Klein + Hummel

NEW

O 410

Active Mid-Field Monitor

Preliminary Information

Mid-Field Monitors

Back in 1967, Klein + Hummel launched the world's first active studio monitor, the OY. The O 410 represents the latest incarnation of the many technologies pioneered by Klein + Hummel during the intervening 40 years. Engineering excellence applied to all aspects of the O 410 design brings a new benchmark in audio reproduction quality. A waveguide featuring Mathematically Modeled Dispersion™ (MMD™), flexible acoustical controls, various input options and an extensive mounting hardware range allow the O 410 to be used in diverse acoustical conditions, with any source equipment, and in a wide variety of physical locations.

The O 410 has been designed for use as a mid-field or main monitor. It is particularly well-suited for use in music, broadcast and post production studios for tracking, mixing and mastering. The O 410 can be used free-standing or flush-mounted into a wall, and, in multichannel systems, can be mixed freely with other loudspeakers in the Klein + Hummel range.

Technical Data	Mid-Field/Main
	O 410
Free field frequency response 1	34 Hz – 20 kHz, ± 2 dB
Free field frequency response 2	32 Hz – 24 kHz, ± 3 dB
Self-generated noise level	< 25 dB(A) at 10 cm
THD < 0.5 % at 1 m distance	95 dB SPL (> 40 Hz)
Nominal power capacity	–
Max. SPL	
In half space at 3 % THD	120.0 dB SPL
Averaged between	100 Hz and 6 kHz
Electronics	
Woofer amplifier, continuous output power*	340 W
Woofer amplifier, peak output power*	400 W
Midrange amplifier, continuous output power*	160 W
Midrange amplifier, peak output power*	190 W
Tweeter amplifier, continuous output power*	180 W
Tweeter amplifier, peak output power*	210 W
Controller design	Analog, active
Crossover	
Frequency	600 Hz/2.0 kHz
Slope	24 dB/oct.
Equalization: Low cut	–
Bass	0; – 2.5; – 5; – 7.5 dB
Mid	0; – 1.5; – 3; – 4.5 dB
High	1; 0; – 1; – 2 dB
Parametric Equalizer	Bypassable
Gain	+ 4 ... – 12 dB
Frequency	20 ... 200 Hz
Q	1 ... 8
Protection circuitry	Limiter: low, mid, high
Subsonic filter frequency; slope	15 Hz; 12 dB/oct.
Input, analog: Impedance, electronic symmetry	XLR, 13 kΩ
Impedance, bal. floating	XLR, 4.7 kΩ**
Input sensitivity	– 8 dBu / + 6 dBu
Attenuator	– 9 ... + 6 dB
CMRR	> 60 dB @ 15 kHz
In-/Output, digital: Norm XLR, (BNC)	AES3 (AES3id, S/P-DIF)**
Impedance XLR	110 Ω, balanced floating**
Impedance BNC	75 Ω, non symmetrical**
Switch, digital input	Digital / analog**
	Left / mono / right**
Digital converter: Resolution, design	16 ... 24 bit DA, ΔΣ**
Sampling rate	20 kHz ... 216 kHz (SRC)**
Displays, indicators: Power on	K + H logo "red"
Limit/clip/signal	Protect / digital / analog
Display	–
Mains	100, 120, 230 V AC swichable
Power consumption: Idle	36 VA
Full output AC; DC	1300 VA
Mechanical Specs	
Height x width x depth	645 x 330 x 480 mm
	25 3/8 x 13 x 18 7/8"
Net volume internal	42 liters
Weight	36 kg (79.4 lb)
Drivers	Magnetically shielded
Woofer	250 mm / 10"
Midrange	76 mm / 3"
Tweeter	25 mm / 1"
Mounting points	8 x M5 on rear
	–
Mounting hardware	LH 41 + LH 28 / LH 29
	LH 41 + LH 36 + LH 28 / LH 29
	LH 41 + LH 42
Cabinet surface	Painted
Color standard	Anthracite, silver
optional	–
Special (add-on price)	–
Baffle cover optional	Optional removable metal grille

