REFERENCE OF ACOUSTICS & VIBRATION DIVISION

NEW MATCHED PAIRS TRIPLES, QUADS

see page 2



EMX-7150

SEMcon

AT A GLANCE

The EMX-7150 is a ¼" microphone made from stainless steel and using state of the art water tight Neutrik*3 connectors have a very accurate frequency response combined with the capability to measure high sound pressure levels up to 145dBspl.

It is a low impedance measurement microphone that can be operated from 12...52 V Phantom Power which is available on most professional microphone preamplifiers and professional computer interfaces. With its mechanically robust design it is well suited for harsh environment use such as open air sound reinforcement measurements. Its class 1 frequency response (NOTE: NOT A CLASS 1 MICROPHONE)*1 makes it predestined for room acoustics analysis including recording studios and home theaters. It can normally be used without the included freefield calibration data file for compensation. In this case take the individual calibration data as proof of its superb performance.

TYPICAL APPLICATIONS

- ✓ Sound-power and sound-field analysis
- ✓ Industrial Acoustics
- ✓ Room acoustics analysis
- Sound reinforcement
- Real time analyzers

FEATURES

- ✓ Frequency range **10Hz...20kHz**
- ✓ Sensitivity 6mV/Pa typ.
- ✓ Dynamic range ~30... >140dBspl
- ✓ 3% distortion limits >143dBspl typ.
- Calibration chart and calibration data files included on
- ✓ IEC 61672 class 1 frequency response*1
- ✓ Dimensions: acoustic port dia. ¼" (7mm) Microphone body 0.75" (19mm) Overall length 6" (152mm)
- ✓ Weight 0.3oz (75 grams)



VALUE ADD PRODUCT 2013

- Individually compensated
- for linear frequency response
- Temperature drift < 0.015dB/K
- Lower selfnoise
- High noise immunity

All stainless steel body

• Matched pairs, triples, quads

Factory replaceable electronics & capsule

O-Ring seal

Water tight connection when using Neutrik*3 NC-3FX-HD connector

A

*1: Class 1 Freq.Response unter limited conditions (23°C ± 3°C, 1013 mbar ± 30mbar)
*2: approximated by 90deg incidence response
*3 The corporate names and names of the products stated in this brochure are trademarks or registered trademarks of the respective companies.

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ACTUAL SIZE



iSEMcon now offers matching stereo pairs as well as matching triples and quads within a consistent tolerance. While matching microphones, it is crucial to ensure that the frequency response and sensitivity is identical within a specified tolerance. Some of our competitors state that their microphones are matching or sell matching pairs and you are not informed about how those microphones might be different in frequency response and microphone sensitivity.

Not with us!

iSEMcon's matching tolerance

To ensure realistic sound field measurement and multi channel audio experience, each microphone is individually calibrated and selected to meet our standard matching tolerance. The matching tolerance is applicable within the microphone's entire frequency range.

For the EMX-7150 the matching tolerance on frequency response is +/- 0.5dB and 1mV on microphone sensitivity.

Matching microphones are supplied not only with the individual calibration data (print and calibration-file) but also with the matching curve(s) for those bundled microphones.



Single microphone freefield and diffusefield response vs class 1 / 2 tolerance limit supplied with each microphone.

For Matched pairs, triples, quads we also include tolerance data that PROOF for the matching.









Matching Quads – sample sheet:



The matching process (1-4):

- The first stage of testing begins with the selection of microphone capsules. We filter capsules being close in their overall performance (frequency and sensitivity).
- The second stage is the microphone manufacture using those filtered capsules.
- The third stage focuses on final testing of each microphone. This includes the calibration procedure (individual frequency response measurement) as well as sensitivity measurement at 12V, 24V and 48V Phantom power.
- Finally we are selecting one reference microphone (A) and compare the overall frequency responses of its potential partners.

FOH: You measure and optimize the acoustical sound field for the audience together with SPL or better say Leq monitoring..... Why not use one matched pair for stereo recording?

Matching pairs in stereo recording:

Matched sensitivity is important when you want center instruments to be heard from the center between your stereo speakers, rather than shifted slightly left or right of center. A level mismatch also can change the musical balance between orchestral instrumentation. Of course, you can compensate for microphone sensitivity differences with your recorder's level controls or mixer's pan pots but not for frequency response mismatch.

