MAX12

Manual (4.0E)

d&b audiotechnik

References in the manual

WARNING! **This refers to a potentially dangerous situation which may lead to personal injury.**

CAUTION! **This refers to a potentially dangerous situation which may lead to damage to the equipment.**

IMPORTANT! **This refers to a situation which may cause the equipment to malfunction.**

Symbols on the equipment



Please refer to the information in the operating manual.



WARNING!
Dangerous voltage!

General Information

MAX12 Manual

Version 4.0E, 10/2003, D2093.E.04

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The information contained in this manual has been carefully checked for accuracy, at the time of going to press, however no guarantee is given with respect to the correctness.

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Technical specifications, dimensions, weights and properties do not represent guaranteed qualities.

As manufacterers we reserve the right to make alterations and modifications within the framework of legal provisions, as well as changes aimed at improving quality.

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Safety precautions

Before you use our products, read the manual carefully and observe all the safety precautions. They will protect you and help to avoid equipment failures.

Keep this manual in a safe place so that it is available for future reference.

If you supply d&b products, please draw the attention of your customers to these safety guidelines. Enclose the relevant manuals with the systems. If you require additional manuals for this purpose, you can order them from d&b.

Information regarding use of loudspeakers

WARNING!

Never stand in the immediate vicinity of loudspeakers driven at a high level. Professional loudspeaker systems are capable of causing a sound pressure level detrimental to human health. Seemingly non-critical sound levels (from approx. 95 dB SPL) can cause hearing damage if people are exposed to it over a long period.

In order to prevent accidents when deploying loudspeakers on the ground or when flown, please take note of the following:

When setting up the loudspeakers or loudspeaker stands, make sure they are standing on a firm surface. If you place several systems on top of one another, use straps to secure them against movement.

Only use accessories which have been tested and approved by d&b for assembly and mobile deployment. Pay attention to the correct application and maximum load capacity of the accessories as detailed in our specific "Mounting instructions" or in our "Flying system and Rigging manuals".

Ensure that all additional hardware, fixings and fasteners used for installation or mobile deployment are of an appropriate size and load safety factor. Pay attention to the manufacturers instructions and to the relevant safety guidelines.

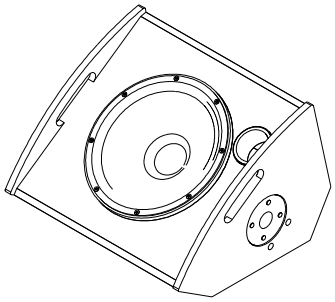
Regularly check the loudspeaker housings and accessories for visible signs of wear and tear, and replace them when necessary.

Regularly check all load bearing bolts in the mounting devices.

CAUTION!

Loudspeakers produce a static magnetic field even if they are not connected or are not in use. Therefore make sure when erecting and transporting loudspeakers that they are nowhere near equipment and objects which may be impaired or damaged by an external magnetic field. Generally speaking, a distance of 0.5 m (1.5 ft) from magnetic data carriers (floppy disks, audio and video tapes, bank cards, etc.) is sufficient; a distance of more than 1 m (3 ft) may be necessary with computer and video monitors.

MAX12



MAX12 is a 2-way floor monitor employing a 12"/2" coaxial driver combination with a passive crossover. The driver design allows the use of a compact, low height cabinet. MAX12 can be driven actively or passively.

Coaxially mounting the 2" HF and 12" LF drivers creates a very compact single driver whilst retaining the benefits of separate magnetic assemblies. The drivers are positioned together to utilise the combined shape and geometry of the LF cone and HF horn to create a single waveguide with a controlled, symmetrical, 80° conical dispersion.

The MAX12 cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. A socket to accept a loudspeaker stand and four M10 threaded inserts complete the possible rigging options for MAX12.

CAUTION!

Only operate MAX12 cabinets with a d&b D12 or E-PAC amplifier configured for MAX or a P1200A mainframe fitted with ampMAX or AMP-L controller modules, otherwise there is a risk of damaging the loudspeaker components.

As an alternative other high quality power amplifiers may be used, provided their output power does not exceed 500 Watts into 8 ohms and an additional subsonic filter is used (25 Hz with 12 dB/ octave minimum), otherwise there is a risk of damaging the loudspeaker components.

