MI series

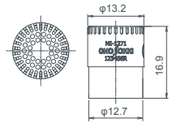
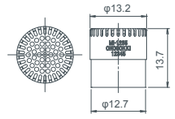
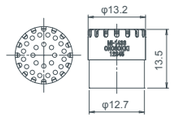
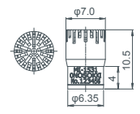
Measurement Microphone

ONO SOKKI

A variety of lineup for the acoustic measurement

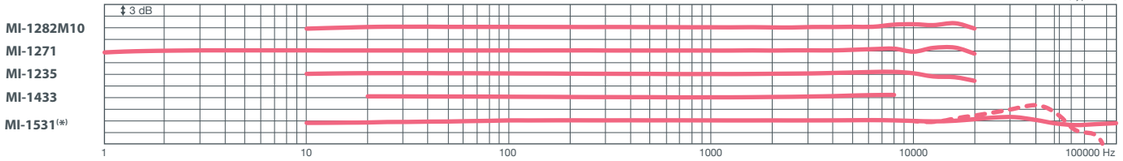
Measurement Microphone

Microphone

	MI-1271	MI-1235	MI-1433	MI-1531
Appearance				
Feature	• 1/2-inch back electret type • High sensitivity • Supports low frequency • Supports measurement under severe temperature environment	• 1/2-inch back electret type • Supports audible region • Cost-effective type	• 1/2-inch back electret type • Cost-effective type	• 1/4-inch back electret type • Wide band measurement (up to 100 kHz) • Space-saving design
Polarization voltage	0 V			
Sensitivity	-26 ±1.5 dB re. 1 V/Pa 50 mV/Pa (1 kHz)	-29 ±3 dB re. 1 V/Pa 36 mV/Pa (1 kHz)		-48 ±3 dB re. 1 V/Pa 4 mV/Pa (250 Hz)
Frequency range	1 Hz to 20 kHz	10 Hz to 20 kHz	20 Hz to 8 kHz	10 Hz to 100 kHz (without protection grid) 10 Hz to 20 kHz (with protection grid)
Maximum sound pressure	135 dB (when using the MI-3170)	135 dB (when using the MI-3111)		157 dB (when using the MI-3140)
Self-noise level (A-weighting)	14 dB (Typ. value, when using MI-3170)	19 dB (Typ. value, when using MI-3111)		37 dB (Typ. value, when using MI-3140)
Operating temperature range	-30 to 80 °C	-10 to 50 °C		-30 to 60 °C (when using MI-3140)
Operating humidity range	0 to 90 %RH (with no condensation)	20 to 90 %RH (with no condensation)		0 to 90 %RH (with no condensation)
Storage temperature range	-40 to 70 °C	-20 to 60 °C		-30 to 80 °C
Storage humidity range	0 to 90 %RH (with no condensation)	10 to 90 %RH (with no condensation)		0 to 90 %RH (with no condensation)
Outer dimensions / weight	φ13.2 × 16.9 mm / approx. 6 g	φ13.2 × 13.7 mm / approx. 6 g	φ13.2 × 13.5 mm / approx. 6 g	φ7.0 × 10.5 mm / approx. 1.5 g
Applicable preamplifier	MI-3170	MI-3111		MI-3140
				

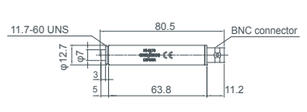
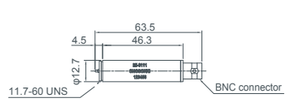
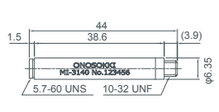
■ Free sound field response

(Typ. value)