Matched frequency response is important for the sharpest possible imaging. The more closely the stereo microphones are matched in frequency response, the better the image focus and localization. For example: Suppose the left microphone is 3 dB off at 200 Hz relative to the right microphone. For an instrument in the center of the musical ensemble, its reproduced low frequencies will shift toward the left, while mid frequencies will remain in the center . Localization for this instrument will spread or will cause blurring between the real (mid frequency) image and the phantom (low frequency) image.

ORDERING INFORMATION

No	Name	Description
150010	EMX-7150	Bulk version: EMX-7150 Microphone + WS-7XL Windscreen + clamp w/ adapter screw+ Data-CD, Mic in tube, Polybag
800060	EMX-7150-CF1	EMX-7150 microphone + clamp w/ adapter screw + WS-7XL windscreen + 1/4" to IEC 1/2" (13,2mm) calibrator adapter + Calibration data on USB stick - Pouch
800070	EMX-7150-CF2	EMX-7150 microphone + Shockmount w/ adapter screw + WS-7XL windscreen+ 1/4" to IEC 1/2" (13,2mm) calibrator adapter + Calibration data on USB stick - Pouch
800080	EMX-7150-CF/MP	2x EMX-7150 microphone (MATCHED PAIR) + clamp w/ adapter screw + WS-7XL windscreen , 1X 1/4" to IEC 1/2" (13,2mm) calibrator adapter + Calibration data on USB stick - Pouch
800081	EMX-7150-CF/MT	3x EMX-7150 microphone (MATCHED TRIPLE) + clamp w/ adapter screw + WS- 7XL windscreen , 1X 1/4" to IEC 1/2" (13,2mm) calibrator adapter + Calibration data on USB stick - Pouch
800082	EMX-7150-CF/MQ	4x EMX-7150 microphone (MATCHED QUAD) + clamp w/ adapter screw + WS-7XL windscreen , 1X 1/4" to IEC 1/2" (13,2mm) calibrator adapter + Calibration data on USB stick - Pouch

SPECIFICATIONS		Values for 23° Celsius a	and 48V Phantom Power		
PERFORMANCE		ELECTRICAL	ELECTRICAL		
Frequency Response characteristic	Free-Field	Output Impedance	< 200 Ω		
Polarization Voltage	Prepolarized	Phantom Power	1252Vdc		
Nominal Sensitivity @1kHz	6mV/Pa				
Sensitivity temeperature drift	<0.015dB/K	PHYSICAL			
Microphone Polarity	Non-Inverting	Housing Material	Stainless Steel		
Frequency Response calibrated	1020.000 Hz	Sealing	O-ring/Polyurethane/Epoxy		
Frequency Response IEC61672 *1	class 1	Output Connector	XLR male		
Inherent Noise100-10000 Hz	<30dB typ.	Dimensions	Ø ¼"(7mm) x 6"(152mm)		
Inherent Noise 1/3 Oct.	<15dB typ.	Weight	0.3 oz (75g)		
Max. SPL. (3% distortion limit)	> 141dBspl				
Max. SPL. (3% distortion) typ.	=143 dBspl				
Max. SPL. (3% THD) @ 12V Phantom	>140 dBspl	CONFORMITY			
Max. Acoustic Input without clipping	>150dBspl		IEC 61000-6-1;		
			IEC 61010-1		
ENVIRONMENTAL					
Operating Temperature range	-10+55°	SPECIAL FUNCTIONALITY			
Storage Temperature Range	-20+70°	Voltage surge protection	\checkmark		
Operating Humidity Range	090%r.H.	EMC noise filter 🗸			
Axial Vibration Sensitivity	~ 50dB				

THD , ref 1kHz



CALIBRATION DATA FILE FORMAT

Human readable ASCII file: 1/12 octave

www.iSEMcon.com freefield Sensitivity 5.88 mV/Pa @1kHz 10.00 -0.02 11.26 0.10

.....

19992.19 0.93 ^ frequency (Hz) ^amplitude response (dB Coming soon:

Calibration file converter software.

