Tornado KT20Cma

Self-powered 2" point source compact ceiling speaker

user's manual

REV. A

ENGLISH

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Self-powered 2" point source compact ceiling speaker

1. INTRODUCTION

Congratulations on your purchase of the K-Array speaker system. The KT20Cma is a pioneering active micro loudspeaker designed for ceiling mount high quality distributed systems.

Truly groundbreaking, the KT20Cma can deliver an incredible maximum peak of 107dB from it's integrated amplifier and all from a unit that fits in the palm of your hand. The elegant but rugged enclosure is built to aircraft specifications from a single piece of aluminum and measures a mere 8.45cm (dia) x 9 cm (deep)

The KT20Cma has flexible and easy-to-configure mounting options.
With its ability to effortlessly reproduce both speech and music, it makes an excellent choice for fixed applications such as theatre, museum displays, restaurants, portable systems for corporate AV presentations, department stores, and in hidden locations such as chancel steps in houses of worship; the applications are endless. The Tornado KT20Cma offers the same sonic capabilities as the KT20ma in a package specifically designed for flushmount ceiling and wall applications, where it mounts in 84,50 mm backcans. The KT20Cma has a proprietary 2" high efficiency drive unit with a neodymium magnet structure and a suspension engineered for maximum linear excursion and minimum residual transducer interference. This cone transducer delivers an impressive maximum peak SPL of 107dB, and has a wide operating frequency range from 150 Hz to 18 kHz with very low distortion.

KT20Cma has a 4-pin Phoenix connector that supplies the power and balanced audio input, making set up or fixed installation a breeze.

All the components are designed in-house at our Florence based R&D department. They are custom manufactured to our exacting standards and quality control.

2. UNPACKING

Each K-array loudspeaker is built to the highest standard and thoroughly inspected before leaving the factory. Carefully inspect the shipping carton, then examine and test your new loudspeaker. If you find any damage immediately notify the shipping company. Only the consignee may institute a claim for damages incurred in shipping. It is suggested that you retain the original packaging so that the system can be repacked at a future date if necessary.
Please note that K-array and its distributors cannot accept any responsibility for damage to any returned product through the use of non-approved packaging.

3. SYMBOLS

	
This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual!	This device complies with the Restriction of Hazardous Substances Directive.

		
Collect electronic and electrical devices separately and dispose of according to recommended recycling and the WEEE safe disposal practices.	The item meets all the essential "Health and Safety" requirements of the relevant European Directives.	This symbol alerts the user to the presence of recommendations about product use and maintenance.

4. SAFETY

– It is important that loudspeaker systems are used in a safe manner.

– Professional loudspeakers are capable of producing extremely high sound levels and should be used with care. Hearing loss is cumulative and can result from levels above 90dB if people are exposed for an extended period.

– Never stand close to loudspeakers driven at high level.

– Suspending the system should only be done by qualified personnel following safe rigging practices. Secure fixings to the building structure are vital. Seek help from architects, structural engineers or other specialists if in any doubt.

– Do not operate the speaker for an extended period of time with the sound distorting. This is an indication of malfunction, which in turn can cause heat to generate and result in a fire.

– Connect the power supply only to an appropriate power adapter.

– Do not install the speaker in wet or humid locations without using weather protection.

– Do not allow water or any foreign object to get inside the speaker. Do not put objects containing liquid on, or near, the unit.

– To reduce the risk of overheating the amplifier, avoid exposing it to direct sunlight. Do not install the unit near heat emitting appliances, such as a room heater or stove.

– No naked flame sources such as lighted candles should be placed near the device.

– The speaker should be placed so that its location does not interfere with its proper cooling.

– Do not attempt to disassemble the unit. The unit contains no user serviceable parts. Repairs should be performed only by factory trained service personnel.

– Be sure that the adapter has the correct voltage value.