*Solid line: without a protection grid Broken line: with a protection grid

Preamplifier

	MI-3170	MI-3111	MI-3140
Appearance			
Feature	• Measurement under severe temperature environment • Measurement of low frequency sound	• Cost-effective type • Multi-channel measurement	• Space-saving design • Wide frequency range
Size	1/2-inch		1/4-inch
Attenuation (typical)	0.15 dB (Typ.)	1.0 dB (Typ.)	0.35 dB (Typ.)
Frequency range	10 Hz to 40 kHz (+0.1 dB, -0.2 dB, 1 kHz as reference) 1 Hz to 40 kHz (+0.1 dB, -1.5 dB, 10 Hz as reference)	10 Hz to 20 kHz (±1.0 dB, 1 kHz as reference) 20 Hz to 20 kHz (±0.6 dB, 1 kHz as reference)	10 Hz to 100 kHz (±0.5 dB, 1 kHz as reference)
Self-noise (effective value voltage, A-weighting)	3.3 μV or less	5.0 μV or less	2.5 μV or less (20 Hz to 20 kHz)
Max. Output voltage	±8 V (peak) Sound pressure conversion 135 dB (when using the MI-1271)	±5.6 V (peak) Sound pressure conversion 135 dB (when using the MI-1235 / 1433)	±8 V (at 24 VDC) Sound pressure conversion 157 dB (when using the MI-1531)
Operating temperature range	-30 to 80 °C	-10 to 50 °C	-30 to 60 °C*
Operating humidity range	0 to 90 %RH (with no condensation)	30 to 90 %RH (with no condensation)	0 to 90 %RH (with no condensation)
Storage temperature range	-40 to 70 °C	-20 to 60 °C	-30 to 80 °C
Storage humidity range	0 to 90 %RH (with no condensation)	10 to 90 %RH (with no condensation)	0 to 95 %RH (with no condensation)
Power supply	CCLD 2 to 4.5 mA (rated 4 mA) 18 VDC to 26 VDC (rated 24 V)	CCLD 0.5 to 5 mA (rated 4 mA) 15 VDC to 25 VDC (rated 24 V)	CCLD 2 to 20 mA (rated 4 mA) 18 VDC to 25 VDC (rated 24 V)
Applicable connector	C02(BNC)		10-32 UNF
Outer dimensions	φ12.7 × 80.5 mm	φ12.7 × 63.5 mm	φ6.35 × 44 mm
Weight	Approx. 35 g (not including microphone)	Approx. 25 g (not including microphone)	Approx. 5.5 g (not including microphone)
Signal cable	MX-1000 series, MX-2000 series (recommended)	MX-2000 series (recommended)	NP-0120 series, NP-0180 series (recommended)
Outer appearance (Unit: mm)			

*This is the operating temperature range for the main unit only. If the signal cable NP-0120 series is included, the operating temperature range is -25 to 60 °C.

MI series

TEDS Microphone

MI-1271M12 Microphone with built-in amplifier (MI-1271+MI-3170)

A microphone with a built-in amplifier. This microphone can be directly connected to a device equipped with a CCLD (constant current drive) power supply using a BNC cable. When connected to a TEDS-compatible device, information such as sensitivity is automatically read, eliminating the need for complicated calibration work. Reliable measurement and time reduction are achieved.

Diameter, response type, polarization voltage	1/2 inch, free sound field, 0 V
Sensitivity	-26.0 ±1.5 dB re. 1 V/Pa (50 mV/Pa)
Frequency range	1 Hz to 20 kHz (± 2 dB)
Maximum sound pressure level (250 Hz, 3 % distortion)	135 dB or more
Self-noise level (A-weighting)	14.0 dB (Typ.)
Static pressure characteristics (250 Hz)	-0.013 dB/kPa
Temperature characteristics (250 Hz)	+0.005 dB/K
Humidity characteristics (250 Hz)	-0.0004 dB/%
Operating temperature range	-30 to 80 °C

Operating humidity range	0 to 90 %RH (with no condensation)
Storage temperature range	-40 to 70 °C
Storage humidity range	0 to 90 %RH (with no condensation)
Power requirement	Constant Current Line Drive
Drive current	2 to 4.5 mA (rated 4 mA)
Drive supply voltage	DC18 to 26 V (rated 24 V)
Output connector	C02 (BNC)
TEDS version	IEEE1451.4.2004 (Template: Microphone with built-in Preamplifier Ver.1.0)
Outer dimensions, weight	φ13.2 × 91.9 mm, approx. 41 g

*Reference environmental condition: 23 °C, 50 % RH,101.3 kPa *Cable length conforming to CE marking: up to 30 m
*For the TEDS compatibility of the measuring instruments and amplifiers to be connected, contact the store where you purchased.

