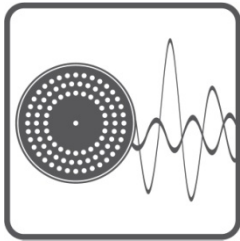


MICROTECH GEFELL

microphones & acoustic systems - founded 1928 by Georg Neumann



Test & Measurement

Product Overview 2016

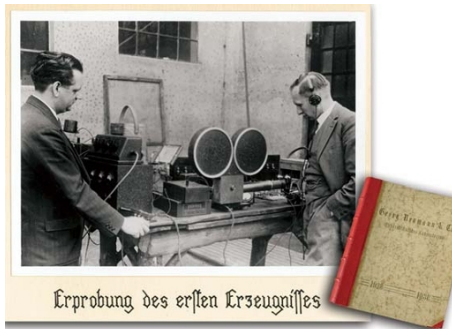
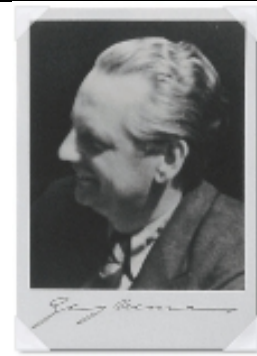
The Tradition

so far - so good

1928 Georg Neumann and Erich Rickmann establish the limited partnership Georg Neumann & Co.

The idea behind this new company is to manufacture microphones following the capacitive transducer concept.

An aim they manage to achieve for the first time in serial production with the condenser microphone CMV 3.



1933 participation at the “Große Deutsche Funkausstellung” leads to a massive rise of sales within Germany and also of exports. During this time, distributors are set up in England, France, the USA and India.

1936 the Olympic Games in Berlin provides the first live test for the classic M 7 electrode in a valve (vacuum tube) set-up as developed by Georg Neumann. It is still manufactured to this day. The so-called “Neumann bottle” can already be equipped with different capsules in order to change patterns. The path that the company has chosen since its founding proves to be the right one. Extensive practical experience leads to a continuous improvement of products.

1943 during the Second World War, the principal factory on Michaelkirchstraße in Berlin undergoes damage both by fire and bombs. To avoid further damage, the entire company, including design and manufacture, are transferred to Gefell in Thuringia.

1945/46 Germany is divided into four sectors after the surrender. Thuringia, initially occupied by the Americans, is exchanged for a part of Berlin (Potsdam Treaty) and handed over to the Soviet Union, which changes the situation in Gefell completely

1947 employees returning from Gefell establish a small workshop in Berlin (West), mainly for the repair of microphones. This workshop becomes Georg Neumann GmbH, the second Neumann company, now owned by Sennheiser.



1950 New condenser measurement microphones are developed and become part of the serial production.

1956 the centralist regime of the GDR forces private companies to accept state co-ownership. Like thousands of other companies, Georg Neumann & Co. becomes a so-called BSB (“Betrieb mit staatlicher Beteiligung” – company under state participation).



During the **1950s**, radio stations in Berlin are rebuilt and production in Gefell continues, both of the known microphone types and of new ones: Valve (vacuum tube) microphone preamplifier CMV 563 With the microphone capsules: M 55 (omni), M 7 (cardioid), M 8 (figure eight) and M 9 (omni) as well as M 7 S, M 8 S and M 9 S with short necks. Also the valve (vacuum tube) condenser microphone UM 57 with switchable patterns, omni-cardioid-figure eight.

1961 the building of the Berlin Wall sets a seal on the division of the city. The socialist GDR also cuts off all communication that has existed up to this point between Georg Neumann & Co. in Gefell and Georg Neumann GmbH in Berlin.

During the three decades from the **1960s** to the **1980s**, production in the studio sector is mainly carried out according to the demands of radio applications. In close co-operation with “Rundfunk und Fernsehtechnisches Zentralamt RFZ” (central radio and television council) the following microphones are developed and produced until 1989: ZUM 64, M582, MV690, MV691, MV692, PM750 and PM860.

1972 the limited partnership Georg Neumann & Co. in Gefell is expropriated and renamed VEB Mikrofontechnik Gefell. Further use of the Neumann trademark is prohibited by the GDR. Instead, products are now marked with the brand RFT.