5. WARRANTY

K-array KT20Cma are warranted against manufacturing defects in materials or craftsmanship over a period of **2 years** from the date of original purchase. During the warranty period K-array will, at it's discretion, either repair or replace products which prove to be defective provided that the product is returned in its original packaging, shipping prepaid, to an authorized K-array service agent or distributor. K-array cannot be held responsible for defects caused by unauthorized modifications, improper use, negligence, exposure to inclement weather conditions, act of God or accident, or any use of this product that is not in accordance with the instructions provided by K-array.

K-array is not liable for consequential damages.

This warranty is exclusive and no other warranty is expressed or implied.

This warranty does not affect your statutory rights.

6. KEY FEATURES & APPLICATIONS

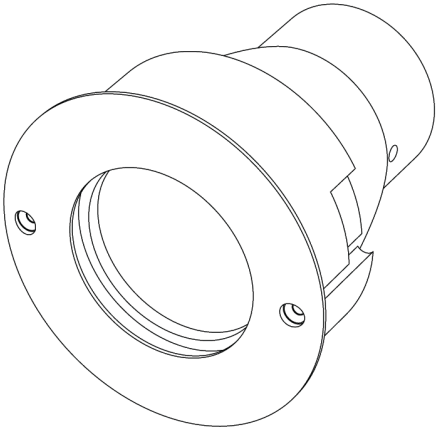
Features

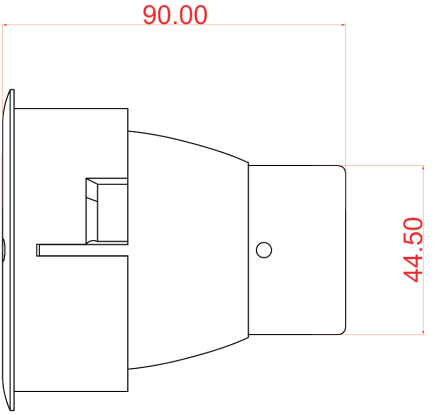
- Self-powered
- Single 2" long excursion full range driver
- Wide range frequency response
- Integrated 4-pin Phoenix connector
- Electronically protected
- Full aluminum ultra strong frame
- Top quality components for outstanding performance
- Available in Black or Aluminum
- High dynamic range capability
- Integrated connection points for accessories
- Only 400g of weight

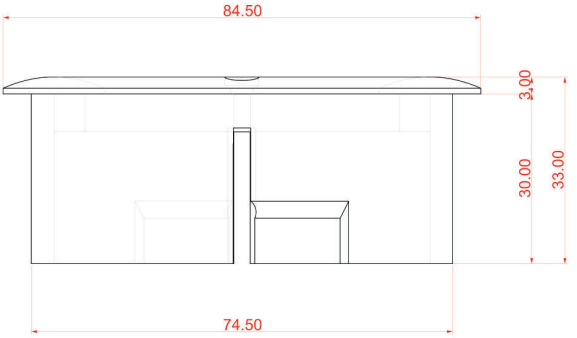
Applications

- Background music systems in restaurants and clubs
- High quality distributed systems for paging and music
- Exhibit audio for museum displays
- Space-sensitive fill for theatres
- Under balcony applications