Low-noise Microphone

MI-1282M10

In order to create a more comfortable sound environment, there is a need to reduce the operating noise of products such as home appliances and information equipment, as well as the sound of motors and inverters that transmits into the vehicle interior.
The Low-noise Microphone allows measurements in the 10 dB range (A-weighting), which is difficult to measure with normal measurement microphones. While conventional low-noise microphone requires a separate amplifier for power supply, this product adapts a CCLD (constant current drive) method and can be used by directly connecting to a CCLD-compatible analyzer.

Diameter, response type, polarization voltage	1/2 inch, Free field, 0 V
Sensitivity	-6.0 dB ± 2.0 dB re.1V/Pa (500 mV/Pa)
Frequency range	10 Hz to 20 kHz (±3 dB) 10 Hz to 16 kHz (±2 dB)
Maximum sound pressure level (1 kHz, 3 % Distortion)	>100 dB (10 Hz to 5 kHz) >80 dB (5 kHz to 20 kHz)
Self-noise level (A-weighting)	4.5 dB (Typ.)
Operating temperature range	-10 to +60 °C
Operating humidity range	0 to 85 % RH (no condensation)

Storage temperature range	-20 to +70 °C
Storage humidity range	0 to 85 %RH (no condensation)
Power supply	Constant current line drive
Driving current	2.8 to 20 mA (rated 4 mA)
Driving voltage	DC 24 to 32 V (rated 24 V)
Output connector	C02 (BNC)
TEDS version	IEEE 1451.4 : 2004 (Template : Microphone with built-in Preamplifier Ver.1.0)
Outer dimension/Weight	φ 13.2 × 91.2 mm/ Approx. 37 g

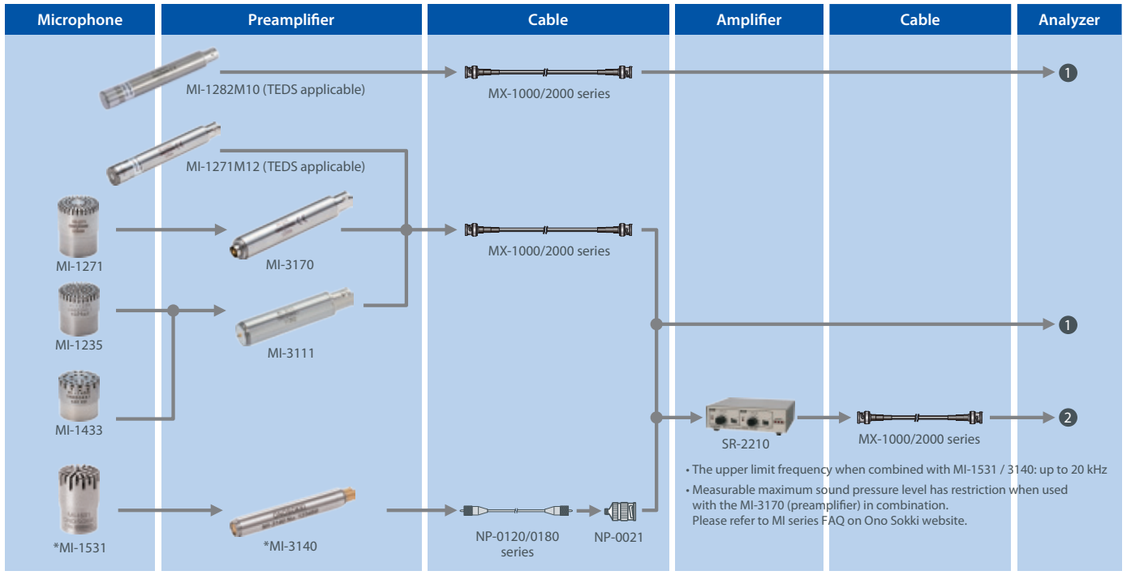
*Reference environmental condition: 23 °C, 50 % RH,101.3 kPa *Cable length conforming to CE marking: up to 20 m
*For the TEDS compatibility of the measuring instruments and amplifiers to be connected, contact the store where you purchased.
*Operation is not warrantied when connected to the SR-2210.

