Microphones & Accessories A4

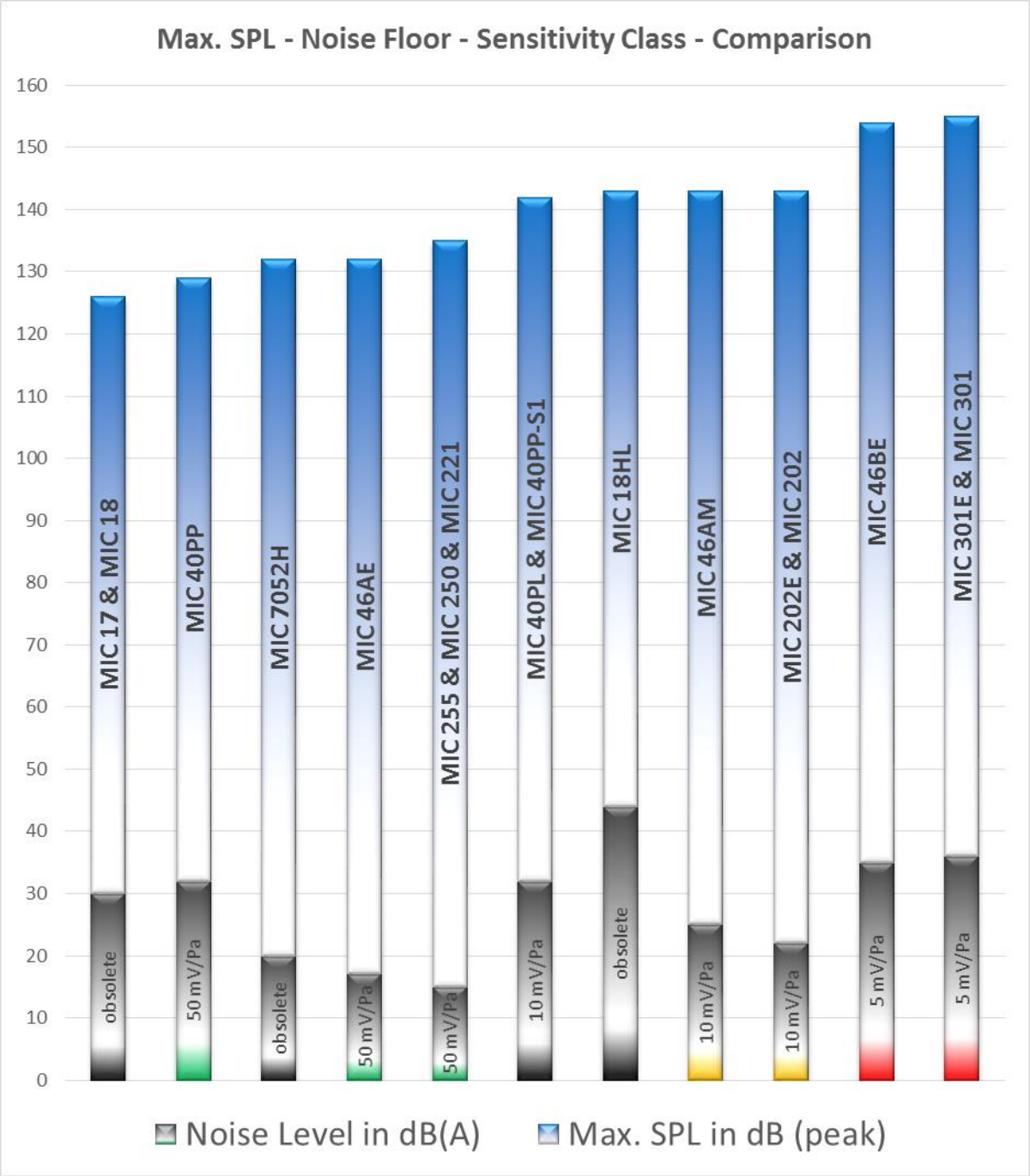
Accessories of the KLIPPEL ANALYZER SYSTEM (Document Revision1.17)

FEATURES

- Microphones optimal for research, development and manufacturing of transducers
- Condenser and electret microphones
- High performance/cost ratio
- Complete sets
  (cartridge, preamp, power supply if required)
- Customized solutions according to your needs

The KLIPPEL ANALYZER SYSTEM provide a spectrum of microphones, which are ideal for transducer measurements in research, development and manufacturing. There are different solutions for applications where special constraints such as excellent performance, special climate conditions or minimal cost are considered. These sets comprise all components (cartridge, preamplifier, power supply, cables) which are required for the operation with the KLIPPEL analyzers (DA, PA or KA3).