7. PHYSICAL







Weight 0.40 Kg

8. AMPLIFIER

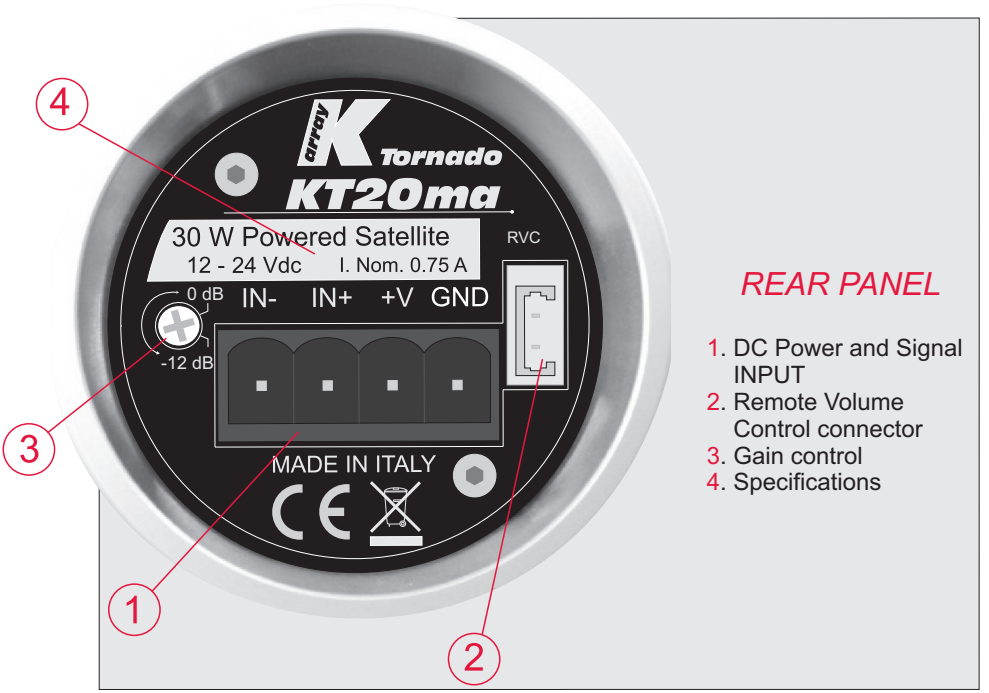
Each KT20ma powered speaker contains a 30 W Class D amplifier that is fully protected from short circuits and includes an auto recovery feature.

A remote power supply for the CMOS circuitry ensures that the total harmonic distortion (THD) is as low as possible. Power supply decoupling also eliminates oscillations that can be caused by long cable lengths between the amplifier and the speaker.

A 4-pin Phoenix connector (1) on the rear panel supplies both the DC power and balanced audio signal to the amplifier, using a common ground (GND).

A 2-pin white connector (2) allows for connection of a potentiometer for remote volume control (RVC) capability.

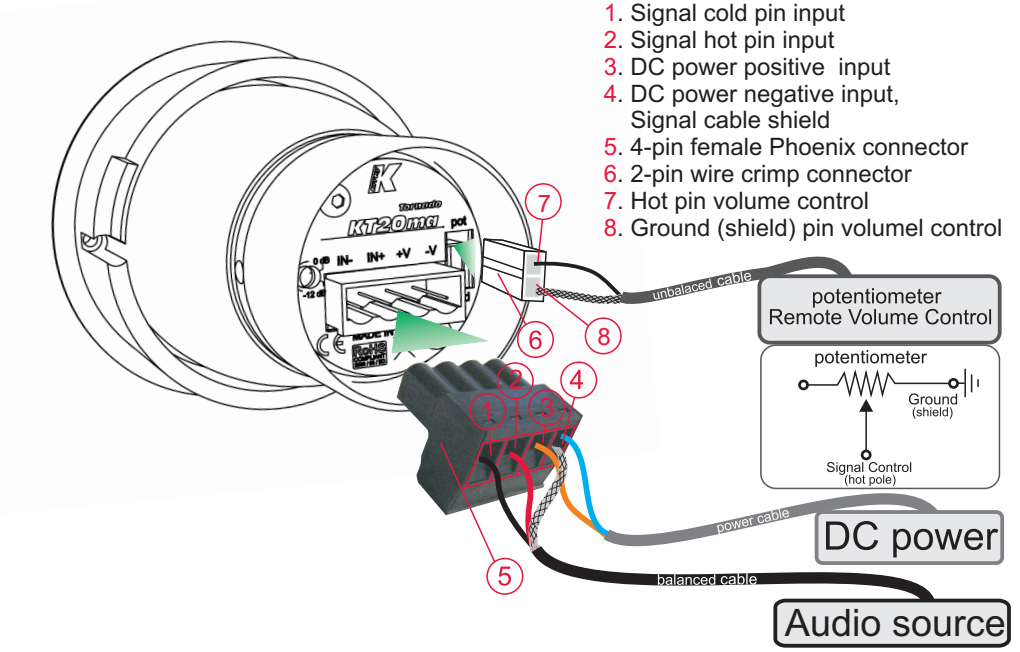
This is wired in parallel to an on-board potentiometer (3) with a 0dB to -12dB range. In RVC operating mode this should be set at full gain to ensure the widest dynamic range.



