

CP-20

electronic piano operating manual



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introduction

You have just joined the large and growing family of satisfied users of Yamaha products. You have chosen wisely when you picked Model CP-20 as your electronic piano. Years of dependable service await you.

Please read this operating manual carefully before connecting the CP-20. The few minutes spent with this manual will help you understand its operation and high performance. You will also learn how to connect the electronic piano properly and how to really get the most out of all the features Yamaha has incorporated into this electronic piano.

If you need any special help or service, see your Yamaha dealer. He knows what to do and will be happy to help you. You've made a good choice. We are confident you'll be satisfied with the performance and versatility of the CP-20.

features

For the musician on tour, the CP-20 Electronic Piano combines the qualities of touch, expression and sound variety in a very portable, rugged package.

If you're a studio musician, the CP-20 gives you the ability to shift from one color sound to another — easily and quickly — on the same keyboard, a keyboard that feels very similar to an acoustic piano.

If you're a composer, the CP-20's wide variety of sounds can help you overcome that "one-color" tired-out sound you may now be working with. The piano's flat top is just right for scoring. In fact, for any keyboard musician, the CP-20's unique combination of sound and features make this a very versatile instrument.

The CP-20 is velocity sensitive, just like a traditional piano. This means that when you strike the keys harder, it gets louder (continuous loudness variation, not a stepped change), yet the CP-20 has no strings or rods to get out of tune, no complicated action to stick or break. The CP-20 is an all electronic piano; the only moving parts in the keyboard are the keys and the reliable leaf switches they activate.

Yamaha worked closely with top performing artists during the combo keyboards' development. Their many valuable suggestions helped perfect the touch, the sound, the features — in fact, the whole concept — of the Yamaha Electronic Piano. Thus, the CP-20 is an instrument developed for you, the musician and artist. When you play the Yamaha CP-20 Electronic Piano, feel its responsiveness, and hear its repertoire of sounds, you will understand why Yamaha, with over nine decades of keyboard instrument experience, is the leader in contemporary keyboards.

CP-20 specifications

Keyboard: 61 keys ($F_1 \sim f_3$)

Controls: PITCH; DECAY; TREMOLO; Four PIANO/HARPSICHORD SWITCHES to alter the sound; BALANCE; BASS and TREBLE Tone Controls; and VOLUME.

Power Requirements:

120V 0.3A (Canadian model),
20W (other models)

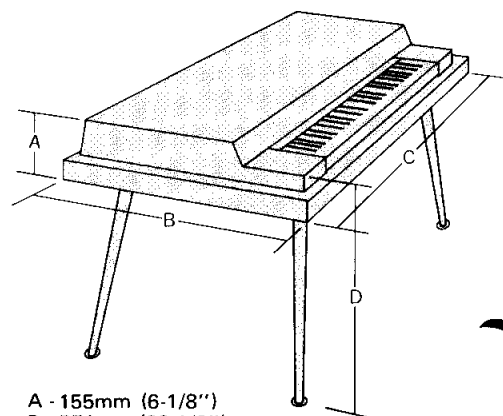
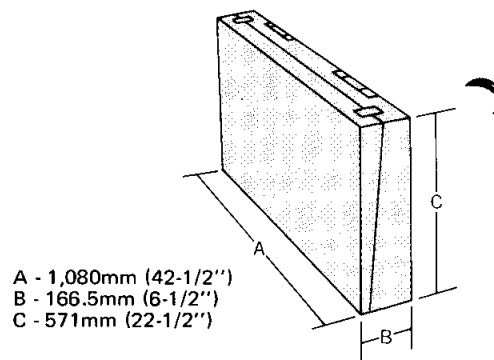
Jack Panel:

Foot Switch Jack: SUSTAIN

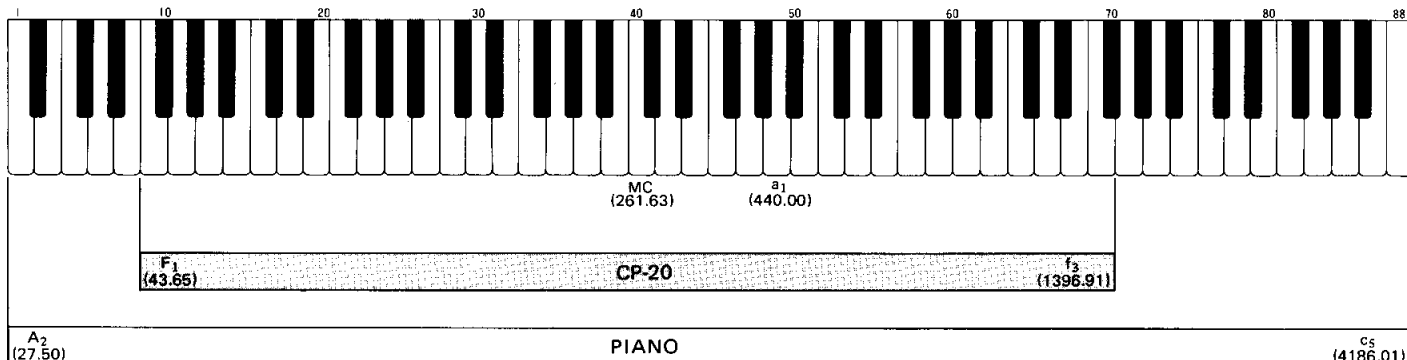
Output Jacks: OUTPUT; HEAD-
PHONES

Dimensions:

Net Weight: 40.5Kg (89.3lbs.)