1989 the Berlin Wall comes down. The Treuhandanstalt takes charge of the company in Gefell with the aim of re-privatising it. The expropriated limited partnership Georg Neumann & Co. files for the restitution of its company.

1993 the company Microtech Gefell GmbH is returned to the limited partnership Georg Neumann & Co. – now Georg Neumann KG. After more than twenty years of state imposed ownership the company now produces under the new registered trademark.



The Business

microphones & acoustic systems



Microtech Gefell designs, manufactures and supplies microphones and acoustic systems. A customer-oriented approach is practiced to achieve the optimal usability of our products in their daily use. The products themselves should be regarded as special tools having particular properties appropriate for their intended applications, and perform at the highest quality level. Every single product is assembled entirely by hand by our specialists, then tested and calibrated. The experience amassed is applied to ensure that product quality is maintained or bettered. A complete company approach results in the acoustics, electronic and mechanical development, design, product management, production, marketing and sales, as well as technical service and support; all coming together under one roof in Gefell. Even the complete manufacturing process is, as far as possible, carried out in-house, and ranges from fabricating the membranes, the microphone capsules and the electronic circuitry right through to the housings and virtually every mechanical part. A dedicated team at our headquarters in Gefell takes care of sales and customer support and a global network of distribution and sales partners provide their customers with the best possible connection to our company. Microtech Gefell products have earned a worldwide reputation amongst professional users as precise and reliable tools in fields spanning from acoustic measurement, recording studios and radio and television, to mobile sound reinforcement and field installations in parliaments and conference venues.

The Support

before - during - after



A product possessing the highest level of quality is not always sufficient in itself to ensure an optimum outcome in every situation. The function of a microphone in a proposed acoustic environment must often be considered in conjunction with the electrical and mechanical parameters pertaining, as well as the layout and operation of complex installations. To achieve this, and to guarantee the best benefits possible to the user, Microtech Gefell provides not only a comprehensive range of accessories, but also extensive pre-sales technical assistance and excellent after-sales support. This includes customer and application-specific custom designed products, expert technical guidance, planning for test facilities, measurement installations and audio systems, design of room acoustics for studio and presentation theatres, as well as measurement and calibration services at the location. Tools used for these services also include computer room simulations, for example, to ensure optimum relationships between microphones and loudspeakers in relation to the relevant sound sources and listeners. The service department at Microtech Gefell is constantly on hand should a fault occur, or servicing or calibration is required. All the company's microphones, including older models, will be repaired or restored using original parts. Older power supply versions can be modified to 48V phantom powering, and previous connector types can be replaced with the modern XLR types if desired. All this guarantees the user that, besides owning a top quality product, their valued investment is safeguarded.

Application engineering



Answering the demands of the modern market, our service spectrum also includes application engineering, consultation services and the development & construction of special devices in the scientific-technical field.

Here our extensive experience comes into play, which we have gained with the construction of test benches for vehicles on the one hand and in the recording studio and sound system installation on the other hand. Our team of engineers will solve your device-specific or room-acoustic problems.

As a mechanical-electronic manufacturing company of high flexibility we are also able – in addition to planning – to build complex systems and produce their individual components.

We can offer you a consultation appointment for your special project free of charge on request.

Please contact us if you are interested in co-operation.

Production on demand



For many years Microtech Gefell has produced mechanical and electro-technical electronic components for very different partners from various branches of industry. Our technologies in small serial microphone production allow unique solutions in the mechanical production of the highest precision and of the surface finishing.

You may say we have gained our manufacturing experiences “at the limits of physics”. So we are able to produce milling and rotary parts in series with units of measurement in the one-digit micrometre range. Our speciality is the production of polymer and metallic membranes in these dimensions. In the same way we can produce the finest nickel surfaces in the colours: ‘satin nickel’ and ‘dark bronze’.

If you are interested in co-operation in this field, please contact us.