Connections

The MAX12 cabinet is fitted with two EP5 connectors. All pins of both connectors are wired in parallel.

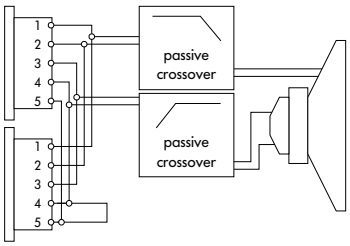
Using one connector as the input, the second connector allows for direct connection to additional cabinets.

The MAX12 cabinet can be supplied with NL4 output connectors as an option.

Pin equivalents of EP5 and NL4 connectors are listed in the table below.

	LF+	**LF–**	**HF+**	**HF–**	**n.c.**
EP5	1	2	3	4	5
NL4	1+	1–	2+	2–	n.c.

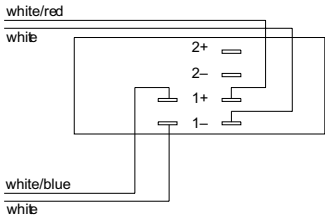
EP5 and NL4 pin assignments



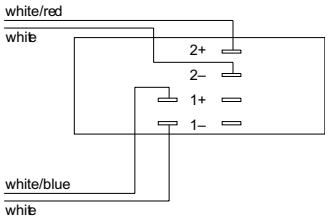
Connector wiring
(4-wire operation with EP5 connetors)

4-wire operation (standard wiring EP5 and NL4)

To allow the choice of active or passive operation the MAX12 cabinet is driven by a 4-wire cable. The HF and LF drivers are each fed by their own pair of pins and separate passive crossovers. Pin assignments 1/2 of the EP5 connectors (NL4: 1+/1–) connect the LF driver, pins 3/4 (2+/2–) connect the HF driver, as shown in the diagram opposite.



MAX12, 2-wire operation NL4



MAX12, 4-wire operation NL4

2-wire operation (NL4 only)

For applications requiring dedicated passive use, the MAX12 cabinet's internal wiring can be configured for connection to pins 1+/1– of the NL4 connectors allowing use of a 2-wire cable.

The passive 2-wire configuration can also be used when the MAX12 cabinet is combined with a d&b active subwoofer and driven through a single 4-wire cable.

To configure the cabinet for 2-wire use the connector panel has to be removed by undoing the four Allen screws with a 2.5 mm Allen key. The wiring on the back of the connector panel can be changed as shown in the illustrations opposite.

In the 2-wire/passive configuration both the LF and HF drivers are connected to pins 1+/1– of the NL4 connector.

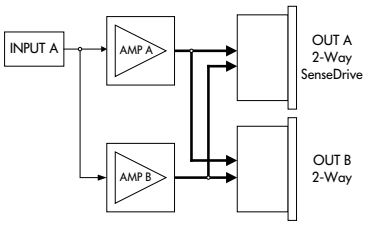
Note that only the HF driver wiring (white and white/red) differs from that used in the 4-wire version.

In the 2-wire configuration MAX12 can also be used with amplifiers from other manufacturers. The output connector of the amplifier or signal distribution box should feed the positive signal to pin 1+ and the negative signal to pin 1– of the cabinet's NL4 connectors.

Operation with D12

The D12 allows the MAX12 cabinet to be driven either in a "2-Way Active" mode or in a Passive mode.

Active operation ("2-Way Active")

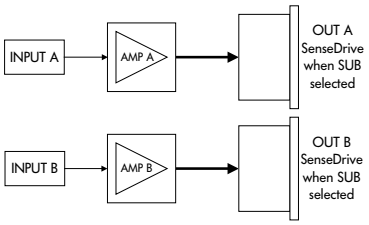


D12 Input/Output routing "2-Way Active " mode

Selecting "2-Way Active" mode with the MAX set up enables up to two MAX12 cabinets to be driven actively by the D12 amplifier. In applications with low continuous levels and low ambient temperatures up to three cabinets may be connected.