SCALE RANGE

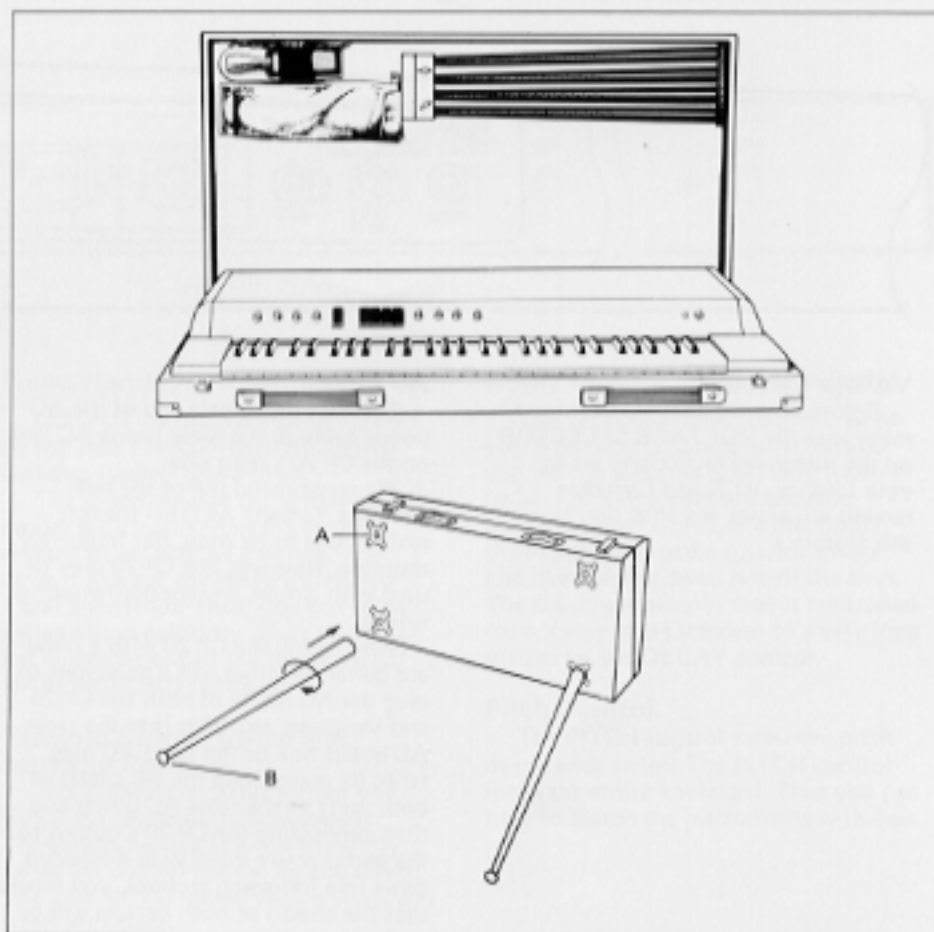


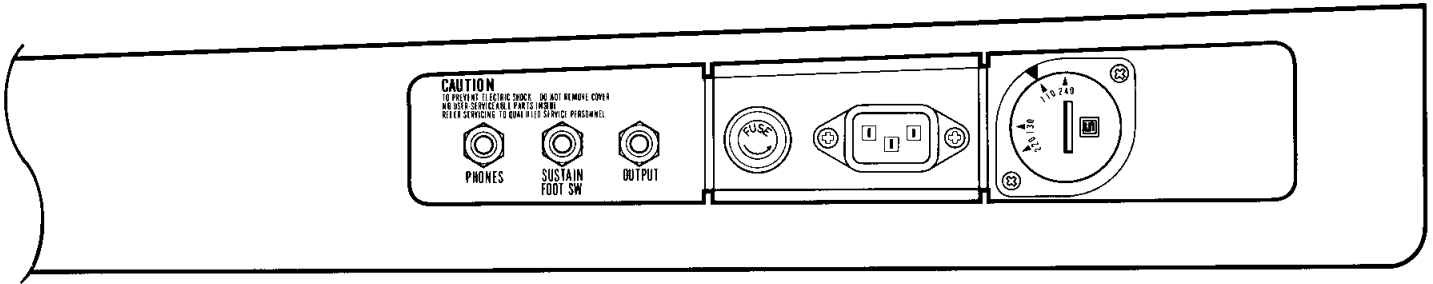
(Frequency in Hz)

setup

1. Remove the four legs from the storage compartment and attach them with screws A on the lower four corners of the unit.

2. When standing the unit upright, balance it by adjusting balancing screw B.





Voltage Selector

Before plugging in the power cord, make sure the VOLTAGE SELECTOR on the side panel is properly set for your locality. (U.S. and Canadian models are preset and thus don't have this feature.)

AC Power

Connect the female end of the AC power cable to the three prong AC jack on the CP-20's right side.

We recommend use of the self-powered Yamaha A4115H speaker system, due to its wide, flat frequency response. However, the CP-20 may be used with almost any speaker/amplifier system.

When using the CP-20 with a standard guitar amplifier, it's a good idea to plug the AC cables of both the CP-20 and the guitar amplifier into the same AC outlet box or the same AC plug strip. By connecting the AC cables of both units to the same AC outlet and then connecting the CP-20's output to the guitar amp's input with a shielded cable (see following section), you insure that the chassis of both devices will be at the same ground potential, avoiding any possible shock hazard. (Not applicable for the model with the 2P-plug.)

Output Jack

OUTPUT jack is a high impedance, low line level, standard tip/sleeve phone jack. (Low line level is nominal -20dB or an average of 77.5 millivolts output). Use any high quality phone-to-phone patch cable to connect the CP-20 to a standard guitar amplifier, a high impedance mixer such as Yamaha's PM-170 or directly to an amplifier/speaker system combination such as the Yamaha A4115H*.

Headphone Output Jack

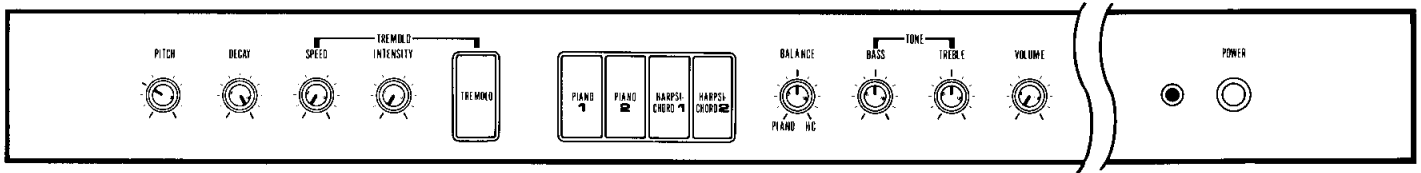
This stereo phone jack is for connection of any stereo headphones of 8-ohm or higher impedance. It is actually a mono output with identical right and left signals. The headphone volume is controlled by the Volume control. This jack supplies enough drive for headphone monitoring in the loudest environment. The signal fed to the OUTPUT jack is not cut out even if the PHONES jack is plugged in.