CONTENTS:



Listed free field mics are tested and suggested mics for typical Klippel measurement applications.

All mics have IEPE current supply or 48V Phantom powered preamplifiers for direct access to the Klippel measurement devices. Condenser mics for dedicated 200V supply units are on request.

Pressure mics, special accessories, like head- and torso simulators are on request.
Klippel application engineers will suggest the right equipment for your measurement application.
Klippel is a registered sales partner of the wide range of acoustical measurement equipment from MTG (Microtech Gefell - Germany) and G.R.A.S. (Denmark).

1 High Sensitivity – Free Field – Measurement Microphones

50mV/Pa class	**Mic 255 IEPE ½" Set**	Mic 46AE IEPE ½" Set	Mic 40PP IEPE ¼" Set	Mic 255 48V ½" Set	Mic 255.S 48V ½" Set	Mic 221 48V ½" Set
Nominal sensitivity in mV/Pa	50					
Allowed sensitivity deviation in dB	**± 1.5**	± 2	± 2	± 1.5	± 1.5	± 1.5
Cartridge diameter	½"		¼"	½"		
Preamp end diameter	½"				21mm	
Preamp supply type	IEPE			48V Phantom Power		
Connector type	BNC			XLR		
Polarization type	pre-polarized Electret cartridge					200V
Max. SPL before clipping in dB @ DA / PA (with 0 dB preamp) (*1)	**135**	132	129	135		
@ PA (with +10 dB preamp) (*2)	125			Production Analyzer has no 48V Phantom Power inputs		
Noise level (*3) in dB(A)	**15**	17	32	15		
Frequency range ± 1 dB in Hz		5 – 10k	20 – 10k			
Frequency range ± 2 dB in Hz	**3.5 – 20k**	3.15 – 20k	10 – 20k	3.5 – 20k		
Cartridge type	**MK255**	40AE	complete mic	MK255		MK221
Preamplifier type	**MV210**	26CA		MV220	MV220.S	MV225
Polarity (*4)	0°			180°		0°
Integrated TEDS memory	✓	✓	✓			
Set includes:						
Mic including Preamp	✓					
Mic clamp	MK10 ½"				K&M 85035 17-22 mm	
Cable	2m BNC			2m XLR (fixed mounted)	2m XLR	
Sensitivity chart	✓					
Storage case	✓					
Recommended for	RnD & QC		QC	RnD		
Typically in stock	✓		✓		✓	
Article Number	**2400-009**	2400-314	2400-312	2400-311	2400-313	2400-011

1.1 High Sensitivity - Free Field - Measurement Microphones

	Microphone type	Recommended application
	**Mic 255 IEPE ½"**	**Standard RnD & QC mic best cost-value ratio**
	Mic 46AE IEPE ½"	G.R.A.S. alternative to MTG MIC 255 IEPE ½" with very similar specification
	Mic 40PP IEPE ¼"	Cost effective QC alternative (higher noise floor than 1/2" pendants) QC: Production Noise test
	Mic 255 48V ½"	For long cable runs 48V Phantom Power is recommended (Klippel RnD System only)
	Mic 221 48V ½"	Condenser mic with 200V polarization, 48V phantom power supply for long cable runs (RnD only), no external 200V supply needed

2 Higher SPL- Wider Bandwidth - Free Field - Measurement Microphones

Choose one of these mics only if max. SPL or bandwidth of the 50 mV/Pa mics is not sufficient!