What is TEDS?

It is the general format that contains sensor-specific information built into measurement sensors, and is defined in the IEEE 1451 series. When connecting the sensor to a TEDS applicable measurement device, information such as sensitivity is automatically read.

Measurement Microphone

System Configuration



- The upper limit frequency when combined with MI-1531 / 3140: up to 20 kHz
- Measurable maximum sound pressure level has restriction when used with the MI-3170 (preamplifier) in combination. Please refer to MI series FAQ on Ono Sokki website.

Analyzer
1. Supporting CCLD
2. Voltage input applicable

DS-5000
Data Station

CF-9200A / 9400A
Portable 2ch / 4ch FFT Analyzer

CF-4700A
FFT Comparator

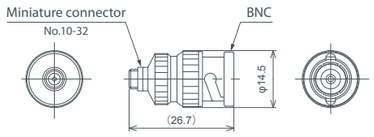
DR-7100
Data Recorder

*For measurements up to 100 kHz, CF-9200A / 9400A and DS-5000 100 kHz unit are recommended. CF-7200, DS-3000 and DS-2000 series 100 kHz unit (discontinued products) also can support.

Signal cable for 1/2 inch microphone

Model name	Length	MI series	Apperance	Operating temperature
MX-1001	1.5 m	• MI-1271M12 • MI-1282M10 • MI-3170 • MI-3111 • MI-0311 • MI-8100	For low/high temperature 	-30 to 80 ˚C
MX-1005	5 m			
MX-1020	20 m			
MX-2001	1.5 m			0 to 60 ˚C
MX-2005	5 m			
MX-2020	20 m			

Signal cable and conversion connector for 1/4-inch microphone

Model name	Length	MI series	Apperance	Operating temperature
NP-0121	1.5 m	• MI-3140	φ6.0 Miniature connector No.10-32 — φ6.0 Miniature connector No.10-32 Cable diameter: φ1.2 mm Type: Low-noise cable	-25 to 105 ˚C
NP-0122	3 m			
NP-0123	5 m			
NP-0124	10 m			
NP-0181	1.5 m	• MI-3140	φ6.5 Miniature connector No.10-32 — φ6.5 Miniature connector No.10-32 Cable diameter: φ2.4 mm Type: Low-noise cable Shape: Hexagon	-40 to 200 ˚C
NP-0182	3 m			
NP-0183	5 m			
NP-0184	10 m			
NP-0021	-	• NP-0121 • NP-0122 • NP-0123 • NP-0124 • NP-0131 • NP-0132 • NP-0133 • NP-0134	Miniature connector No.10-32 — BNC 	-

Sound Calibrator

It is used for unit calibration of measurement microphones and confirmation of indicated value for sound level meter. Since sound pressure is affected by temperature and air pressure, it is important to use a sound calibrator before and after measurement in order to perform correct measurements.
Some standards stipulate that microphones must be calibrated with sound calibrators. In addition, in JIS C 1509 and IEC 61672-1, when using a class 1 sound level meter, using a class 1 sound calibrator is required.