Pedal Jack

Plug the supplied SUSTAIN foot pedal into the SUSTAIN jack. Even if a SUSTAIN foot pedal is not plugged in, the keys will sustain normally when you hold them down.

*Set the INPUT LEVEL switch on the PM-170 or the A4115H to the "-20dBm" position (for nominal -20dB sensitivity).

controls and switches



AC Power Switch and Pilot

Push the switch once to turn the CP-20 "on", and again to turn power "off". The Pilot lamp is illuminated when the AC power is "on".

Volume

The VOLUME control sets the overall level in Output and Headphone Output jacks.

Balance

The BALANCE control, continuously adjusts the relative level of PIANO 1 and PIANO 2 compared to HARPSICHORD 1 and HARPSICHORD 2.

Bass and Treble Tone Controls

The BASS and TREBLE controls both affect the entire keyboard, changing the sound in Output and Headphone Output jacks. Centering the controls (12 o'clock) provides "flat" frequency response. Experiment with the TONE controls to learn how they can alter the CP-20's sound.

Piano/Harpsichord Switches

OUTPUT carries the sounds created by the four PIANO/HARPSICHORD switches labeled above them.

The sound created by its PIANO 1 switch is different from the sound created by its PIANO 2 switch. The same is true for the HARPSICHORD 1 and 2 switches. Thus, you can enjoy varied sound colors by selecting different combinations of the four PIANO/HARPSICHORD switches.

Tremolo Switch, Speed and Intensity Controls

The Tremolo controls further enhance the CP-20's available sounds. Tremolo automatically and smoothly varies the output volume up and down. The TREMOLO rocker switch starts and stops the effect.

The TREMOLO INTENSITY control sets the depth of the tremolo effect (the modulation percentage). Lower settings yield a more shallow tremolo effect, and higher settings yield a more intense tremolo effect. The TREMOLO SPEED control varies the rate of the TREMOLO effect (the modulation frequency). Higher settings of the SPEED control cause the volume to vary more rapidly; lower settings cause the volume to vary more slowly.

Decay Control and Sustain Pedal

The keyboard notes "sustain" when you hold down the keys or when you depress the supplied SUSTAIN foot pedal, just like a standard acoustic piano. In other words, holding down the sustain foot pedal sustains a note just like holding down one of the keys. The maximum sustain time is controlled from a very short staccato to a very long sustain by the DECAY control.

Pitch Control

The PITCH control varies the pitch over a wide range. The PITCH control tunes the entire keyboard. Thus you can tune to match the instruments with you.



A4115H self-powered speaker system



EM-150 self-powered mixer



PM-170 mixer

The sound of the CP-20 will depend to a large degree on the amplifier and speaker system. If you use several keyboards, you may also wish to use a keyboard mixer. In any case, it's a good idea to choose these items carefully.

If you have a multi-keyboard setup, we recommend the Yamaha PM-170, a six-input stereo output mixer with VU meters and BASS and TREBLE equalization on every input. This mixer can then feed any amplifier/speaker system. Alternately, use a self-powered mixer such as the Yamaha EM-150. The CP-20's output can be fed to the mixer input, and the output can be connected directly to a speaker system such as Yamaha S4115H's.