In "2-Way Active" mode the D12 routes seperate LF and HF signals to the amplifier channels. Pins 1/2 of both EP5 output connectors (NL4: 1+/1–) carry the LF signal, pins 3/4 (2+/2–) carry the HF signal. The output connector pin assignment is changed automatically when "2-Way Active" mode is selected. The input signal is fed to INPUT A, while the input signal is routed (linked) to INPUT B internally.

Passive operation

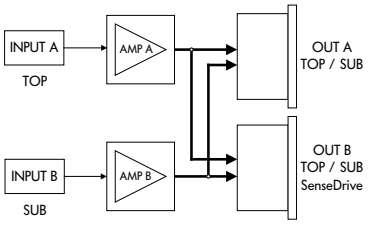


D12 Input/Output routing "Dual channel " mode

Selecting the "Linear" mode in the D12 enables up to two MAX12 cabinets to be driven by the respective channel. In applications with low continuous levels and low ambient temperatures up to three cabinets per channel may be connected.

Passive operation ("Dual channel" mode)

In "Dual channel" mode, the MAX12 cabinet can be used in either 4-wire or 2-wire operation. The respective channel has to be set to "Linear". Each amplifier is driving all output pins on the channels output connector. Pins 1/3 of the EP5 output connector (NL4: 1+/2+) carry the positive and pin 2/4 (1–/2–) carry the negative components of the signal.



D12 Input/Output routing "Mix TOP/SUB " mode

Passive operation ("Mix TOP/SUB" mode - NL4 only)

In "Mix TOP/SUB" mode, the MAX12 cabinet has to be configured for 2-wire operation.

Selecting "Linear" mode for channel A and an applicable subwoofer for channel B allows a single D12 to drive two MAX12 and two active subwoofer cabinets.

When the D12 is operated in "Mix TOP/SUB" mode the MAX12 cabinet and a respective active subwoofer can be linked together locally and fed by a single 4-wire cable from either amplifier output connector.

IMPORTANT!

To apply SenseDrive for the subwoofer, EP5 connectors and 5-wire cables have to be used. When operated in "Mix TOP/SUB" mode the subwoofer has to be fed from the output B connector of the D12 amplifier.

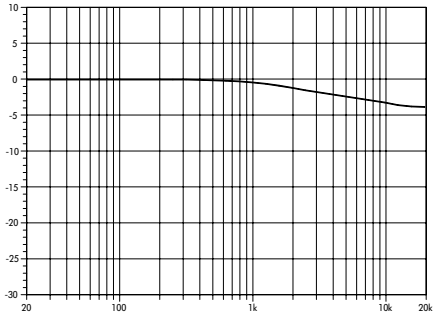
Controller settings

For acoustic adjustment the settings CUT, HFA and CPL can be selected.

CUT

Set to CUT, a high pass filter with a 130 Hz cut off frequency is inserted in the controller signal path. The MAX12 is now configured for use with d&b active subwoofers.

HFA circuit

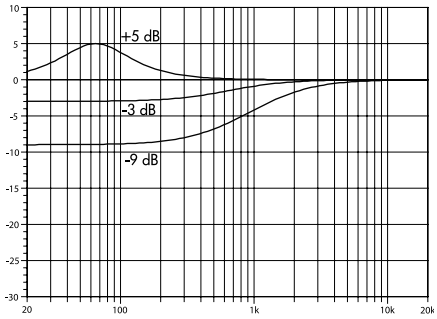


Frequency response of HFA circuit

In HFA mode (High Frequency Attenuation), the HF response of the MAX12 is rolled off. The HFA provides a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.

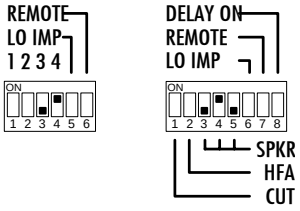
CPL circuit



Frequency response of CPL circuit

The CPL (Coupling) circuit compensates for coupling effects between the cabinets when building closely coupled arrays. CPL begins gradually at 1 kHz, with maximum attenuation below 400 Hz, providing a balanced frequency response when the MAX12 cabinet is used in arrays of two or more. The function of the CPL circuit in the D12 amplifier is shown in the diagram opposite and can be set in dB attenuation values between –9 and 0, or a positive CPL value which creates an adjustable low frequency boost around 65 Hz (0 to +5 dB).