	SC-2600	SC-2500A	SC-2120A
Appearance			
Applicable standard	IEC 60942: 2017 Class 1 ANSI S1 40 2006 (R2011) Class 1 JIS C 1515: 2020 Class 1		IEC 60942: 2003 Class 2 JIS C 1515: 2004 Class 2
Method	Speaker		
Applicable microphone	1/2-inch microphone: MI-1235 / 1271 / 1433 / 1271M12 / 1282M10 1/4-inch microphone: MI-1531*2 High performance Sound Level Meter: LA-7200 / 7500 / 7700 Sound level meter: LA-1411 / 1441A / 4441A Ultraminiature microphone: MB-2200M10*3	1/2-inch microphone: MI-1235 / 1271 / 1281*1 / 1433 / MI-1271M12 1/4-inch microphone: MI-1531*2 High performance Sound Level Meter: LA-7200 / 7500 / 7700 Sound level meter: LA-1411 / 1441A / 4441A	1/2-inch microphone: MI-1235 / 1271 / 1433 / 1271M12 / 1282M10 High performance Sound Level Meter: LA-7200 Sound level meter: LA-1411 / 1441A Ultraminiature microphone: MB-2200M10*3
Sound pressure level	Nominal sound pressure level: 94 dB Deviation of sound pressure level: ±0.20 dB or less*4	Nominal sound pressure level: 114 dB Deviation of sound pressure level: ±0.20 dB or less*4	Nominal sound pressure level: 94 dB Deviation of sound pressure level: ±0.5 dB or less*4
Total distortion	0.5% or less*4		0.5% or less
Frequency	Nominal frequency: 1000 Hz Frequency deviation ±0.1 % or less*4		Nominal frequency: 1000 Hz Frequency deviation ±1 % or less*4
Operating environment	Air temperature: -10 to 50 °C (with no condensation) Static pressure: 65 to 108 kPa Relative humidity: 25 to 90 % (Excluding a combination of air temperature and humidity that exceeds dew-point temperature of 39 °C or higher.)		
Power requirement	Size AA battery (LR6 or HR6) × 2		9 V flat battery (6F22 or 6LR61) × 1
Battery life	10 hours or more continuous operation (when using LR6)		20 hours or more continuous operation (when using 6F22)
Outer dimensions (not including protruded section)	84 (W) × 53 (H) × 76 (D) mm		52 (W) × 45 (H) × 130 (D) mm
Weight	Approx. 220 g (including battery cells)		Approx. 300 g (not including battery cells)
Accessory	Instruction manual × 1, Size AA battery (LR6) × 2 Protection cover for coupler × 1		Instruction manual × 1 9 V flat battery (6F22) × 1

*1: This product is discontinued.
*2: SC-0313 adapter attached to MI-3140 1/4-inch preamplifier is required.
*3: MB-0210 Ultraminiature Microphone Calibration Adapter (Option) is required.
*4: Under reference environment (reference environment condition: air temperature 23 °C, static pressure 101.325 kPa, relative humidity 50 %)

Peripheral Products

2ch Sensor Amplifier SR-2210

Feature

- 2ch input
- Can be connected to CCLD type microphone preamplifier or accelerometer

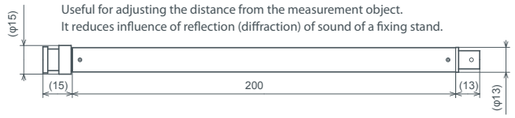
Specification

Constant current voltage	Current: 2.4 mA (±20 %) /applied voltage: approx. 18 V
Operating frequency range	1 Hz to 20 kHz (±0.5 dB) (when output load impedance 100 kΩ or more)
Gain	-10, 0, 10, 20, 30, 40, 50, 60 dB
Frequency weighting	A/C/FLAT(Z) (Conforming standard: IEC 61672-1, JIS C 1509-1)
Output cut-off frequency	approx. 0.2 Hz (load impedance 100 kΩ or more) approx. 0.4 Hz (load impedance 50 kΩ or more)
Input/output connector	C02 (BNC)
Power requirement	4 pieces of size AA battery cell or exclusive AC adapter
Battery life	20 hours or more when used 4 pieces of size AA alkaline battery cell (LR6)
Outer dimensions	140 (W) × 40 (H) × 125 (D) mm (not including protruded section)
Weight	approx.500 g (including battery cells)

*Note: The measurement range of the microphone may be limited depending on the combination of microphone/preamplifier and SR-2210.

Extension rod (for MI-3111/3170) MI-0311

Useful for adjusting the distance from the measurement object.
It reduces influence of reflection (diffraction) of sound of a fixing stand.