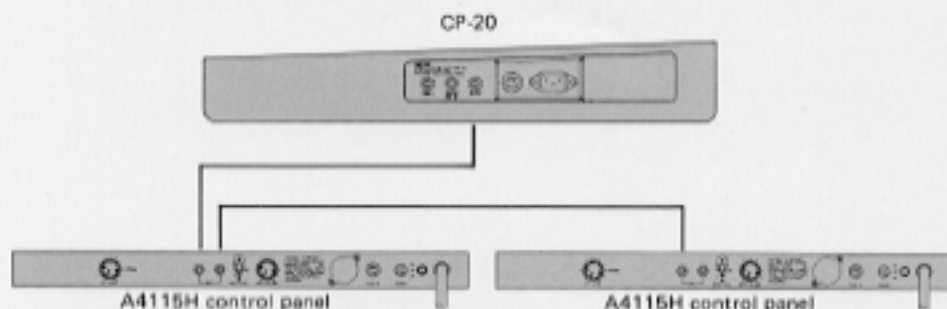
For amplified speaker systems, we recommend the Yamaha A4115H, a self-powered, two-way speaker system with a very natural, accurate sound and a wide, smooth dispersion pattern. The A4115H can be driven directly from the CP-20's output, or from the output of a PM-170 or similar mixer. In the studio, the sound can be taken direct from the CP-20, or from a microphone placed near the A4115H. With this setup, there should be little or no audible difference whether the piano is "direct" or miked. On the stage, the A4115H's high sensitivity and high power output mean that you can have high volume levels free of audible distortion.

The A4115H's controls are simple to operate. If you are using just one A4115H, connect a phone-to-phone patch cable between the CP-20's OUTPUT and the A4115H's INPUT jack.

If you wish to use two A4115H's, one may be fed by the CP-20's OUTPUT.

Then, connect a phone-to-phone cable from the unused input jack of the A4115H being fed by the CP-20 to an input jack on the next A4115H.

Set the A4115H's INPUT LEVEL switch to the "-20dBm" position, and set its INPUT VOLUME as required. The H.F. LEVEL control sets the volume level of the high frequency horn in relation to the low frequency woofer.



Connecting the CP-20 to two A4115H amplified speaker systems.

Disassembled, the CP-20 is compact, easy to carry and suitable for light duty traveling, such as in a station wagon or van. For heavy cartage (commercial trucking or air-freight as examples), we recommend that you use an additional travel case.

PM-170 general specifications

Number of Inputs: 6 Input Channels,
1 Auxiliary Stereo Input.

Input Channel Controls: VOLUME,
INPUT LEVEL SWITCH, HIGH-
PASS FILTER, LOW & HIGH EQ,
PAN POT.

Number of Outputs: 2 PROGRAM
OUT (L, R), 1 PHONES.

Frequency Response: $\pm 0.5\text{dB}$ (50Hz ~
15KHz).

Total Harmonic Distortion: Less than
0.1% +20dB (7.8V) (30Hz ~ 25KHz).

Hum and Noise (20Hz ~ 20KHz):
-118dBm Equivalent Input Noise
(150-ohm termination)
-66dB (0.388mV) output noise
(70dB signal-to-noise) (Master
Volume & one Input Volume at
nominal level).

Maximum Voltage Gain: PGM 66dB,
AUX IN 36dB.

Maximum Input Level: +9dB (2.2V)
(Input Level Switch at -20dB),
-21dB (69mV) (Input Level Switch
at -50dB).

Maximum Output Level: +24dB
(12.3V) (at less than 0.1% T.H.D.).

Crosstalk: -60dB (at 1KHz adjacent
inputs).

Equalization: $\pm 15\text{dB}$ (LOW, HIGH).

High-Pass Filter: 12dB per octave roll-
off below 40Hz or 80Hz.

Power Consumption: AC, 50/60Hz,
15W.

Finish: Semi-gloss black.

Dimensions (WxHxD): 48x18.2x25.3cm
(18-7/8x7-1/8x10").