* THD+N < 0,1 %; limiter deactivated

** User fitable option

O 410 Mid-Field Monitor

Mid Sized 3-way System

- The most important part of the frequency spectrum is reproduced by a separate midrange driver
- Extremely low harmonic and intermodulation distortion results in clean sounding audio reproduction
- Exceptionally neutral sound stage from 32 Hz to 24 kHz (– 3 dB)
- Ideal cabinet materials with excellent self-damping properties
- Structural resonances avoided using LRIM™ (Low Resonance Integral Molding™)
- Vented enclosure extends bass response, even at very high output
- Modern-looking design with optional grille
- Extensive accessories allow for a multitude of installation possibilities
- Magnetically shielded for use next to CRT screens

Mathematically Modeled Dispersion™ (MMD™)

- Three stage design process:
  - Waveguide is mathematically modeled before physical prototypes are realized
  - Physical prototypes are measured under anechoic conditions to verify theoretical performance
  - Extensive listening tests correlate objective measurements and subjective perception
- Wide horizontal directivity gives increased freedom of movement along the mixing console
- Narrow vertical directivity reduces the effect of early reflections off the console surface
- MMD™ is easily rotated in the field when horizontal mounting the cabinet
- Perfect directivity pattern leads to a smooth power response

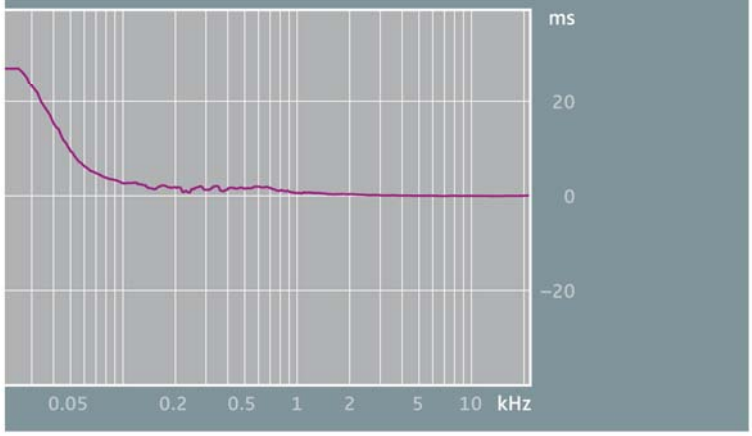
Advanced Electronics

- Integrated electronic limiter for each driver
- Hybrid class A-B amplifiers, employed for their best overall performance, are also protected
- Active three-way crossover with 24 dB/oct. slopes
- Input options give flexibility without burdening basic product:
  - Transformer balanced input stage equipped with special distortion reduction crossover function
  - 16...24-bit, 20...216 kHz digital input stage for AES3, AES 3id and S/P-DIF signals
  - XLR and BNC inputs, and a BNC output for flexible and robust interconnectivity
- Display for signal type, protect and digital status is integrated into the MMD™, together with a K+H logo
- Controls adapt the monitor's response to compensate for the loudspeaker's environment:
  - Bass, mid and treble controls for specific and common acoustical issues
  - Parametric EQ for low-frequency corrections
- Electronics can be remotely accessed when the cabinet is flush mounted
- Electronics can be remotely powered on with two modes of operation (0 V and 12 V trigger)
- Attention to detail in design results in low self-generated noise