10mV/Pa class	Mic 202E IEPE ½" Set	Mic 46AM IEPE ½" Set	Mic 40PP-S1 IEPE ¼" Set	Mic 40PL IEPE ¼" Set	Mic 202E.S 48V ½" Set	Mic 202 48V ½" Set
Nominal Sensitivity in mV/Pa	14	14.5	10		14	
Allowed sensitivity deviation in dB	± 1.5	± 2	± 3		± 1.5	
Cartridge diameter	½"		¼"		½"	
Preamp end diameter	½"		¼"		21mm	
Preamp supply type	IEPE				48V Phantom Power	
Connector type	BNC			SMB	XLR	
Polarization type	prepolarized Electret cartridge					200V
Max. SPL before clipping in dB @ DA / PA (with 0 dB preamp) (*1)	143		142		143	
@ PA (with +10 dB preamp) (*2)	135.5	136.5	138.5		Production Analyzer has no 48V Phantom Power inputs	
Noise level (*3) in dB(A)	22	25	32		22	
Frequency range ± 1 dB in Hz		5 – 16k	50 – 5k			
Frequency range ± 1.5 dB in Hz	10 – 35k				10 – 35k	
Frequency range ± 2 dB in Hz			50 – 20k			
Frequency range ± 3 dB in Hz	10 – 40k	3.15 – 40k	10 – 20k		10 – 40k	
Cartridge type	MK202E	40AM	complete mic		MK202E	MK202
Preamplifier type	MV210	26CA			MV220.S	MV225
Polarity (*4)	0°				180°	0°
Integrated TEDS memory	✓					
Set includes:						
Mic including Preamp	✓					
Mic clamp	MK10 ½"			MH37 ¼"	K&M 85035 17-22 mm	
Cable	2m BNC			2m SMB to BNC	2m XLR	
Sensitivity chart	✓					
Storage case	✓					
Recommended for	RnD & QC		QC		RnD	
Typically in stock			✓			
Article Number	2400-006	2400-317	2400-007	2400-005	2400-321	2400-322

2.1 Higher SPL- Wider Bandwidth - Free Field - Measurement Microphones

	Microphone type	Recommended application
	Mic 202E IEPE ½"	Standard RnD & QC higher SPL and wider bandwidth mic!
	Mic 46AM IEPE ½"	G.R.A.S. alternative to MTG MIC 202E IEPE ½" with very similar specification
 **Mic 40PP-S1 IEPE ¼"**	 Mic 40PL IEPE ¼"	cost effective QC alternative (higher noise floor than 1/2" pendants) QC higher SPL test mic Mic 40PP-S1 IEPE ¼" = BNC connector Mic 40PL IEPE ¼" = SMB connector
	Mic 202E.S 48V ½"	for long cable runs 48V Phantom Power is recommended (RnD only)
	Mic 202 48V ½"	Condenser mic with 200V polarization, 48V phantom power supply for long cable runs (RnD only), no external 200V supply needed

3 Max. SPL- Widest Bandwidth - Free Field - Measurement Microphones

Choose one of these mics only if max. SPL or bandwidth of the 10 mV/Pa mics is not sufficient!

5mV/Pa class	Mic 301E IEPE ¼" Set	Mic 46BE-S5 IEPE ¼" Set	Mic 301E 48V ¼" Set	Mic 301E.S 48V ¼" Set	Mic 301 48V ¼" Set
Nominal Sensitivity in mV/Pa	5	4	5		
Allowed sensitivity deviation in dB	± 1.5	± 3	± 1.5		
Cartridge diameter	¼"				
Preamp end diameter	¼"		½"	21 mm	
Preamp supply type	IEPE		48V Phantom Power		
Connector type	Microdot	SMB	XLR		
Polarization type	prepolarized Electret cartridge				200V
Max. SPL before clipping in dB @ DA / PA (with 0 dB preamp) (*1)	155	154	155		
@ PA (with +10 dB preamp) (*2)	144.5	146.5	Production Analyzer has no 48V Phantom Power inputs		
Noise level (*3) in dB(A)	36	35	36		35
Frequency range ± 1 dB in Hz		10 – 40k			
Frequency range ± 3 dB in Hz	5 – 100k	4 – 100k	5 – 100K		
Cartridge type	MK301E	40BE	MK301E	MK301E	MK301
Cartridge to preamp adapter			A67		
Preamplifier type	MV310	26CC	MV220	MV220.S	MV225
Polarity (*4)	0°		180°		0°
Integrated TEDS memory	✓				
Set includes:					
Mic including Preamp	✓				
Mic clamp	MH37 ¼"		MK10 ½"	K&M 85035 17-22 mm	
Cable	3m Microdot to BNC	2m SMB to BNC	2m XLR (fixed mounted)	2m XLR	
Sensitivity chart	✓				
Storage case	✓				
Recommended for	RnD & QC		RnD		
Typically in stock	✓				
Article Number	2400-310	2400-300	2400-323	2400-324	2400-325