Net Weight: 8Kg (17.6lbs.).

input specifications

Model	Connection	Level Switch	Impedance		Sensitivity (at Max. Gain)	Input Level		Connector** in Console
			Actual	Nominal Source		Nominal	Max. before Clip	
PM-170	INPUT (1 ~ 6)	-50dB -40dB -20dB	20K Ω	150 Ω ~ 600 Ω Mics & Lines	-62dB (0.6mV)	-50dB (2.5mV)	-20dB (78mV)	Phone Jack
			30K Ω 35K Ω	600 Ω ~ 10K Ω Mics & Lines	-52dB (2mV) -32dB (20mV)	-40dB (7.8mV) -20dB (78mV)	-10dB (250mV) +10dB (2.5V)	
	AUX IN (L,R)	-	30K Ω	5K Ω Lines	-32dB (20mV)	-20dB (78mV)	-	Phone Jack

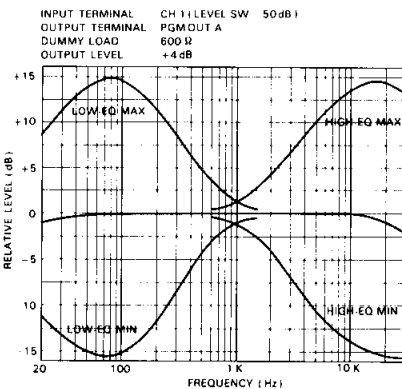
output specifications

Model	Connection	Level Switch	Impedance		Power Output Level		Connector** in Console
			Actual	Nominal Load	Nominal	Max. before Clip	
PM-170	PGM A (L, R)	+4dB -20dB	5 Ω 100 Ω	600 Ω	+4dB (1.23V) -20dB (78mV)	+24dB (12.3V) 0dB (775mV)	Phone Jack
	PGM B (L, R)	-	5 Ω	600 Ω	+4dB (1.23V)	+24dB (12.3V)	Phone Jack
	HEADPHONES	-	4.7 Ω	8 Ω	-10dB (250mV)	+4dB (1.23V)	Stereo Phone Jack

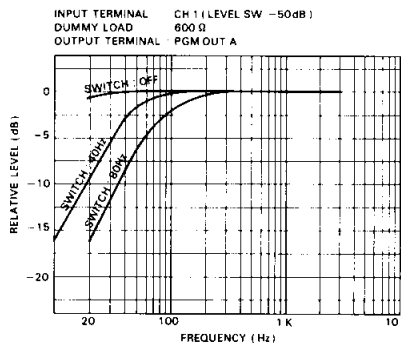
*This is the level required to produce an output of +4dB (1.23V).

**All XLR connections are balanced and transformer-isolated. Phone jacks are unbalanced.
In above specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V.

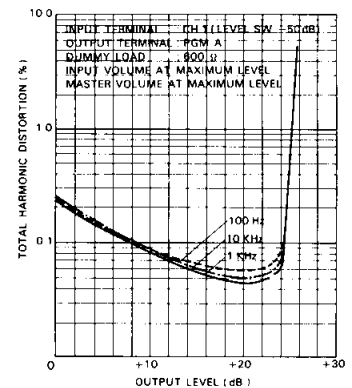
Frequency Response



High-Pass Filter Frequency Response



Total Harmonic Distortion



A4115H amplifier controls & jacks

Input Jacks: Two (parallel) standard tip-sleeve phone jack which accept unbalanced, line level sources.

Input Level Control: An input attenuator controls the volume level of the amplifier.

Input Level Switch: A slide switch selects -20dBm or 0dBm nominal input level: for compatibility with low or high level lines.

H.F. Level Control: An "L-Pad" attenuator (for constant impedance) adjusts the volume level of the high-frequency driver.

A4115H amplifier specifications

Output Power: 100 Watts continuous average sine wave power into an 8-ohm load at 0.1% T.H.D.

Frequency Response: 10Hz to 30kHz +0, -1dB with the INPUT LEVEL switch in the "0dBm" position; 40Hz to 50kHz +0, -3dB with the INPUT LEVEL SWITCH in the "-20dBm" position.

Power Bandwidth: 20Hz to 20kHz (at 100 watts into an 8-ohm load at 0.1% T.H.D.).

Total Harmonic Distortion: Less than 0.01% at 80 watts into 8 ohms.

Damping Factor: 90 from 20Hz to 3kHz.