Operation with E-PAC



E-PAC version 1, E-PAC version 2
E-PAC Configuration for "Linear" mode

To drive the MAX12 cabinet the E-PAC has to be configured to "Linear" mode.

For an E-PAC version 1 or 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

For an E-PAC version 3, the configuration is set via the encoder in conjunction with an LCD. Selecting "Linear" mode enables a single MAX12 cabinet to be driven at an output power of 300 Watts. LO IMP mode allows the E-PAC to drive two MAX12 cabinets with a 6 dB reduction of input level to the loudspeakers.

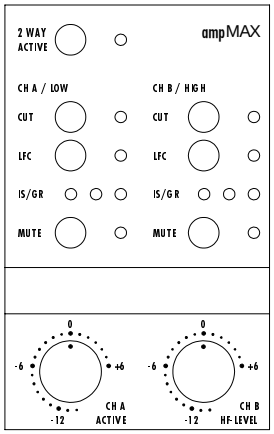
In "Linear" mode all four pins on the NL4 connector are driven by the E-PAC power amplifier, pins 1+ and 2+ carry positive signal, 1– and 2– carry negative signal. The MAX12 cabinet can be used in either 4-wire or 2-wire configuration.

The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT and HFA settings are explained under the previous section "Operation with D12 - Controller settings".

Operation with P1200A (ampMAX module)

The combination of P1200A and ampMAX allows the MAX12 cabinet to be driven either in a "2-Way Active" mode or in a Passive mode.

ampMAX controller module



Controls on ampMAX module

2-WAY ACTIVE switch

The "2-Way Active" operation is described under the previous section "Operation with D12 - "2-Way Active" operation.

If "2-Way Active" is selected the left volume control (CH A / ACTIVE) controls both channels and sets the overall level, the right volume control (CH B / HF-LEVEL) sets the **relative** HF level.

CUT switch

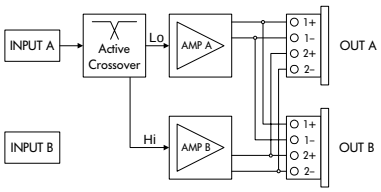
The CUT setting is available. The characteristics of the CUT setting is explained under the previous section "Operation with D12 - Controller settings".

LFC switch

When the MAX12 cabinet is used without an active subwoofer selecting LFC (Low Frequency Compensation) extends the low frequency response of the MAX12 cabinet down to 75 Hz. In active mode only the channel A LFC switch is functional.

Active operation ("2-Way Active")

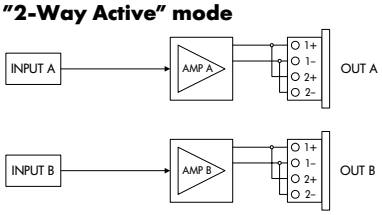
The ampMAX module contains a switchable electronic crossover which routes seperate LF and HF signals to the P1200A amplifier channels. A P1200A mainframe can drive two MAX12 cabinets in active mode.



P1200A with ampMAX, "2-Way Active" mode

Passive operation

In standard passive mode, ampMAX provides two linear amplifier channels, each amplifier driving all pins on the channels output connector. A P1200A mainframe can drive two MAX12 cabinets per channel in passive mode.

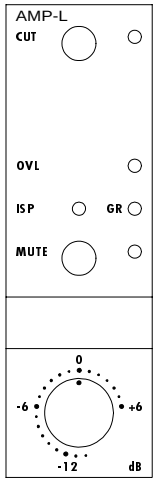


P1200A with ampMAX, "Passive" mode

Operation with P1200A (AMP-L module - NL4 only)

The AMP-L module provides a single linear amplifier channel, which drives the pins 1+/1– of the respective NL4 output connector. For operation with the AMP-L module the MAX12 cabinets has to be configured for 2-wire operation (see previous section "2-wire operation").

A P1200A mainframe fitted with two AMP-L modules can drive two MAX12 cabinets per channel in passive mode. Fitting one AMP-L and one subwoofer controller module allows a single mainframe to drive two MAX12 and two active subwoofer cabinets. All cabinets can be linked together locally and fed by a single 4-wire cable from either mainframe output connector.