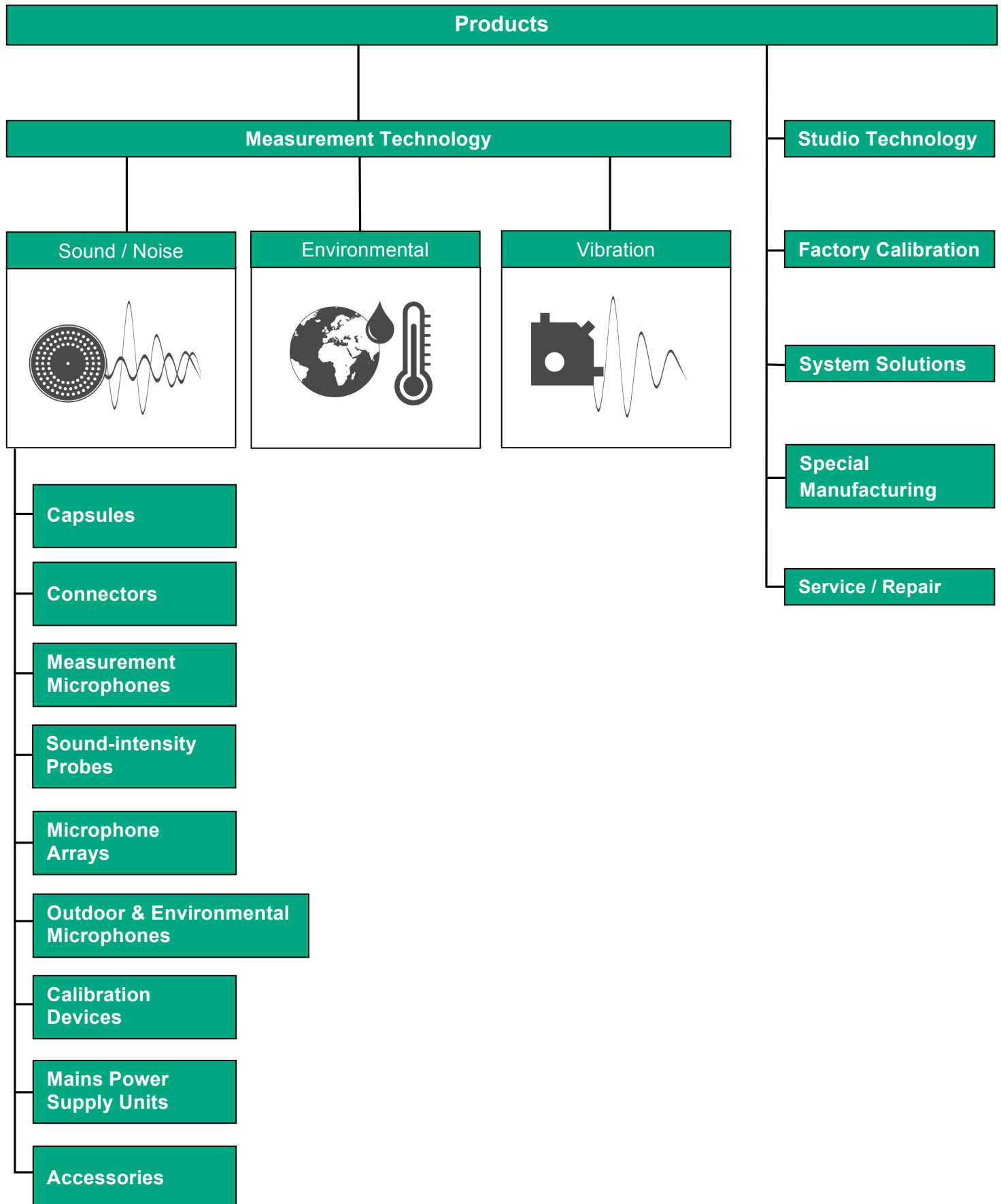
Measurement microphones



The product range of Microtech Gefell comprises microphones for applications in audio technology as well as in measurement, factory calibration, application-specific system solutions and special manufacturing in the areas of acoustic, electronic, mechanical and service & repair. The measurement products that are listed in this overview are separated into three product sectors: “Sound / Noise”, “Environmental” and “Vibration”. The focus of development and production is in the sector of sound sensing.

