



## MEASUREMENT MICROPHONES

# MI SERIES

A series of condenser microphones, including high-sensitivity microphones and wide-bandwidth microphones for a variety of applications, the MI series exhibits good environmental stability with regard to temperature and humidity.

ONO SOKKI

# Measurement Microphones MI-1211/1233/1431



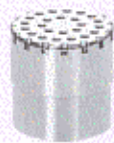
## ● MI-1211

The MI-1211 features a titanium diaphragm that is directly laser-welded to the case using a new technology, thereby achieving wide bandwidth, high sensitivity, and good temperature stability. Because the MI-1211 is a bias-type microphone, it needs electrode forming voltage. It is ideal for measurement of low-level noise.



## ● MI-1233

The MI-1233 uses a titanium diaphragm and not only maintains high stability, but also is designed specially to realize flat frequency response over a wide bandwidth.



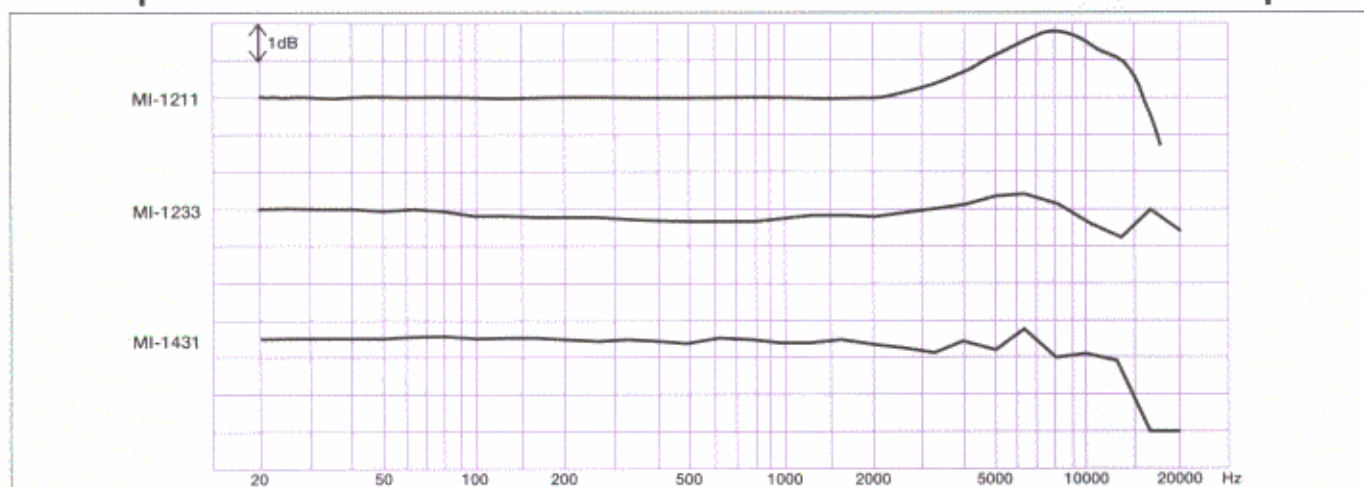
## ● MI-1431

The MI-1431 not only maintains high sensitivity, but also uses a titanium diaphragm and achieves high stability, in spite of its low cost.

## ▼ Specifications

	MI-1211	MI-1233	MI-1431
Frequency range	20 Hz to 14 kHz	20 Hz to 20 kHz	20 Hz to 8 kHz
Response type	Free field type		
Electrode forming voltage	200 V	0 V	
Sensitivity	-20 dB±1.5 dB (0 dB=1 V/Pa)	-29 dB±3 dB (0 dB=1 V/Pa)	-29 dB±3 dB (0 dB=1 V/Pa)
Capacitance	12 pF±1 pF	10 pF±1 pF	
Maximum sound pressure level	132 dB (using the MI-3210)	140 dB (using the MI-3210)	
Intrinsic noise level	12 dB (A) max.	19 dB (A) max.	20 dB (A) max.
Operating temperature range	-10 to +50°C		
Operating humidity range	30 to 90% relative humidity (with no condensation)	0 to 90% relative humidity (with no condensation)	
Temperature characteristics	0.007 dB/°C max.	0.01 dB/°C max.	0.012 dB/°C max.
Humidity characteristics	0.003 dB/% relative humidity max.		0.005 dB/% relative humidity max.
Aging drift	0.1 dB/year max.		0.2 dB/year max.
Storage temperature range	-20 to 80°C	-20 to 60°C	
Storage humidity range	0 to 90% relative humidity (with no condensation)		
Outer dimensions	13.2 mm dia. x 15.2 mm	13.2 mm dia. x 13.5 mm	13.2 mm dia. x 12.9 mm
Mass	5 g		

## ▼ Response to a Free Sound Field Incident From the Front of the Microphone



# Preamplifier MI-3110/3150/3210/3310



## ● MI-3110

The MI-3110 is a low-cost preamplifier for use with a 1/2-inch condenser microphone, featuring constant current operation, with a BNC input, thereby improving its connectability. When disturbing the sound field would be a problem, an optional extension rod can be connected to the MI-3110 to prevent disturbance. (The maximum measurable sound pressure level will be 137 dB when combined with MI-1233 or MI-1431.)