REAR PANEL

1. DC Power and Signal INPUT
2. Remote Volume Control connector
3. Gain control
4. Specifications

9. WIRING AND CONNECTORS



For long distances use a balanced sound source with a balanced screened cable.

The KT20Cma receives DC power and balanced audio from the four-pin Phoenix connector on its back panel. The connector's four pins include two for DC power (3), (4) (positive and negative) and two for the cold and hot pin of the balanced audio (1), (2). The shield must be connected with DC negative (4).

When using an unbalanced audio cable, connect the shield with the first (1) of four pins and the hot with pin (2). Then connect the shield (1) with the negative DC power.

The connector accepts single conductors up to 12 AWG (American Wire Gauge) or 2.5mm^2. A single composite cable (such as the Belden 1502R) can be used to connect a number of KT20Cma speakers. To do this, wire the cable connector plugged into the first KT20Cma with a second jumper cable both connected to the power supply and audio source. Extend this to the next speaker, and so on.

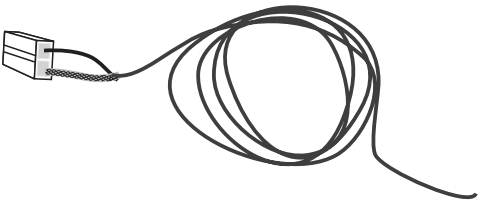
When wiring KT20ma cable connections, make sure each pin in the connector is wired correctly to avoid damage to the loudspeaker and polarity reversal, which can affect system performance.

Remote Volume Control cable

To connect a remote volume control you will need the specific cable sold as an accessory.

Solder the shield to the ground of the potentiometer and the remaining wire to the hot pin of it.

There is only one way to connect this accessory to the speaker.



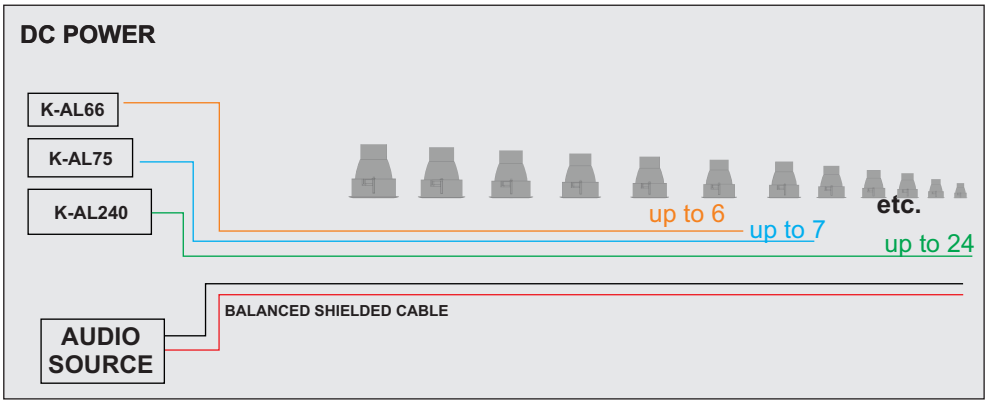
10. POWER CABLE LENGTHS and GAUGES

Cable Gauge	Resistence	Approximate MAX. length (1 KT20ma per line)	Approximate MAX. length (4 KT20ma per line)	Approximate MAX. length (8 KT20ma per line)	Approximate MAX. length (24 KT20ma per line)
2.50 mm^2	0.0052	710 m	177 m	88 m	30 m
1.50 mm^2	0.01076	350 m	87 m	43 m	14 m
1.00 mm^2	0.02087	180 m	45 m	22 m	7 m
0.75 mm^2	0.03307	110 m	27 m	13 m	4 m