MicrotechGefell has a tradition-rich manufacturing department for precision measurement microphones. In this regard, all components of the capsule are produced in-house, even down to the membranes. Combined with a high-quality preamplifier technique they form complete microphone units. In many cases they are certified for official verification. To round out the portfolio, there are also comprehensive accessories and special microphones; for example the sound intensity probe and weather-proof microphone unit. In addition to the microphone portfolio of Microtech Gefell there is also the complete product range of the long-term partner DELTA OHM in the programme. It comprises sound level meters, human vibration meters and microclimate data loggers as well as a comprehensive measurement probe programme.

The Products



Capsules



The measurement microphone production of Microtech Gefell can look back on over 80 years experience. Based on proprietary galvanic membrane production technology the microphone membranes can be produced with a thickness of just a few micrometres. This process is followed by an artificial ageing process to reach a stable mechanical state of stress. This guarantees an extremely accurate metrological stability of the microphone. This characteristic gives the microphone advanced technical properties. The typical feature of the measurement microphones is the protection grid with hole pattern. Furthermore, the standard version contains a highly-resistant part that can be used for the calibration of the frequency response and sensitivity of the electrostatic actuator.

There are 1", 1/2" and 1/4" capsules in the range that differ with regard to frequency range, sensitivity and dynamic range. The product range includes microphones with frequency responses optimised for free-field, diffuse-field and pressure-field. Thus, matching microphones for every application can be found.

1" Measurement Microphone Capsules



	MK 102.1	MK 103.1	MK 112
Frequency Type	Free field	Free field	Diffuse field
Frequency Range (± 2 dB) / Hz	10...18 k	2...18 k	5...8 k
Sensitivity / mV/Pa	50	50	50
Dynamic Range / dB A (max. SPL for 3% THD)	11...146	11...146	11...146
Polarisation voltage V	200	200	200
Operating Temperature Range	-50...+100	-50...+100	-50...+100

1/2" Measurement Microphone Capsules



	MK 202 E	MK 221; MK 223; MK 250 B	MK 222 E B BE
Frequency Type	Free field	Free field	Free field
Frequency Range (± 2 dB) / Hz	10...40 k	3.5...20 k	0.5...20 k
Sensitivity / mV/Pa	14	50	50
Dynamic Range / dB A (max. SPL for 3% THD)	22...158	15...146	15...146
Polarisation voltage V	200	200; 200; 0 0	200 0 200 0
Operating Temperature Range	-50...+100	-50...+100	-50...+100



	MK 231 B E BE	MK 290 E
Frequency Type	Diffuse field	Free field
Frequency Range (± 2 dB) / Hz	3.5...8 k	35...5 k
Sensitivity / mV/Pa	50	50
Dynamic Range / dB A (max. SPL for 3% THD)	15...146	15...146
Polarisation voltage V	200 200 0 0	200 0
Operating Temperature Range	-50...+100	-50...+100

1/4" Measurement Microphone Capsules



	MK 301 E	MK 302	MK 390 E
Frequency Type	Free field	Free field	Free field
Frequency Range (± 2 dB) / Hz	5 ...100 k	5...60 k	1 k ...12 k
Sensitivity / mV/Pa	5	3	5
Dynamic Range / dB A (max. SPL for 3% THD)	35...168	39...172	35...168
Polarisation voltage V	200 0	200	200 0
Operating Temperature Range	-50...+110	-50...+110	50...+110

Preamplifiers



Digital USB
AES-42 XLR

Phantom P 48
XLR

Conventional
LEMO

ICP®
Microdot, SMB, BNC

For the connection of high-quality measurement microphone capsules, Microtech Gefell produces suitable measurement microphone preamplifiers. This impedance converter allows the connection of the very high-impedance capsule to the measurement equipment. Particular attention is given to connection condition standards and interference-free signal transmission. Based on the classical/conventional interfaces with LEMO connectors for standard measuring equipment nowadays there are suitable preamplifiers for every applied form of measurement inputs. These are, on the one hand, the current driven ICP® connections which are compatible with Detratron® and similar systems with BNC connectors; P 48 phantom powered inputs with symmetrical signal transmission and XLR connectors and, on the other hand, digital interfaces such as AES-42 (XLR), SPDIF or USB. The comprehensive range of accessories allows the connection of all possible capsules with the suitable preamplifier, whereby even permanently polarised capsule systems are compatible such as capsules from other companies.