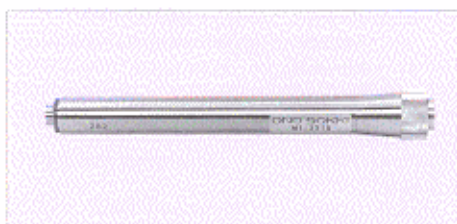
## ● MI-3150

The MI-3150 is a constant-current-line-drive preamplifier designed for use with 1/2-inch electret condenser microphones. The MI-3150 features built-in A weighting circuit to simplify sound measurement; an external dedicated amplifier is not required. The BNC connector ensures economical and simple hookup even if the signal is fed a long distance. An optional extension boom minimizes interference with the sound field.



## ● MI-3210

The MI-3210 is a preamplifier for use with a 1/2-inch condenser microphone, featuring high impedance and a long configuration that does not disturb the sound field being measured. This preamplifier is intended for use in combination with the SR-1100/1210 microphone amplifier, and can be used with both electret and bias-type microphones.



## ● MI-3310

The MI-3310 is a preamplifier for use with a 1/2-inch condenser microphone, enabling use of a bias-type microphone. It can be directly connected to an analyzer (e.g. a DS-9100 Series (acoustic board), CF-5200 Series, and SR-5300 Series), and covers a wide frequency range of 10Hz to 100kHz.

A cable, AG-3301 to 3305 is necessary for connection.

## ▼ Specifications

	MI-3110	MI-3150	MI-3210	MI-3310
Applicable microphones	MI-1233/1431	MI-1233/1431	MI-1211/1233/1431	MI-1211/1233/1431
Frequency bandwidth	20 Hz to 20 kHz	10 Hz to 20 kHz	10 Hz to 100 kHz	10 Hz to 100 kHz
Gain	-3 dB (at 1 kHz)	-6 dB (at 1 kHz)	-1.7 dB (at 18 pF)	-2.4 dB (at 1 kHz)
Input impedance	Approx. 5 GΩ			
Intrinsic noise	15 μVrms max. (flat weighting)	14 μVrms max.	20 μVrms max. (flat weighting)	15 μVrms max. (flat weighting)
Distortion	0.7% max.	1% max. (at 1 kHz, 2Vrms input)	1% max.	0.5% max.
Operating temperature range	-10 to +50°C			
Operating humidity range	30 to 90% RH (with no condensation)		25 to 80% RH (with no condensation)	30 to 90% RH (with no condensation)
Power supply required	15 to 20 V/0.5 to 5mA	15 to 20 V/2 to 10mA	±15 V	±15 V
Cable length	—	—	5 m	—
Outer dimensions	13 mm dia. x 61 mm	12.7 mm dia. x 74 mm	12.7 mm dia. x 173.2 mm	12.7 mm dia. x 129.5 mm
Weight	35 g	42 g	Approx. 450 g	Approx. 60 g
Extension cable	AG-2010 to 2100 (BNC)		Ax-505	AG-3301 to 3305
Accessories	MI-0301 (for tripod mounting)*			

\* The MI-0302 microphone mounting adapter (3/8 in. diameter) is sold separately.

# 2ch Sensor Amplifier SR-2200

Compact, light-weight, battery or AC-powered constant-current sensor amplifier suitable for field measurement  
Two channels provide simultaneous stereophonic measurement of sound and vibration.



## ▼ Outline

The SR2200 amplifier accepts constant-current-line-drive sensors and connects the signal to analyzers and recorders that would not otherwise be compatible with constant-current sensors. The unit connects directly with BNC connectors to our compact MI-3110 and MI-3150 microphone preamplifiers and NP-3000 series of acceleration pickups. The small size, light weight, and battery operation of this amplifier save time and trouble in preparation for measurement. All of these features, and economy, make this amplifier ideal for field measurement application.

## ▼ Features

- Two input channels for simultaneous measurement of either sound pressure level and vibration, or input and output source measurement
- Dual power source: battery or AC adapter (optional)
- Flat-, A- and C-weighting
- Stackable for multiple channels