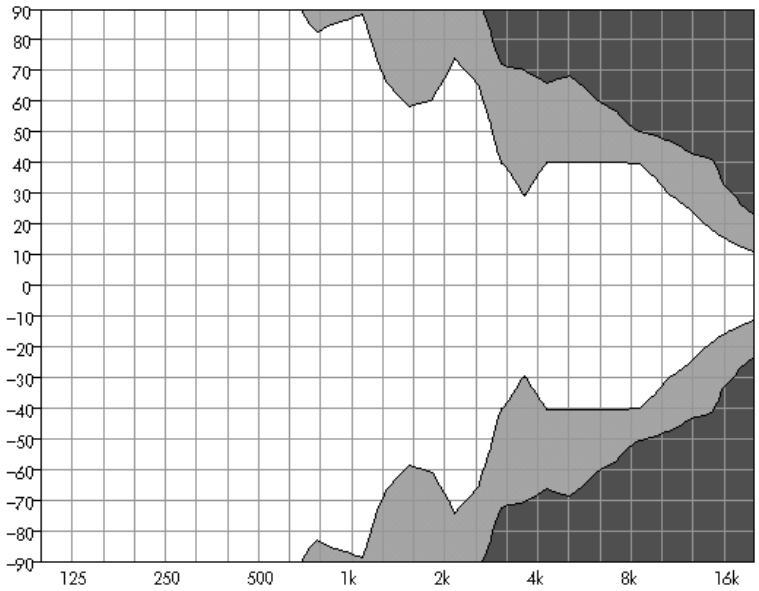
Controls on AMP-L module

CUT switch

The CUT setting is available. The characteristics of the CUT setting is explained under the previous section "Operation with D12 - Controller settings".

Dispersion characteristics

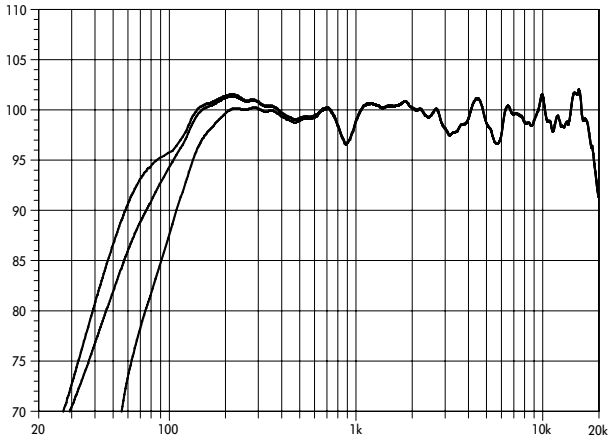
Due to the conical coverage pattern of the coaxial driver design, the horizontal and vertical dispersion characteristics of MAX12 are largely identical (slight differences which do occur are attributable to the cabinet shape). The diagram below shows dispersion angle versus frequency plotted using lines of equal sound pressure (isobars) at –6 dB and –12 dB.



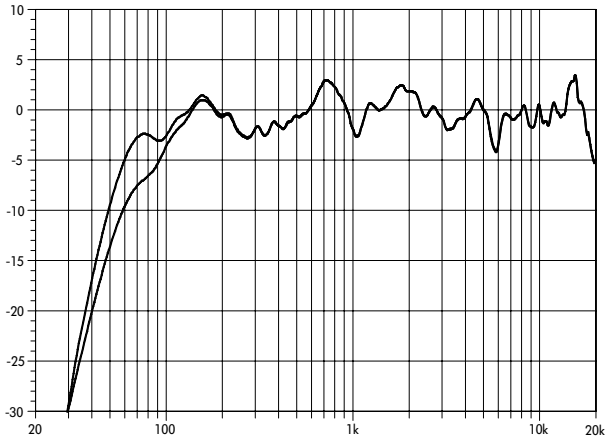
MAX12 isobar diagram

Frequency response

The diagrams below show the different response curves for MAX12 in free field driven with the P1200A mainframe with ampMAX. The response in standard mode is equivalent to the operation with a linear power amplifier.