Interfaces with LEMO connectors



	MV 203; MV 204	MV 203.3; MV 204.3	MV 205	MV 206	MV 302; MV 302.1
Application	universal	universal	for WME 940 with heating regulation	For replacement voltage calibration	universal; for Sensors
Capsule polarisation voltage	by power supply; none	by power supply; none	by power supply	by power supply	by power supply
Operating voltage / V	28...130	28...130	28...130	28...130	28...130
Power consumption / mA	≤ 2.3	≤ 2.3	≤ 2.3	≤ 2.3	≤ 1...2.5
Amplification / dB, at 1 kHz	0 ± 0.05 at C _e =22 pF	0 ± 0.05 at C _e =22 pF	0 ± 0.05 at C _e =22 pF	0 ± 0.05 at C _e =22 pF	0 ± 0.05 at C _e =5,6 pF
Frequency Range / Hz	1 ... 1 M	1 ... 1 M	1 ... 1 M	1 ... 1 M	1 ... 1 M
Max. Output voltage / V _{eff} at 1 kHz and R _L = 100 kΩ	7 (at 28 V) 33 (at 130 V) at C _e =22 pF	7 (at 28 V) 33 (at 130 V) at C _e =22 pF	7 (at 28 V) 33 (at 130 V) at C _e =22 pF	7 (at 28 V) 33 (at 130 V) at C _e =22 pF	7 (at 28 V) 33 (at 130 V) at C _e =5.6 pF
Operating Temperature Range / °C	-10...+50	-10...+50	-10...+50	-10...+50	-10...+50
Heating	Yes	none	Yes	none	none
Connector	7-pin LEMO	7-pin LEMO	7-pin LEMO	7-pin LEMO	7-pin LEMO
	FGG 1 B 307 CLAD 62 ZN	FGG 1 B 307 CLAD	FGG 1 B 307 CLAD 62 ZN	FGG 1 B 307 CLAD 62 ZN	FGG 1 B 307 CLAD 35 ZN

ICP[®] - Microdot, SMB, BNC



	MV 210	MV 310
Application	universal	universal
Capsule polarisation voltage	none	none
Operating voltage / V	24 ... 30	24 ... 30
Power consumption / mA	2...10	2...10
Amplification/ dB, at 1 kHz	-0.55 at C _e = 22pF	-2,0*at C _e = 5.6 pF
Frequency Range / Hz	20...100 k	20...100 k
Max. Output voltage / V _{eff} at 1 kHz and R _L = 100 kΩ	6.5 at C _e = 22pF	8.2 at C _e = 5.6 pF
Operating Temperature Range / °C	-25...+70	
Heating	none	none
Connector	BNC	MALCO-Microdot, 10-32 UNF-2A

* for a different Capsule amplifier combination - see data sheet

Phantom P 48 V XLR



	MV 220	MV 220 S	MV 225
Application	universal	universal	universal
Capsule polarisation voltage	none	none	200V (generated internally)
Operating voltage / V	48	48	48
Power consumption / mA	4	4	5.5
Amplification / dB, at 1 kHz	-1.0 at C _e =22 pF	-1.07at C _e =22 pF	-0.1 at C _e =22 pF
Frequency Range / Hz	20...100 k	20...100 k	20...100 k
Max. Output voltage / V _{eff} at 1 kHz and R _L = 100 kΩ	5.0 at C _e = 22 pF	5.0 at C _e = 22 pF	7.5 at C _e = 22 pF
Operating Temperature Range / °C	-10...+50	-10...+50	-10...+50
Heating	none	none	none
Connector	XLR 3M	XLR 3M	XLR 3M

Digital USB AES 42 XLR



MV 230 digital

ADC	Sigma-Delta- Converter 24 Bit 96 kHz in 2 level areas
Operating voltage / V	5.6...15; Digital Phantom Power (DPP)
Power consumption / mA	< 100
Capsule polarisation voltage	200 (generated internally)
Frequency Range / Hz	1...40 k
Dynamic Range / dB	>140 in 2 divided level ranges
Sampling frequencies, switchable / Hz	96 k / 48 k
Connection standards	1. AES 42 – 2011 2. AES 3 – 1992 (AES/EBU) + Operating voltage + remote control data 3. SPDIF (special request)
Connector	XLR 5M