3.1 Max. SPL- Widest Bandwidth - Free Field - Measurement Microphones

	Microphone type	Recommended application
	Mic 301E IEPE ¼"	Standard RnD & QC max SPL and widest bandwidth mic
	Mic 46BE-S5 IEPE ¼"	G.R.A.S. alternative to MTG MIC 301E IEPE1/4" with very similar specification
	Mic 301E 48V ¼"	For long cable runs 48V Phantom Power is recommended (RnD only)
	Mic 301E.S 48V ¼"	
	Mic 301 48V ¼"	Condenser mic with 200V polarization, 48V phantom power supply for long cable runs (RnD only), no external 200V supply needed

4 Obsolete - Free Field - Measurement Microphones

	Mic 250 IEPE ½" Set	Mic 17 IEPE ¼" Set & Mic 18 IEPE ¼" Set	Mic 7052H IEPE ½" Set	Mic 17-HL IEPE ¼" Set	Mic 18-HL IEPE ¼" Set
Sensitivity in mV/Pa	50		22	10	
Cartridge diameter	½"	¼"	½"	½"	
Preamp end diameter	½"		¼"	½"	
Preamp supply type	IEPE				
Connector type	BNC				
Polarization type	prepolarized electret cartridge				
Max. SPL before clipping in dB @ DA / PA (with 0 dB preamp) (*1)	132	126	132	138	143
@ PA (with +10 dB preamp) (*2)	125	125	130	138	140
Noise level (*3) in dB(A)	15	30	20	44	
Frequency range ± 1.5 dB in Hz		30 – 20k		30 – 20k	
Frequency range ± 2 dB in Hz	3.5 – 20k		3 – 20k		
Cartridge type	MK250	complete mic	7052H	complete mic	
Preamplifier type	MV210		4212		
Polarity (*4)	0°			180°	0°
Integrated TEDS memory	✓				
Set includes	mic incl. preamp, clamp, 2m BNC cable, sensitivity chart, storage case				
Recommended for	RnD & QC	QC	RnD & QC	QC	
Article Number	2400-002				

4.1 Obsolete - Free Field - Measurement Microphones

	Microphone type	Notes
	Mic 250 IEPE ½"	Mic 250 IEPE ½" replaced by Mic 255 IEPE ½": same spec, different capsule material, better price Mic 250 IEPE ½" is still available on request.
	Mic 17 IEPE ¼" & Mic 18 IEPE ¼" & Mic 17-HL IEPE ¼" & Mic 18-HL IEPE ¼"	Cost effective ¼" measurement mics: Mic 17 & Mic 18 IEPE ¼" replaced by Mic 40PP ¼" IEPE with better specification on a comparable price Mic 17-HL & Mic 18-HL IEPE ¼" replaced by Mic 40PL ¼" IEPE with better specification on a comparable price
	Mic 7052H IEPE ½"	Mic 7052H IEPE ½" replaced by Mic 255 IEPE ½" with better specification on a comparable price