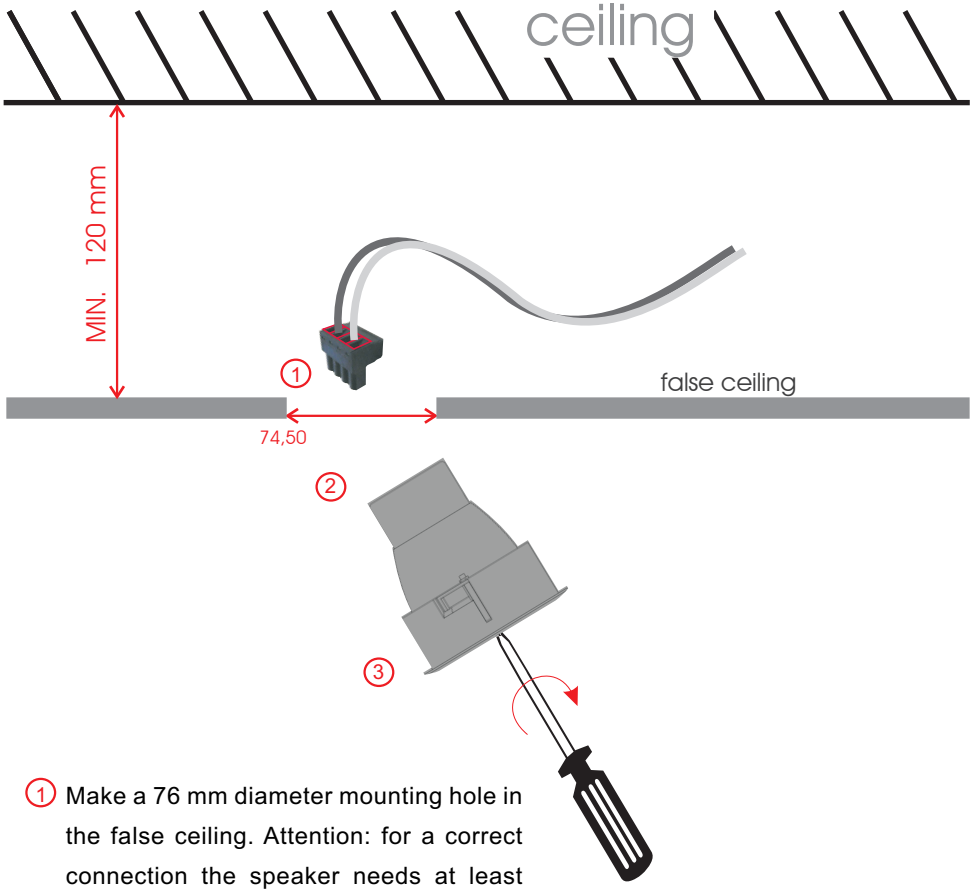
Cable Gauge	Resistence	Approximate MAX. length (1 KT20ma per line)	Approximate MAX. length (4 KT20ma per line)	Approximate MAX. length (8 KT20ma per line)	Approximate MAX. length (24 KT20ma per line)
12 AWG	0.0016	2400 ft	600 ft	300 ft	100 ft
14 AWG	0.00253	1500 ft	375 ft	187 ft	62 ft
16 AWG	0.00402	950 ft	237 ft	118 ft	39 ft
18 AWG	0.00636	600 ft	150 ft	75 ft	25 ft
20 AWG	0.01008	350 ft	87 ft	43 ft	14 ft

11. POWER SUPPLY

To function properly, the KT20Cma requires a 24 V DC, 10 VA stabilized power supply (1/3 of the continuous delivered power). The KT20Cma can operate with a voltage range from 12 to 24 Vdc but lower supply voltage reduces performance. A 24Vdc stabilized power supply is strongly suggested.
K-array also provides a range of power supplies: K-AL66 (66 VA max), K-AL75 (75 VA max, for DIN rail mounting), K-AL240 (240 VA max, for DIN rail mounting).