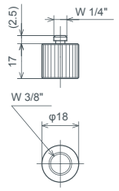
Windscreen φ70 mm

Use with MI-3170 / 3111 / 3310
(MI-3140 not supported)

Microphone holder MI-0301

Standard accessory of the
MI-3111 / 3170
MI-1271M12

Conversion screw (1/ 4" → 3 / 8") MI-0302



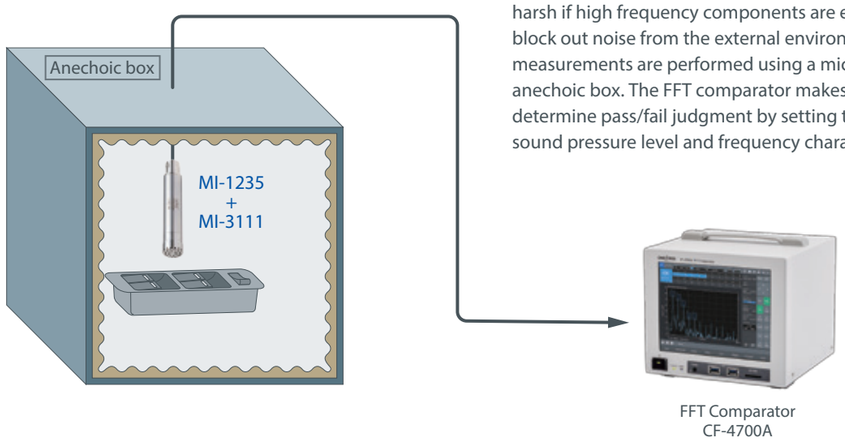
Tripod (Made by SLIK Corporation)

Used for fixing a microphone preamplifier, adjusting height.
Free camera platform type, with a case.

Shortened:	417 mm
Lowest position:	170 mm
Highest position:	1543 mm
Weight:	980 g

Application examples

Pass/fail judgment of power window switches



The sound produced when pressing the switch may seem harsh if high frequency components are emphasized. To block out noise from the external environment, measurements are performed using a microphone in an anechoic box. The FFT comparator makes it possible to determine pass/fail judgment by setting thresholds for both sound pressure level and frequency characteristics.

FFT Comparator
CF-4700A

Evaluation of electric vehicle running noise

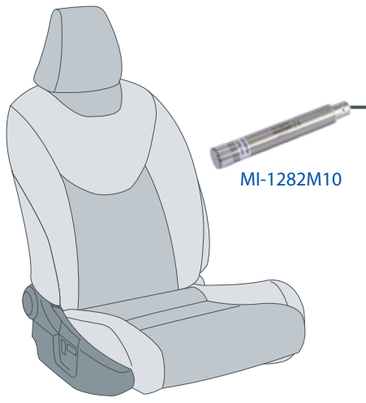
GPS Speedometer
LC-8300A

Electric vehicles use inverters and motors as their power sources. The high-frequency pure tone components emitted by the inverter can be unpleasant inside the vehicle.
A microphone is placed near the passenger's ear position to capture those sounds. At the same time, by performing the tracking analysis that follows changes in vehicle speed, it is possible to understand the correlation between frequencies of problematic sound and vehicle speed.

DS-5000

O-Solution

Evaluation of quietness for power seat motor

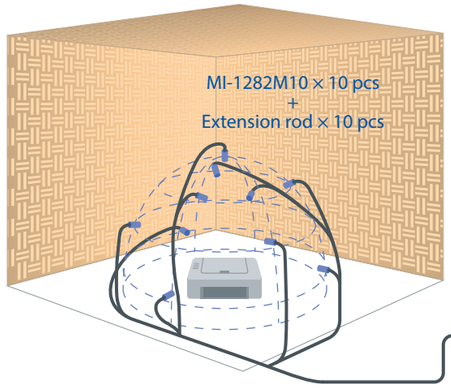


In addition to countermeasures of noise for the electrification of automobiles and wind noise, the quietness of vehicle interior is also being required.
As a result, small sounds that were previously masked become unpleasant, and there is a demand to reduce the sound pressure levels of minute operating sounds generated by various components inside the vehicle.
In order to implement effective countermeasures, it is important to perform frequency analysis and understand the dominant frequencies.