5 Hints for Microphone Selection

- Mics with larger cartridge diameters typically have lower noise level.
- Mics with smaller cartridge diameter typically have wider bandwidth but increased noise level.
- For measurement applications choose the mic with the highest available sensitivity, which fulfills the given max. SPL and bandwidth requirements.
- For sensitive Rub & Buzz testing and high-level SPL testing maybe separate mics are beneficial. This could be a combination of a high sensitive, low noise 50mV/pa mic with a higher SPL, 10 or 5 mV/Pa mic.
- QC applications: for ambient noise detection the noise microphone should have equal or lower noise floor than the measurement microphone, if test is operated in free field.
- QC applications: max. SPL depends on used preamplifier in hardware unit. Production Analyzer units have 10 dB input preamplifier by default. This can be changed to 0 dB on request.
- Phantom powered mics are the better choice for long cable runs. See last chapter.
- (*1) Peak value considering the maximum positive deviation of the sensitivity. Depending on the specific sensitivity the value could be higher.
- (*2) Peak value considering the maximum positive deviation of the sensitivity. Depending on the specific sensitivity the value could be higher. If values are lower than max. SPL level @ DA (Distortion Analyzer) they are determined by default PA (Production Analyzer) input gain stage of +10dB.
  Note that the PA input gain stage can easily be changed to 0 dB. In this case the max SPL values are identical to the max. SPL level @ DA in the line above.
- (*3) Noise level in dB(A) specified by manufacture with related preamplifier.
- (*4) Polarity of cartridge and preamp combination: (+) sound pressure = (+) voltage = 0°

6 Microphone IEPE Power Supply

Article Number: 2400-052

The IEPE power supply G.R.A.S. 12AL is required for operation with older Distortion Analyzer units (version 1.x), which do not have built in IEPE power supply. For connectivity to the DA Line input a BNC output cable and BNC to XLR adapter is included.

GRAS 12AL

- Recommended for RnD System
- 1-Channel
- BNC Input and Output
- Switchable A-weighting network
- Battery or externally powered
- Battery status LED
- Overload indicator LED

Including:

- AC main power supply
- 1 m BNC-BNC cable
- BNC to XLR male adapter

IEPE Voltage / Current	+28 V / 4 mA
Input Impedance	> 100 kΩ
Output Impedance without A-weighting	as source in serial with 22 µF
Output Impedance with A-weighting	100 Ω in serial with 22 µF
Frequency range (-3 dB) @ 10 kΩ signal output	0,7 Hz - 200 kHz
A-weighting network according	IEC 60651 Type 0
Signal Gain	0 dB
DC supply voltage / current	3 - 6 V / 50 – 120 mA
AC main power supply	100 ...240 V
In- / Output Connectors	BNC
Dimensions (W x H x D) / weight	66 x 28 x 91 mm / 110 g (160g with battery)
Case	Aluminum cabinet
Temperature (operation)	-10 ... +50 °C

Article Number: 2400-301

The IEPE power supply IV11-S may be used to connect IEPE microphones to the line inputs of the QC Production Analyzer hardware. With its switchable 0 and +10 dB gain it offers the same features as Production Analyzer's BNC inputs with included IEPE supply.
For connectivity to the Production Analyzer's Line input, a BNC output cable and BNC to XLR adapter is included.

IV 11-S	• Recommended for Production Analyzer • 1-Channel • BNC In and Out • Switchable gain stage • Mini USB power socket • Overload indicator LED Including: • AC main power supply • 1 m BNC-BNC cable • BNC to XLR male adapter	
	IEPE Voltage	+24 V / 4 mA
	Input Impedance	1 MΩ
	Output Impedance	50 Ω
	Frequency range (-3 dB)	0,2 Hz - 100 kHz
	Signal Gain	0 or 10 dB
	DC supply	5 V
	AC main power supply	100 ...240 V
	In- / Output Connectors	BNC
	Dimensions (W x H x D)	100 x 55 x 24 mm
	Case	Aluminum cabinet
	Temperature (operation)	-10 ... +50 °C
	Temperature (storage)	-25 ... +70 °C

IEPE supply units with more channels are on request.