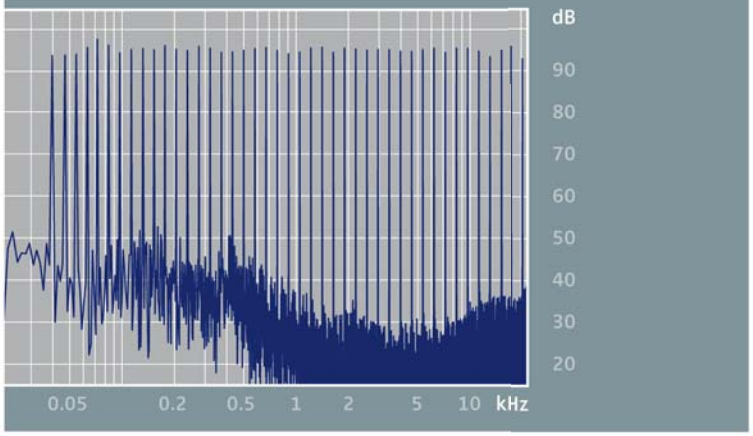
Frequency response

THD at 95 dB SPL at 1 m 2nd 3rd

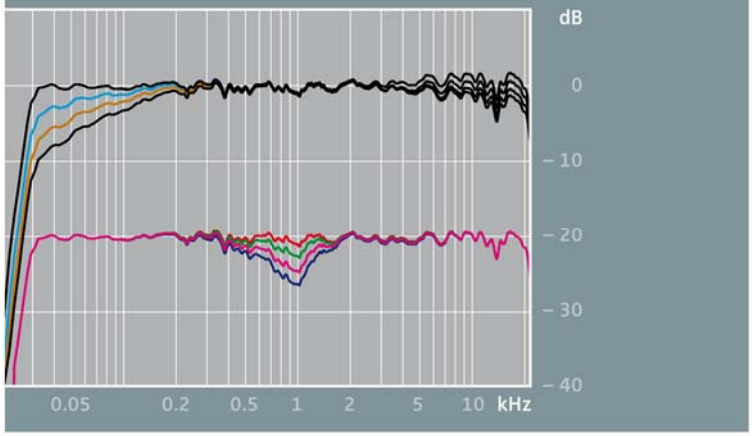
Group delay



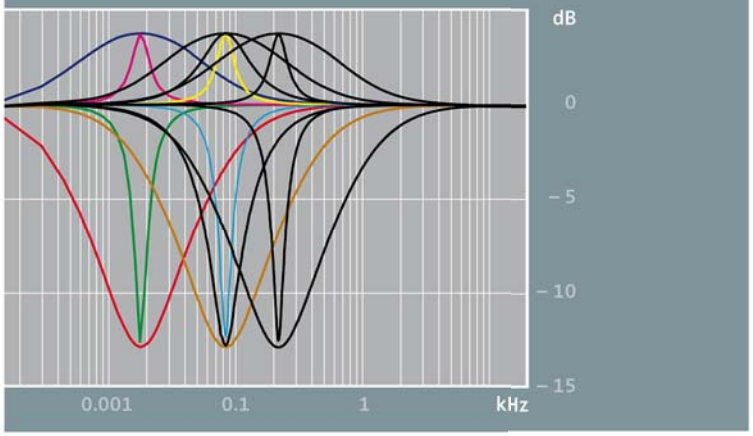
Multitone distortion O 410 at 95 dB SPL at 1 m



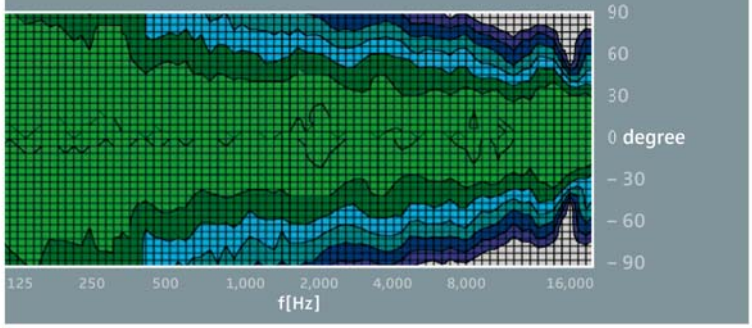
Acoustical controls



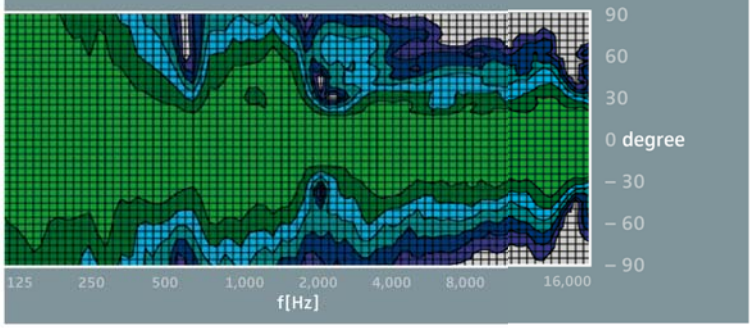
Parametric equalizer



Horizontal directivity



Vertical directivity



0 to 3 | –3 to 0 | – 6 to – 3 | – 9 to – 6 | – 12 to – 9 | – 15 to – 12 | – 18 to – 15 | – 21 to – 18

Decrease of SPL (dB)

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