Complete Microphones



In order to ease the search for the right combination of measurement microphone capsule and preamplifier there are factory-provided compositions of complete microphones available. The most common versions are shown here, the components are also available separately. Additionally Microtech Gefell GmbH also offers a microphone family with a fixed capsule to take account of the budget limit for four-channel measurement systems. There are complete microphones for classical/conventional LEMO connectors, current powered ICP[®] and Detratron[®] connectors with BNC connectors, phantom powered symmetrical signal inputs with XLR connectors and digital interfaces for AES-42 (XLR), SPDIF or USB.



MM 203

MM 302

MM 210

MM 310

MM 225

MM 230

Consisting of:	Capsule MK 221 Preamplifier MV 203	Capsule MK 301 Preamplifier MV 302	Capsule MK 250 Preamplifier MV 210	Capsule MK 301 E Preamplifier MV 310	Capsule MK 221 Preamplifier MV 225	Capsule MK 221 Preamplifier MV 230
Connector	LEMO	LEMO	BNC	Microdot	XLR	Digital USB AES-42 XLR



M 370

M 371

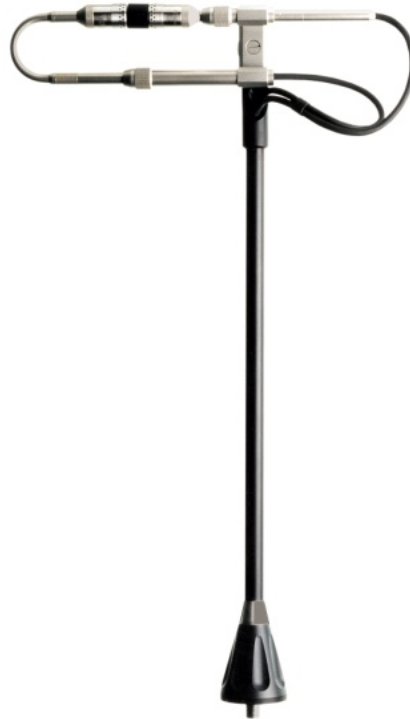
M 372

M 373

Supply	current-fed/powering	supplied with voltage	supplied with voltage	phantom powering
Plug connector	Microdot	4-pin LEMO	Microdot with 3.5 mm Jack cable	3-pin XLR

In addition to the basic choice introduced here, there are also many other capsule/preamplifier combinations available.

Sound intensity probes



Since the introduction of computerised measurement systems the sound intensity measurement process, for example for sound field mapping or sound power measurement, has become very significant. Microtech Gefell offers selected precision microphone pairs in this area that are integrated in different mechanical constructions. Following customer requests, the different mechanical structures are originated in order to optimise the use of the intensity probes. With $\frac{1}{2}$ " and $\frac{1}{4}$ " microphone capsule pairs, a large frequency range is covered. Using the remote control, the user is able to work in stand-alone operation and control the measurement from the measurement location.



SIS 90

SIS 90 1/2"
 Pair of capsules 1/2" MK 290
 Preamplifier 1/4" MV 302.1
 Spacer 1/2" - 12 and 50 mm

SIS 90 1/4"
 Pair of capsules 1/4" MK 390
 Preamplifier 1/4" MV 302.1
 Spacer 1/4" - 6 and 12 mm



SIS 91

SIS 91 1/2"
 like SIS 90 1/2", but with
 Preamplifier MV 302

SIS 91 1/4"
 like SIS 90 1/4", but with
 Preamplifier MV 302



SIS 92

SIS 92 1/2"
 like SIS 91 1/2"

SIS 92 1/4"
 like SIS 91 1/4"



SIS 93

SIS 93 1/2"
 like SIS 91 1/2"

SIS 93 1/4"
 like SIS 91 1/4"

Pair of capsules	Spacer	Measuring range
1/2"	50 mm	35 Hz ... 1.5 kHz
	12 mm	70 Hz ... 5 kHz
1/4"	12 mm	1 kHz ... 6 kHz
	6 mm	1 kHz ... 12 kHz