7 Microphone Calibrator

(Sound Pressure Calibrator)

Article Number: 2400-020

FEATURES	• Provides easy and fast calibration of microphones • Compatible to 1", ½" and ¼" microphones • Portable (9V block battery operated)	
COMPONENTS	• Adapter for ½" and ¼" microphones • Compatible with all capsules provided by Klippel	
4000 CL.1	**Sound Pressure Calibrator** • Supported by Klippel QC and R&D software • Standardized 1 kHz @ 114 dB level • Automatic switch off to save battery life • Low weight • Automatic low battery detection	
	Sound pressure level (re: 20 µPa)	114.0 ± 0.2 dB
	Frequency	1000 Hz ± 0.2 %
	Distortion	< 1 %
	Sensitivity to change in the load volume	+ 0.0003 dB/mm³
	Typical change in SPL per year	< 0.02 dB
	Time for level to stabilize	< 2 sec.
	Microphone cartridge size	1", 1/2", 1/4"
	Controls	Power-on push button Automatic shut-off when the mic is removed
	Indication	green power LED
	Temperature range	- 10 °C to + 50 °C
	Ambient pressure range	65 - 108 kPa
	Humidity range	10 / 90 %RH
	Battery type	9 V 6LR61
	Battery live-time	> 30 hours
	External supply voltage (via battery connector)	7.5 - 15 V_{DC} Automatic shout-off when VBATT < 7.5 V_{DC}
	CE classification, EMC	EN 50081-1, EN 50082-1
	Safety	EN 61010-1, 1993 portable equipment pollution category 2
	Size	L: 109.5 mm; Ø: 40 mm
	Weight	185 g with battery

8 ½” Mic Clamp

		Article Number: 2400-206
The clamp can be used to mount any ½” microphone to a microphone or laser stand.		
MK10	• ½” clamping width • swivel range by additional ball joint • 1/4” thread • Included in: Mic 255 IEPE & 255 48V ½” Set, Mic 46AM IEPE ½“ Set, Mic 40PP IEPE ¼“ Set Mic 202E IEPE ½” Set Mic 46AM IEPE ½“ Set Mic 301E 48V ¼” Set	

9 ½” Swivel Adaptor

		Article Number: 2400-204
The clamp can be used to mount any ½” microphone to a microphone or laser stand.		
MH64	• ½” clamping width • > 180° swivel range • 3/8” thread • Locking screw • Included in the Mic 250 IEPE ½” Set	

10 17 – 22 mm Swivel Adaptor

		Article Number: 2400-211
The clamp can be used to mount phantom powered microphone to a microphone or laser stand.		
K&M 85035	• 17 – 22 mm clamping width • > 90° swivel range • 5/8” thread & 3/8” with included adapter • Locking screw • Included in: Mic 255.S 48V ½” Set, Mic 221 48V ½” Set, Mic 202 & 202E.S 48V ½” Set, Mic 301 & 301E.S 48V ¼” Set	

11 ¼” Swivel Adaptor

		Article Number: 2400-208
The clamp can be used to mount any ¼” microphone to a microphone or laser stand.		
MH37	• ¼” clamping width • > 180° swivel range • 3/8” thread • Locking screw • Included in: Mic 40PL IEPE ¼“ Set Mic 301E IEPE ¼” Set, Mic 46BE-S5 IEPE ¼” Set	

12 Wind Screens & Protectors

Foam pieces to reduce wind noise and to protect mic capsules and complete mics from damages.

• Round ¼” foam wind screen • Ø = 30 mm	• Cylindrical ½” foam protector • Whole mic covered • Ø = 35 mm x 160 mm	• Round ½” foam wind screen • Ø = 80 mm
Article Number: 2400-207	Article Number: 2400-008	Article Number: 2400-209

13 SMB to BNC Adapter

Article Number: 2400-212

Connect SMB mics with standard BNC cables. Adapter or BNC plug could be clamped with MK10 mic clamp.