DS-5000

O-Solution

Sound power level measurement for minute sounds generated from printer in standby mode

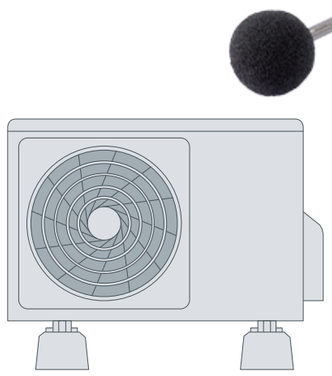


While general sound pressure level changes depending on the distance from a sound source or a test environment, sound power level is the specific values of sound sources and a global indicator that is also used for environmental labels and noise regulations. There is a need to reduce the operating noise from products such as home appliances and information equipment, which are difficult to measure with normal microphones. The low-noise microphone allows to measure an overall value of 20 dB or less. In addition, by using the extension rods, the effects of sound reflection caused by fixed stands, etc. can be reduced.

DS-5000

OS-0541
Sound Power Level Using Sound Pressure

Noise measurement for outdoor unit of air conditioner

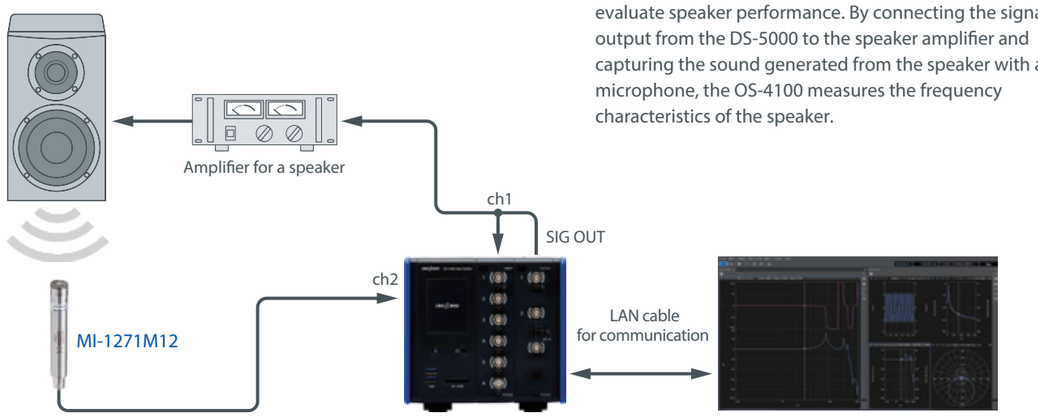


Low frequency noise generated when the outdoor unit is operating travels to neighboring houses, which leads to complaints. In Japan, sound below approximately 100 Hz is called low frequency sound, and it cause discomfort to human and window glass and furniture to vibrate. Therefore, during the development stage, the operating sounds are measured by microphones and the low-frequency sound levels are checked from the results of frequency analysis to confirm if any countermeasures are necessary.

DS-5000

O-Solution

Evaluation of frequency characteristics of speaker



Sound frequency characteristics is one of the factors that evaluate speaker performance. By connecting the signal output from the DS-5000 to the speaker amplifier and capturing the sound generated from the speaker with a microphone, the OS-4100 measures the frequency characteristics of the speaker.

JCSS Calibration Service

Ono Sokki provides reliable and high level calibration results, based on the international reference "General requirements for the competence of testing and calibration laboratories" and the skills and know-how of quality assurance system that has been acquired through many years of practices.
Under the JCSS of calibration laboratory accreditation system, Ono Sokki is assessed and accredited as Accredited Calibration Laboratories to meet the requirements of the Measurement Law, relevant regulations and ISO/IEC.
We support 7 accreditation scopes, which is industry-leading in measurement instruments manufacturers.

*1 JCSS: Japan Calibration Service System
*2 ilac: International Laboratory Accreditation Conference
*3 MRA: Mutual Recognition Arrangements

Accreditation Scope

- Acoustics & Ultrasound
- Acceleration
- Torque
- Fluid flow
- Electricity (Direct Current & Low Frequency)
- Speed
- Time & Frequency & Rotational speed

JCSS 0170

Ono Sokki can issue the calibration certificates with the JCSS accreditation symbol, which assures the traceability to National Measurement Standards as well as a laboratory's technical and operational compentence, and is acceptable in the world through the ilac*2-MRA*3.
(Under the calibration laboratory accreditation system JCSS, Ono Sokki is officially certificated by NITE.)

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