FREQUENCY RESPONSE (Calibration Chart)



POLAR PATTERNS, typical



TEMPERATURE STABILITY

The temperature characteristics of the sensitivity of an electret condenser microphone depends on the electrical characteristics of the microphone capsule built-in impedance converter and signal conversion circuitry as well as the acousto-mechanical characteristics of the diaphragm equivalent stiffness. iSEMcon is one of the first microphone manufacturers disclosing the secret about the temperature behavior of electrets based measurement microphones.

The range for the measurement was set at -20 to 65 C which is more than iSEMcon microphones are normally used at. The most important temperatures are 10 °C up to about 55°C which covers indoor as well as open air use. It will give you a good predictable performance whether it is used in a cold autumn night or if the hot summer sun "burns" microphone body.

		1kHz
	-20°C	6,92
é	0°C	6,83
atur	10°C	6,71
Dera	20°C	6,62
me	35°C	6,60
Ť	45°C	6,57
	55°C	6,50

The right table shows the microphone sensitivity change 1kHz. The diagram on next page shows how temperature affects the frequency response behavior of an EMX-7150 microphone. The microphone capsule itself is the part being responsible for most of the temperaturechange. *(see also: Temperature characteristics of electret condenser microphones Acoust. Sci. & Tech. 27, 4 (2006))*



SUPPLIED ACCESSORIES									
Small windshield	Universal holding clamp								
OPTIONAL ACCESSORIES									
MH-SH19 Shockmount Features Shock absorbent. For use with our EMX-7150 microphone. Use from diameter 1922 mm	SWS-7 windshield Metal grid guard covered from impregn foam. Protects microphone port from spraying Slide on retainer with O-ring prevents fr trickle water	ated g water. rom	MB-230-BOX O-Ring seal Water protection Dust protection Dimensions [mm] 210 x 167 x 90	SOUND CALIBRATOR SC-1 94dBspl and 110dBspl switchable. Standard and custom size adapters. Calibration data included (includes individual pressure chart)					
PP									

*1: Class 1 Frequency Response under limited conditions only (23°C ± 3°C, 1013 mbar ± 30mbar). It does not meet the IEC 61672 over pressure, temp and long term stability.

APPLICATION NOTE:

FREEFIELD vs. DIFFUSEFIELD USE

Only a small percentage of all acoustical measurements are performed in a well defined and/or well controlled environment of an e.g. acoustical laboratory – on the contrary most acoustical measurements are done under not really controlled conditions. Here are some hints on how to use our microphone.

Sound Fields:

Free field:There are no reflecting objects, only the microphone disturbs the sound field.Diffuse field:There are many reflecting surfaces or sound sources so that the sound waves arrive from all directions.Pressure field:This is found in small confined spaces like sound calibrators.

Depending on the nature of the sound field an appropriate microphone, which is optimized for the sound field could be selected. Unfortunately there are many practical situations where the sound field is not really of a well defined type. This application note should give you an idea on how to measure with a free field response microphone.

The free field microphone is the most common in use, chosen on tradition but we should know about the sound field. The following picture shows both the free field and the diffuse field response of a free field microphone.



The diffuse field response is not easy to measure, because it is not easy to generate a truly diffuse sound field over a wide frequency range but there is a known procedure to estimate the diffuse frequency behavior of a free field microphone.

From literature we know, that a microphone's random (diffuse) incidence response can be approximated by measuring the 90 deg incidence response relative to a single sound source.

While it is an approximation only iSEMcon has measured the 90deg response of many EMX-7150 microphones and used the averaged data to generate a 19th order polynomial. This is now used to approximate the "diffuse field" response from the microphones free field response data.





Typical freefield measurement:

Speaker measurement. The microphone should target to the sound source (speaker)

Typical diffusefield measurements:

Concert SPL monitoring (normally at FOH), Room Acoustics measurement (RT60): the microphone should not target to the sound source. Let it target to the ceiling. This is the most practical way.

Picture left shows EMX-7150 microphone together with shockmount and floor-stand.



The EMX-7150 should not be plugged or unplugged into a mixer console or PA system unless the input channel is muted. If the system does not have a muting option the volume should be turned off. This avoids loud popping noise that can cause damage in speakers and/or affect your hearing.