory noise.



AN-37



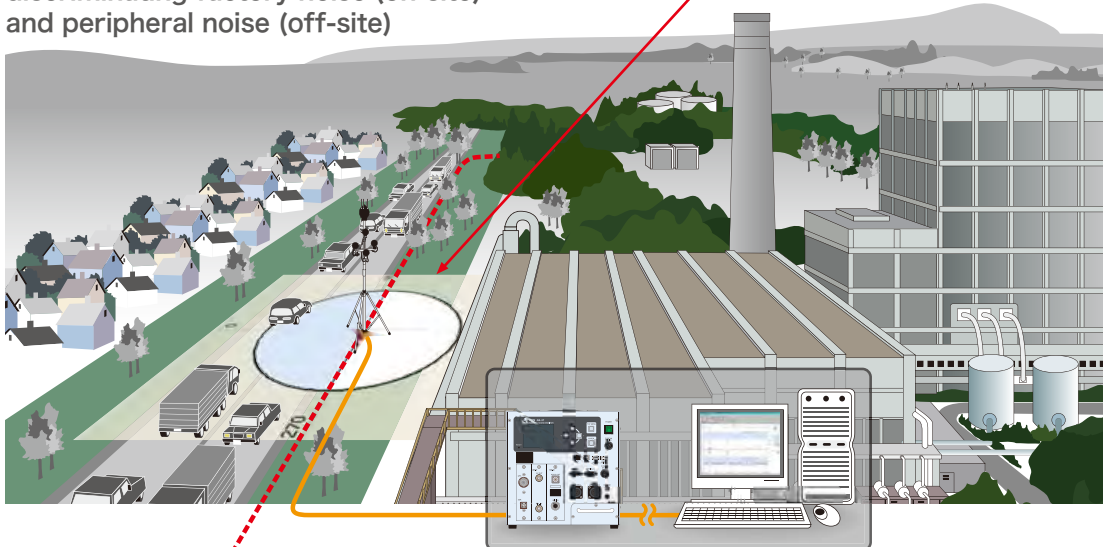
Cursor

Display for the level direction elevation & direction angles

This is a displayed screen of level time history with in vertical axis & in horizontal axis direction in vertical axis. Measuring values at a cursor on the graph are displayed at the right of the screen. The graph tells white marked areas set up as factory side. Several dots in the white marked area represent the noises from factory side.

An example of the display for the site boundary

### Example for a measurement system capable of discriminating factory noise (on-site) and peripheral noise (off-site)



Site boundary

## ■ NA-37 Specifications

Application Standard	
CE mark	EMC Directive 2004/108/EC EN 61326 (Class 1) EN 61000-3-2, EN 61000-3-3 Low-Voltage Directive 73/23/EEC EN 61010-1 WEEE Directive 2002/96/EC 2003/108/EC EN 50419 Electrical Appliance Safety Law
Sound level meter section	
Model	Sound Level Meter NA-83
Display	
Type	Semitransparent TFT color LCD with backlight
Number of dots	320 x 240
Inputs/Outputs	
USB A port	For program installation, data transfer to external memory, printout
Type	Storage device class
Number of ports	2 (USB 1.1 Full Speed)
Printer connection	See "Printout" section
USB B port	For maintenance setup / data transfer
Type	Communication device class, storage device class
Number of ports	1 (USB 1.1 Full Speed)
LAN port	For maintenance setup / data transfer via Ethernet connection to network
Type	TCP/IP
Number of ports	1 10BASE-T, 100BASE-TX
RS-232C ports	For maintenance setup / data transfer via public phone line connection to network For data retrieval/control of weather transmitter
Number of ports	2
Communication Type	Full duplex
Data transfer rate	1 200 / 2 400 / 4 800 / 9 600 / 19 200 / 38 400 / 57 600 / 115 200 bps
Data word length	8 bit
Data save capability	Internal memory: 256 MB for storage of calculated data and messages in specified format (expandable to 2 GB) * Store data specifications, see "NX-37A" section.
Clock section	Accuracy: ±10 ppm or less. Format: year / month / day / hour / minute / second (with leap year correction)
Power supply section	
Backup power supply	Sealed lead storage battery (replacement cycle 3 years; low battery voltage warning provided)
Backup capacity	AN-37R not connected: approx. 2 h (NX-37WR not operating, LAN, USB not connected) approx. 1.5 h (NX-37WR operating, LAN, USB connected) AN-37R connected: approx. 45 minutes (time can be extended by connecting external DC supply)
Ambient temperature/humidity conditions for operation	-10 °C to +50 °C, 10 to 90 % RH (no condensation)
Ambient temperature/humidity conditions for storage	-10 °C to +50 °C, 10 to 90 % RH (no condensation)
Dimensions and weight	270 (H) × 270 (W) × 188 (D) mm, 7 kg
Supplied accessories	Power cord x 1, 3P-2P adapter x 1