Hum and Noise: -73dB (0.17mV)†

Slew Rate: 25 volts per microsecond.

Input Sensitivity (input level for 100-watts into an 8-ohm load): 0dB (0.775 volts) with the INPUT LEVEL switch set at the "0dBm" position; -20dB (77.5mV) with the INPUT LEVEL switch set at the "-20dBm" position.

Input Impedance: 8k-ohms with the INPUT LEVEL CONTROL at the maximum clockwise position.

A4115H speaker specifications

System Impedance: 8-ohms nominal, 7-ohms minimum.

Sensitivity: 101dB SPL at 1 meter with 1 watt input (DIN and JIS standard)*; 52dB SPL at 30 feet, 1 milliwatt input (EIA standard).

Frequency Response: 70Hz to 15kHz, ±6dB (referred to 101dB SPL).

Dispersion: 70-degrees horizontal by 40-degrees vertical (angles between 6dB down points at 1kHz).

Crossover Transition Frequency and Slope: 2kHz at 12dB/octave

Enclosure Type: Combination—front-loaded horn/ducted-port bass reflex, with separate high frequency horn/compression driver.

Finish: Black leatherette with metal corner caps and black (removable) grille.

Dimensions:

Height: 908mm (35-3/4")

Width: 610mm (24")

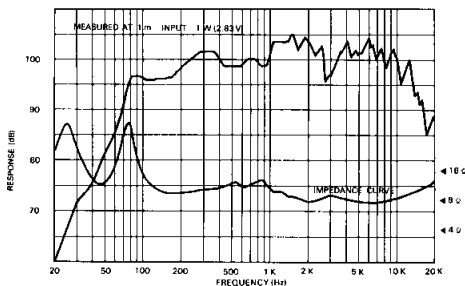
Depth: 452mm (17-3/4")

Weight: 58Kg (127.9lbs.)

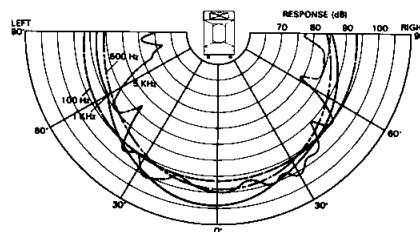
Driver (Loudspeaker)	Model	Nominal Cone Diameter	Voice Coil Diameter	Nominal Impedance	Sensitivity **	Continuous Pink-Noise Power Rating	Peak Power	Rated Power Bandwidth	Magnet Weight	Flux Density
Woofer	JA3803	15" (38cm)	2.6" (6.6cm)	8 ohms	99dB	120 Watts	240 Watts	20Hz-20kHz	6.0Kg (13.2lbs.)	12,500 Gauss
Horn/Driver	JA4201		1.6" (4.2cm)	8 ohms	104dB	20 Watts	40 Watts	2kHz-20kHz	2.2Kg (4.8lbs.)	16,000 Gauss

NOTES: The Yamaha S4115H speaker system is identical to the A4115H, except it contains no amplifier. In above specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V.

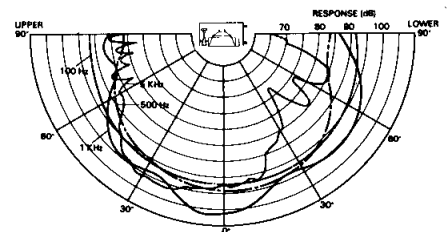
A4115H Frequency Response



A4115H Horizontal 180° dispersion



A4115H Vertical 180° dispersion



†Measured with a 6dB/octave filter at 12.5kHz (equivalent to a 20kHz filter with infinite dB/octave attenuation).

*Sensitivity at 4 feet, with 1 watt is 1.75dB below DIN/JIS standard.

**Sensitivity is extremely significant, since an increase of only 3dB in sensitivity is equivalent to doubling the amplifier power. In other words, a 50-Watt amp used with a speaker that is 3dB more sensitive than another speaker, will produce the same sound level as a 100-Watt amp used with the less sensitive speaker.

Specifications subject to change without notice.

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