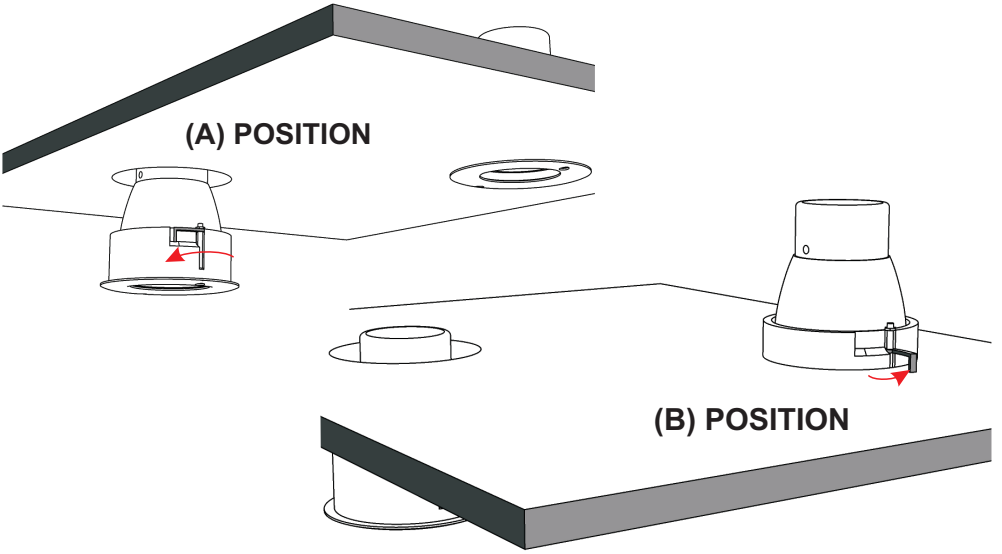
12. INSTALLATION

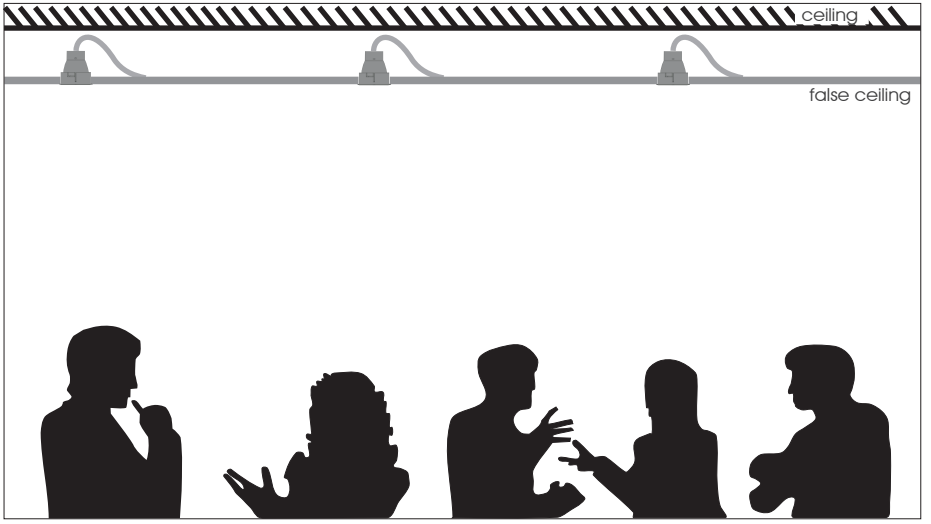


1. Make a 76 mm diameter mounting hole in the false ceiling. Attention: for a correct connection the speaker needs at least 120mm of depth behind the false ceiling.

2. Plug the Phoenix connector to the KT20Cma. The cables must respect the correct wiring indications.

③ Insert the speaker in the ceiling hole, taking care that the stoppers on the side are in the **(A) position.** Then, using a screwdriver, tighten two stopper mounting-screws until they clamp the ceiling panel **(B).**





13. SERVICE

To obtain service:

1) Contact the official K-array distributor in your country. They will direct you to the service centre.