### ● Options

Name	Model
All-weather windscreen	WS-13
GPS unit	NA-37-S08
GPS antenna set C	SZ-53C
USB flash memory	5ZSLUF00
NA-37 case	EF-37
All-weather windscreen tripod	WXT520
Rack mounting flange	NA-37-S09
All-weather windscreen tripod for roof mounting	Various
AN-37 spacer (22 mm) (for ST-81)	AN-37-S09
7P microphone extension cable	Various
Identification unit extension cable	Various
GPS antenna extension cable	Various

## Environmental Noise Processing Program NX-37A

Functions	Noise detection, noise identification (air-borne noise / surface noise, movement direction, pass-through range), evaluation value calculation (WECPNL, Lden), equivalent sound level calculation (various values)
Setup parameters	Measurement parameters, data save parameters, printing parameters, transit parameters
External equipment utilization	
Sound level meter	Automatic level check function, level calibration (+, -), level check parameter setup (check level, tolerance)
AN-37	Elevation angle and azimuth angle analysis for noise identification
Weather transmitter	VAISARA Weather Transmitter WXT520 supported. Weather data output at noise event and at regular intervals.
GPS	POSITION GSU-36AF(D) supported. Used for automatic time calibration and to provide measurement position information output.
Real-sound monitor	Optional NX-37WR for real-sound recording according to trigger conditions supported
System functions	Clock, auto shutdown, auto measurement reset, battery warning, backlight auto off
Screen display and operation	
Operation method	6 keys on main unit used for on-screen button operation
Display language	Japanese / English
Display contents	Basic information (current time, instantaneous sound pressure level, various warnings), latest noise event information, data list, menus
Data storage	Measurement data for at least one month can be saved in internal memory of NA-37
Printing functions	Line on/off, data printing, paper feed, hard copy
Communication functions	
LAN	Socket connection allows command transfer, FTP server capability
RS-232C	Command transfer via telephone network or direct connection
Data transfer	Transfer of measurement data and real-sound data to USB memory (date range / continuous selectable)

## Sound Level Meter NA-83

Application Standard	IEC 61672-1:2002 Class 1, WEEE Directive, CE mark (EMC Directive 2004/108/EC EN 61326:1997 + A1:1998 + A2:2001 + A3:2003), Sound Level Meter according to the specifications, JIS C 1509-1:2005 Class 1
Measurement functions	
Measurement items	Time-weighted sound level $L_p$ Time-weighted maximum sound level $L_{max}$
Serial communication data	$L_p, L_{max}, L_{min}, L_{eq}$ every 100 ms
Measurement level range	A characteristics: 28 dB to 138 dB, C characteristics: 36 dB to 138 dB, Z characteristics: 42 dB to 138 dB
Overall linear operation range (A characteristics, 1 kHz)	28 dB to 138 dB
Inherent noise level	A characteristics: 20 dB or less C characteristics: 28 dB or less Z characteristics: 34 dB or less
Measurement frequency range	20 Hz to 20 kHz
Frequency weighting characteristics	A, C, Z
Time weighting characteristics	F (Fast), S (Slow)
Linear operation range	110 dB
Single level range	Bar graph indication range 30 dB to 130 dB
RMS detection circuit	Digital processing (sampling cycle 20.8 $\mu$ s)
Reference frequency	1 kHz
Windscreen compensation function	Frequency response compensation ensures that specifications are met also when windscreen WS-13 is mounted