Special: Electrically powered sound intensity probes ICP®



SIS 190 - ICP®

SIS 190 1/2"
 Pair of capsules 1/2" MK 290 E
 Preamplifier 1/4" MV 310
 Spacer 1/2" - 12 and 50 mm

SIS 191 - ICP®

SIS 191 1/2"
 like SIS 190 1/2"

SIS 192 - ICP®

SIS 192 1/2"
 like SIS 190 1/2"

SIS 193 - ICP®

SIS 193 1/2"
 like SIS 190 1/2"

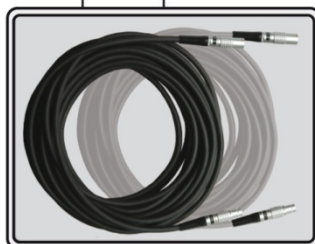
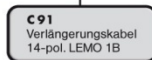
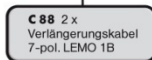
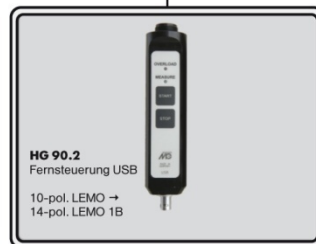
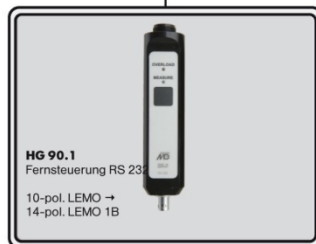
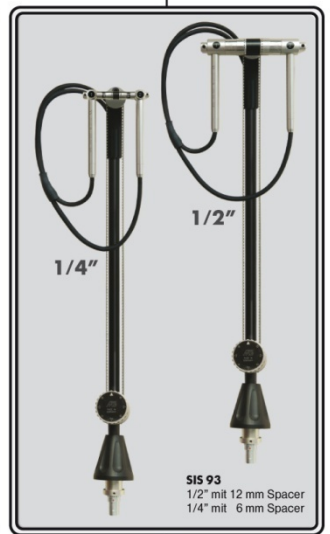
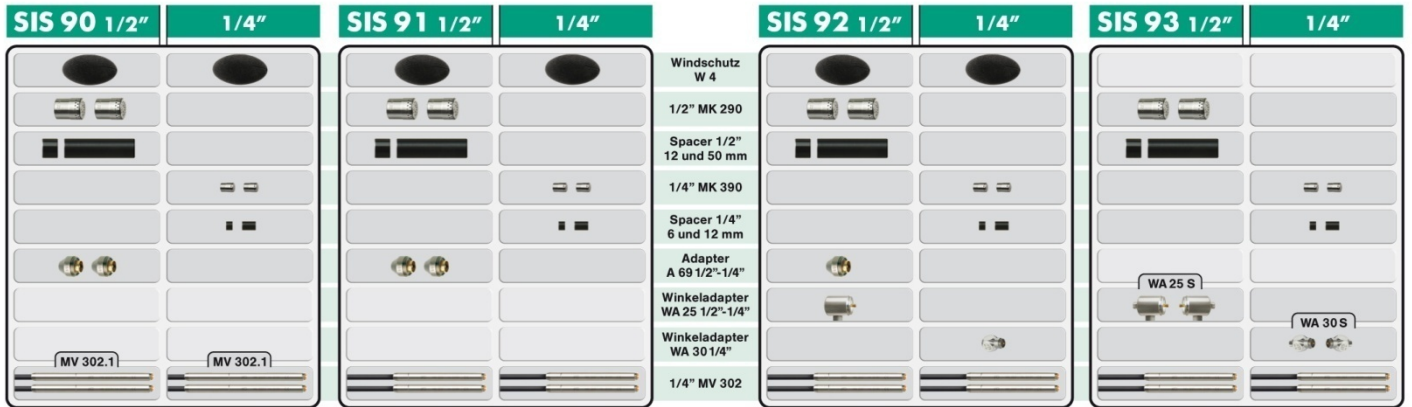
SIS 190 1/4"
 Pair of capsules 1/4" MK 390 E
 Preamplifier 1/4" MV 310
 Spacer 1/4" - 6 and 12 mm