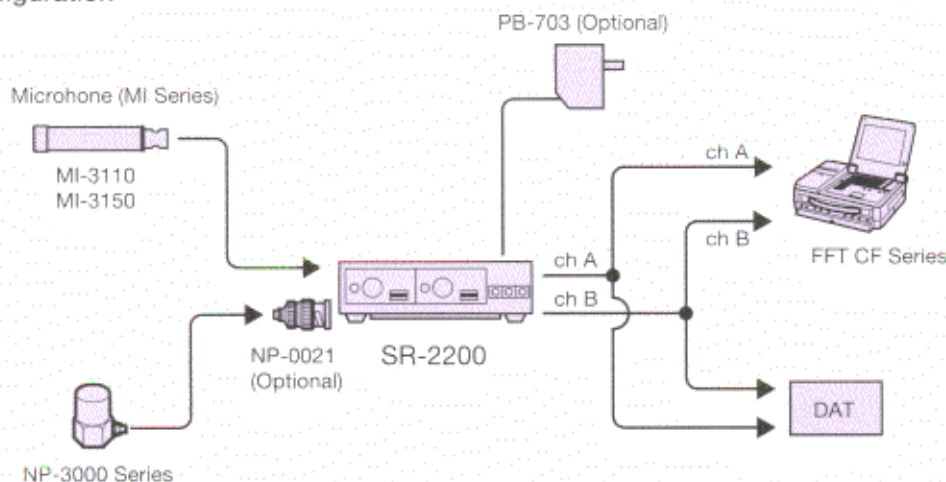
## ▼ Specifications

Input		Input/output connectors	: BNC (C02)
Constant current power supply	: 2.4 mA ( $\pm 20\%$ )/ Applied voltage: Approx. 18 V	Output	
Number of channels	: 2	Output voltage	: 12.6 dBVrms max. ( $\pm 6$ V)
Operating frequency range	: 1 Hz to 20 kHz ( $\pm 0.5$ dB). Load impedance: 100 k $\Omega$ min.	Maximum output cable length	: 30 m
Input impedance	: 1 M $\Omega$ $\pm 0.5\%$ .	General specifications	
Input Cutoff frequency	: Approx. 0.16 Hz	Power	: Battery: Four AA Cells External power supply: PB703 AC adapter (Optional)
Input voltage	: 12.5 dBVrms max. ( $\pm 6$ V)	Continuous operation time with battery	: 20 hrs. min., with four AA (LR04) alkaline cells
Gain	: -10, 0, 10, 20, 30, 40, 50, 60 dB (Selectable in eight 10-dB steps, $\pm 0.2$ dB)	Operating temperature range	: -10°C to +50°C
Frequency weighting	: A/C/FLAT (Conforming standards: IEC651 Type 1, JIS C 1505)	Operating humidity range	: 30% to 90% RH
Output cutoff frequency	: Approx. 0.2 Hz (Load impedance: 100k $\Omega$ min.) Approx. 0.4 Hz (Load impedance: 50 k $\Omega$ min.)	Storage temperature range	: -20°C to +60°C
Input-converted self noise	: -105 dBVrms max. (A), -100 dBVrms max. (C), -95 dBVrms max. (FLAT)	Storage humidity range	: 10% to 90% RH
		External dimensions	: 140 (W) x 40 (H) x 125 (D) mm, not including protruding components
		Weight	: Approx. 500 g (with batteries)
		Accessories	: Instruction manual 1 Battery: 4 AA (LR06) cells

## ▼ Compatible microphone preamplifiers and acceleration pickups

- Preamplifiers: MI-3110 and MI-3150 (Microphones: MI-1431 and MI-1233)
- Acceleration pickups: NP-3000 Series (Optional connector conversion adapter required)

### Example Configuration



# Sound Calibrator SC-3100/2120



The SC-3100 is a pistonphone type precision sound source for use in calibration of measurement microphones. It can accommodate both 1-inch and 1/2-inch microphones.

The SC-2120 is a simplified sound calibrator for use in operational checking of acoustic measurement systems.

## ▼ Features

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|---|---|
| <b>SC-3100</b> <ul style="list-style-type: none"><li>• Can be used with 1-inch and 1/2-inch microphones.</li><li>• Enables calibration to within <math>\pm 0.3</math> dB.</li></ul> | <b>SC-2120</b> <ul style="list-style-type: none"><li>• For use in operational checks.</li><li>• Accommodates 1/2-inch microphones.</li><li>• Long battery life (up to 20 hours of continuous operation)</li></ul> |
|---|---|

## ▼ Specifications

	SC-3100	SC-2120
Conforming specifications	IEC 942 Class 1 (L)	IEC 942 Class 2 (L)
Method	Pistonphone	Dynamic speaker
Applicable microphones	1/2 and 1 inch	1/2 inch
Sound pressure level	124 dB SPL	94 dB SPL
Calibration accuracy	$\pm 0.3$ dB	$\pm 0.5$ dB
Distortion	2.5% max.	0.5% max.
Frequency	250 Hz $\pm 1$ Hz	1000 Hz $\pm 10$ Hz
Operating temperature range	-10 to +50°C	-10 to +50°C
Storage temperature range	-20 to +70°C	-20 to +60°C
Power supply	Three type AA batteries	6F22 (S-006P) 9-V battery or 6LR61
Battery life	2.5 hours of continuous operation (using manganese batteries)	20 hours of continuous operation (using 6F22)
Outer dimensions	60 (W) x 200 (H) x 38 (D) mm	52 (W) x 45 (H) x 130 (D) mm
Mass	Approx. 600 g	Approx. 300 g
Accessories	Adapter for 1-inch microphone Barometer Type AA batteries (3) Case	Battery (6F22)