## Outdoor Microphone MS-11

Microphone section	1/2 inch electrets condenser microphone
Nominal outer diameter	13.2 mm
Sensitivity level (including preamplifier)	-29 dB (re 1 V / Pa at 1 kHz, in standard environment)
Built-in sound source	1 kHz (for microphone calibration), 250 Hz, 500 Hz, 4 kHz (for operation check), 114 dB (sound pressure level)
Heater	
Heater current	94 mA DC
Heater power consumption	0.9 W
Ambient temperature/humidity conditions for operation	-20 °C to +50 °C, 100 % RH max. (no condensation)
Ambient temperature/humidity conditions for storage	-10 °C to +50 °C
Dimensions and weight	Outer diameter 16 mm x 122 mm, approx. 120 g

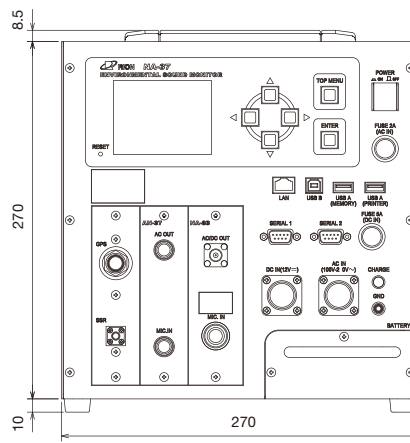
**Real Sound Monitor Program NX-37WR (factory option)**

Auto recording	
Noise event trigger	Recording of real sound near maximum level, linked to noise event detection
Level trigger	Recording of real sound exceeding trigger level (file split every 60 seconds) Separate trigger levels can be set for separate time periods
Interval trigger	Recording occurs at regular intervals (every 1 to 60 minutes)
Manual recording	Recording start / stop controlled by screen operation or communication commands
Recording time	
Recording time	5 to 60 seconds (including pre-trigger time) for level trigger, interval trigger, and manual recording
Pretrigger time	Inclusion of 0 to 5 seconds of pre-start records Level trigger, interval trigger, and manual recording
File creation	
Format	Compressed or PCM
Sampling frequency	48 kHz
Number of channels	1 (monaural)
Data word length	16 bits
File saving	
Limitations	Max. 2,000 files per day, max. 100 days
Memory use	Compressed format: 50 hours PCM format: 4 hours

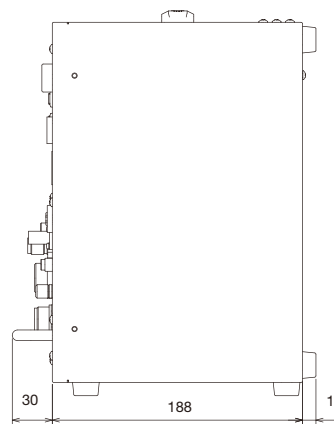
**Sound Discrimination Unit AN-37**

Input section	
Input connector	6-pin circular connector x 1
Measurement level range	45 dB to 130 dB
Measurement frequency range	100 Hz to 1500 Hz (-3 dB attenuation frequency)
A/D converter	24-bit resolution
Microphone system	
Microphone spacing	25 cm
Support frame material	Stainless steel
Pole diameter	22 mm or 32 mm
Dimensions and weight	407 (H) x 444 (W) x 331 (D) mm, 2.2 kg
Supplied accessories	Microphone (UC-52) x 4, Preamplifier x 4, Windscreen x 4, Microphone stays x 1 set

**● Dimensional Drawing (Unit : mm)**

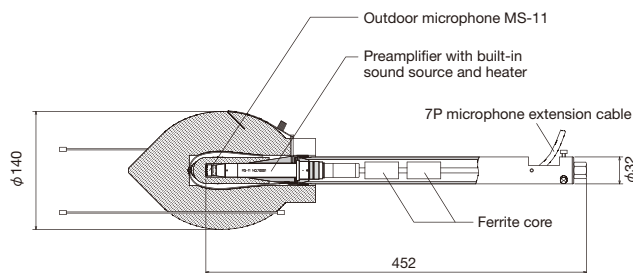


Front View



Side View

**● WS-13 Structural Diagram (Unit : mm)**



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