2) If you are calling for service, have the serial number(s) of the unit(s) at hand for reference. Ask for Customer Service, and be prepared to describe the problem clearly and completely.

3) If the problem cannot be resolved over the phone, you must return the unit for service.

4) You will be given an RA (Return Authorization) number for job tracking. Refer to this number on shipping materials and in all correspondence concerning the repair. Shipping charges are the responsibility of the purchaser.

Any attempt to modify or replace components of the device will invalidate your warranty. Service must be performed by an authorized K-array service center.

Cleaning:

• Clean the product enclosures using a soft, dry cloth only.

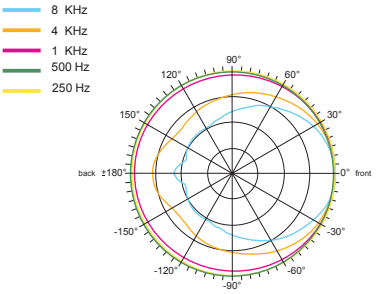
• Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives.

• Do not use any sprays near the product or allow liquids to spill into any openings.

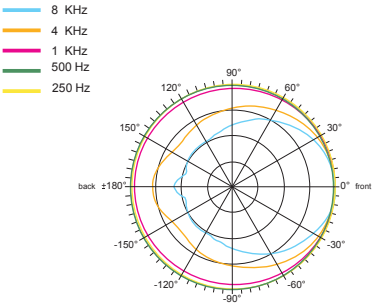
14. SPECIFICATIONS

	KT20Cma
	Acoustics
Speakers power handling	18 W(AES)
Max power	30 W [1]
Impedance	8 Ω
Frequency range	150 HZ - 18 KHz +/- 3dB
SPL 1W/1mt	87 dB [2]
Maximum SPL	101 dB continuous - 107 dB peak
	Coverage
Horizontal	90°
Vertical	90°
	Crossover
Type	active filter
Frequency	150Hz 24dB/oct
	Transducers
Full-range	2" Neodymium cone driver with 0.75" voice coil
	Audio Input
Connectors	4-pin Phoenix connector
Wiring	PIN1= cold (-) PIN2 = hot (+) PIN4 = Ground
	Power Audio Output
Connectors	-
	Remote control Input
Connectors	-
	Power Input
Connectors	4-pin Phoenix connector
Wiring	PIN3= V+ PIN4 = Ground
	Amplifier
Type	1 module class D electronically processed
Power	30 W @ 8Ω [3]
Protection	Dynamic limiter, over current, over temp, short circuits
Input impedance	112K balanced 56K unbalanced
Distortion	F = 1 KHz Po = 20W 0.2% THD+N
	DC Power
Operating range	Standard 12 - 24 Vdc
P. nom / I. nom	1 A / 24 Vac
Minimum operation voltage	11 Vac
Maximum operation voltage	25 Vac
Max continuous burst current	Standard 0.75A(>10 sec) - 3A (<1 sec)
	Physical
Dimensions	8.5 cm dia x 9.6 cm deep (3.35" dia x 3.78" deep)
Weight	0.42 Kg (0,93 lbs)

DISPERSION GRAPHS



horizontal



vertical

Notes for data
1. Maximum RMS applicable power for a musical signal, the reference signal is the one proposed by EIAJ standard.
2. Measured @4 mt then scaled @1 mt
3. Amplifier wattage rating is based on the maximum unclipped burst sine wave RMS voltage that the amplifier will produce into the nominal load impedance.

New materials and design are introduced into existing products without previous notice. Present systems may differ in some respects from those presented in this brochure.

Approval

K-array declares that this device is in compliance with the applicable CE standards and regulations.

Before putting the device into operation, please observe the respective country-specific regulations!

WEEE

Please dispose of this product at the end of its operational lifetime by bringing it to your local collection point or recycling centre for such equipment.

The contents of this manual are furnished for informational purpose only. Hp Sound Equipment s.r.l. assumes no responsability for any errors or inaccuracies that may appear in this manual.

Hp Sound Equipment s.r.l. reserves the right to make modifications without prior notice.

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