SIS 191 1/4"
 like SIS 190 1/4"

SIS 192 1/4"
 like SIS 190 1/4"

SIS 193 1/4"
 like SIS 190 1/4"

Pair of capsules	Spacer	Measuring range
1/2"	50 mm	35 Hz ... 1.5 kHz
	12 mm	70 Hz ... 5 kHz
1/4"	12 mm	1 kHz ... 6 kHz
	6 mm	1 kHz ... 12 kHz



PC

Measurement system – front end

Outdoor and Environmental microphones



In today's world of a high degree of environmental awareness, accurate noise measurement is of decisive importance. In this area a series of precision measuring microphones with weather protection for temporarily and long-term installations is offered by Microtech Gefell. Most microphones are certified for official verification and can be used for legally binding measurements. Microtech Gefell produces microphones for aircraft noise monitoring systems for sound incidence from above as well as, for example, for noise monitoring like traffic noise with sound incidence from the side relating to the microphone axis. Some models are equipped with a remote calibration system. There are different installation and connection systems for mast mounting and various cable adaptors available. Thereby the microphones are compatible to all standard monitoring systems in the measurement area.



21.31
94.91



21.31
95.103



WME 960 H/V mit VM 1/2



WME 940

WME 950

WME 952; WME 953 P 48 V

WME 960 H

WS 1

remotely calibrated

not remotely
calibrated

not remotely
calibrated

remotely calibrated

not remotely calibrated

Reference sound
incident level:
vertical

Reference sound
incident level:
vertical

Reference sound
incident level:
vertical

Reference sound
incident level:
horizontal

Reference sound
incident level:
horizontal

Capsule MK 223
Preampfier MV
205, U_{pol} 200 V

Capsule MK 223
Preampfier MV 203,
 U_{pol} 200 V
5 m cable,
7-pin LEMO

WME 952
Capsule MK 250
Preampfier MV
210, U_{pol} 0 V
5 m cable, BNC

WME 960 H Supply
module incl. VM 960
calibration generator
Capsule MK 223 B
Preampfier MV 203.3,
 U_{pol} 200 V
10 m cable,
LEMO

for freefield microphone
types:

Capsule MK 221/222/223
with Preampfier MV
203/203.3

Capsule MK 250/255
with Preampfier
MV 204/204.3/210/220

WME 953 P 48 V
Capsule MK 250
Preampfier MV
220, U_{pol} 0 V
5 m cable, 3-pin.
XLR

WME 970 H digital
Supply module incl.
VM 960 calibration
generator
USB-Audio- Interface
for MV 230 digital

Supplied with:

Dehumidifier TA 202

Cable for MV 203.3/204.3:
7-pin LEMO

Cable for MV 210:
BNC

Capsule MK 223 B
Preampfier MV 230
digital,
 U_{pol} 200 V
5 m cable,
LEMO

Sound

Calibration equipment



**Sound pressure calibrator
4000 KI. 1**



Pistonphone 5002

Generated SPL / dB	114.0 ± 0.2	124
Frequency / Hz	1 k ± 0.2 %	250 ≤ 0.1%
For microphone types:	1", 1/2", 1/4"	1", 1/2", 1/4"



**EMK 1
Measuring chamber for calibrating
the measurement grid**

Recommended supply voltage for the calibration grid	200 V DC + 10 V AC
Microphone output voltage	ca. 5 mV
= SPL (at Microphone sensitivity 50 mV / Pa)	74 dB
Max. Frequency Range:	Depending on the microphone, up to 100 kHz

Power Supplies



**M 28;
M 32**

ICP[®] Conditioning modules



MN 960-8 (-4)

Eight channel measurement microphone
power supply
(-four channel)



MN 940

Single channel power supply for
WME 940



MN 920

Single channel power supply

Environmental



HD 32.3
Microclimate meter – Delta Ohm



HD 32.2
Microclimate meter – Delta Ohm



HD 32.1
Microclimate meter – Delta Ohm

Vibration



HD 2030
4-Channel Vibration Analyser