14 3/8” Gooseneck

Article Number: 2400-217

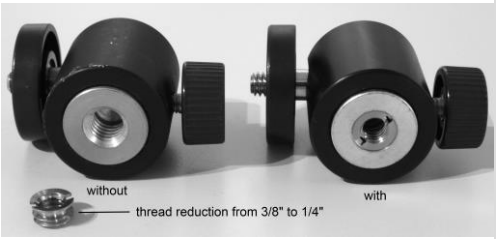
- Flexible but solid 20 cm Gooseneck with 3/8” thread on both ends
- For mounting mics at the Klippel Microspeaker Clamping or Scanning Vibrometer Turn Table
- Included in Klippel Micro-speaker Clamping platform

15 Swivel Head / Ball Joint

Article Number: 2400-216

For unrestricted but solidly fixed microphone positioning.
Can be used to mount any microphone to a microphone or laser stand and combined with any mic clamp.

- Unrestricted movable head
- Solid clamping
- Mic connection: ¼” thread
  (or 3/8” with included adapter)
- Stand connection: 3/8” thread
  (or ¼” with included adapter)
- Included in:
  Klippel Pro Stand
  Klippel Microspeaker Clamping



16 Estimated Max. Cable Length for IEPE Power Supply

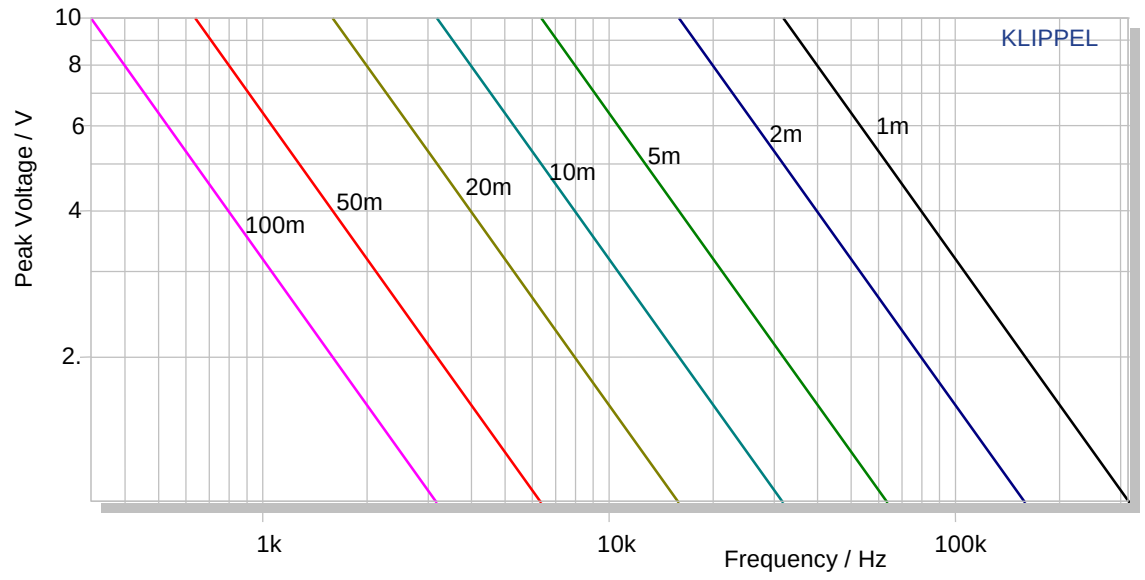
CONDITIONS

The chart below is an estimation of maximal applicable cable length for IEPE powered microphones with the following assumptions:

- BNC cable: capacity per length: C' = 100pF / 1m
- Current to drive cable capacitance: I = 1mA.
  This current is the excessive current, which is not used to power the microphone preamplifier, so the IEPE current (default is 3mA in Klippel hardware) is actually split into mic pre-amplifier power supply and cable driving.
- Y-axis: peak voltage of output signal. This can be calculated for a particular microphone and given peak SPL level using the formula:

$$U_{\text{peak}}[V] = \frac{S_{\text{Mic}}[\text{mV/Pa}]*10^{\left(\frac{SPL_{\text{peak}}-94.02dB}{20}\right)}}{1000}$$

  Note that the microphone sensitivity must be specified in [mV/Pa].
- X-axis: maximal frequency of recorded microphone signal
- Typical symptoms for exceeded cable length are high frequency signal attenuation and signal distortion.



Find explanations for symbols at:

http://www.klippel.de/know-how/literature.html

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