MAX12 frequency response, (1m (3.3 ft), free field) standard (linear, 2,83 V), LFC and CUT switch settings



MAX12 frequency response, floor position, microphone on axis, height 1.5 m (4.9 ft), standard and LFC switch settings

Technical specifications

MAX12 system data, passive set up

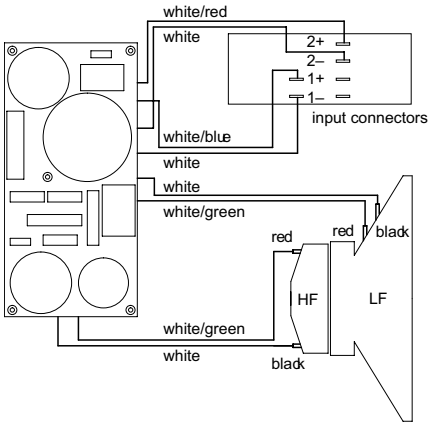
Max. sound pressure (1 m, free field) with D12 ..... 134 dB
Max. sound pressure (1 m, free field) with E-PAC ..... 130 dB
Max. sound pressure (1 m, free field) with P1200A ..... 132 dB
(SPLmax peak, pink noise test signal with crest factor of 4)
Input level (100 dB SPL / 1 m) ..... –16 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: –) ..... LF: + / HF: –

MAX12 system data, active set up

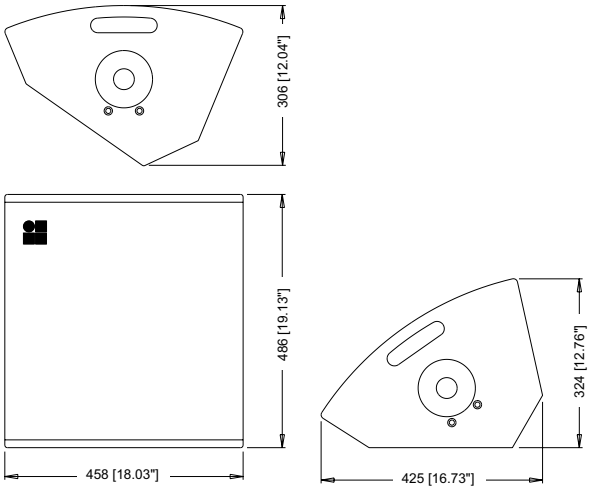
Max. sound pressure (1 m, free field) with D12 ..... 135 dB
Max. sound pressure (1 m, free field) with P1200A (ampMAX) ..... 134 dB
(SPLmax peak, pink noise test signal with crest factor of 4)
Input level (100 dB SPL / 1 m) ..... –16 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: –) ..... LF: + / HF: +

MAX12 loudspeaker

Frequency response (–5 dB, free field) ..... 100 Hz - 18 kHz
Frequency response (–5 dB, floor coupling) ..... 80 Hz - 18 kHz
Sensivity (2.83 V / 1 m) ..... 99 dB
Nominal impedance ..... 8 ohms
Power handling capacity (RMS / peak 10 ms) ..... 250 / 1200 W
Nominal dispersion angle ..... 80° conical
Connections ..... 2 x EP5
Pin assignments EP5 ..... LF+: 1/LF–: 2
..... HF+: 3/HF–: 4
optional ..... 2 x NL4
Pin assignments NL4 ..... LF+: 1+/LF–: 1–
..... HF+: 2+/HF–: 2–
Weight ..... 22 kg (48 lb)



MAX12 wiring diagram
(4-wire standard set up NL4)



MAX12 cabinet dimensions in mm [inch]

EU declaration of conformity (CE symbol)

CE

EU conformity of loudspeakers

This declaration applies to loudspeakers manufactured by d&b audiotechnik AG and includes the types listed in the table below:

– **MAX12 Z1300**

All production versions of these types are included, provided they correspond to the original technical version and have not been subject to any later design or electromechanical modifications.

We herewith declare that said products are in conformity with the provisions of the following EC directives including all applicable amendments:

– **89/336 Electromagnetic Compatibility**

The following standards have been applied:

– **DIN EN 55013:08-1991**
– **DIN EN 55020:05-1995**
– **DIN EN 50082-1:03-1993**

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