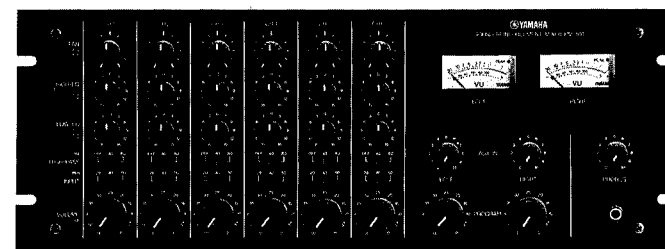
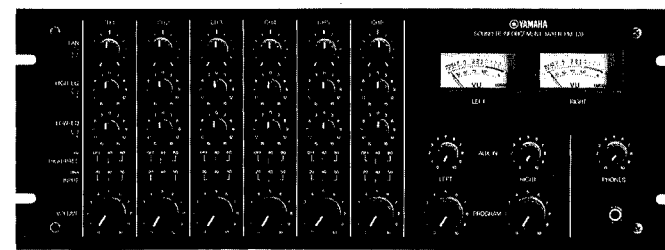


# SOUND REINFORCEMENT MIXERS

OWNER'S MANUAL

PM-170

PM-180



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## **Congratulations!**

You have just joined the large and growing family of satisfied users of Yamaha products. You have chosen wisely whether you picked model PM-170 or PM-180 or both. Years of dependable service await you.

Please read this OWNER'S MANUAL carefully before connecting either mixer. The few minutes spent with this manual will help you understand their operation and high performance. You will also learn how to connect the mixers properly and how to really get the most out of all the features Yamaha has incorporated into these two mixers.

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 these models.

# FEATURES

Yamaha's PM-170 and PM-180 are six-channel input, stereo output mixers that can be used alone or as submixers with more sophisticated models. They are easy to operate but perform like real professionals. Check the features here and look at the front and rear panels.

You'll see immediately that these two mixers have the flexibility, performance and reliability you need in your work.

## Six-Channel Inputs

Both mixers have six-channel inputs. Each channel has its own individual VOLUME, LOW/HIGH-EQ and PAN rotary controls and HIGH-PASS filter and INPUT level switches.

## Choice of Input Jacks

PM-170 has unbalanced phone jacks for all six input channels. PM-180 is equipped with transformer-isolated XLR connectors.

## Top Electronic Performance

These mixers are designed for top professional performance. They offer flat frequency response, low distortion and inaudible noise and crosstalk.

## Mechanically Solid

Both the PM-170 and PM-180 are rugged enough for the road but especially ideal for permanent installation thanks to the standard 19" rack mounting. All solid state circuitry increases reliability and portability.

## Smooth Rotary Controls

All the controls are conveniently mounted on the front panel where you can easily reach them. They offer smooth performance to give you the mixing freedom and control you need.

## Versatile Auxiliary Inputs

The right and left AUX INputs can be used for taped programs, echo or reverb or any suitable sources without using any of the six input channels.

## VU Meters + LED's

The two VU meters offer a visual indication of the average audio level of the program buses. PM-180 has, in addition, two peak indicating LED's (Light Emitting Diodes). These LED's react faster than the meters and give the operator a means to evaluate actual output headroom.

## Switchable Input/Output Levels

All six input channels have switches to change the input attenuation so the full range of the VOLUME controls can be used with varying microphone or instrument sensitivities. PROGRAM OUT A is switchable between +4dB (1.23V) and -20dB (78mV) (PM-170). PROGRAM OUT A can be changed between +4dB (1.23V) and -50dB (2.5mV) (PM-180). PROGRAM OUT B for both mixers is set at +4dB (1.23V).



PM-170



PM-180

# PRECAUTIONS

## Precautions

These Yamaha mixers have a modern solid state construction. They have been designed to stand up to tough handling, but they are not indestructible. The most frequent cause of trouble is improper use due to incomplete understanding of exactly what these mixers can and cannot do. You can easily avoid these mistakes by following the precautions listed here before plugging in or attempting to operate your mixer.

Be sure the POWER switch is off before plugging in the power cord.

Unplug the power cord as a safety precaution, or at the very least, be sure the POWER switch is off before connecting or disconnecting any cords.

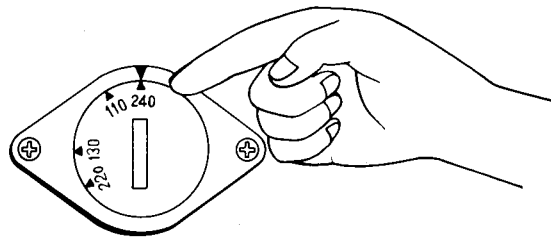
The mixer circuitry is guarded by a fuse. When replacing a fuse after the trouble has been corrected, be sure the new one is the exact same type and rating as specified on the chassis.

Keep the units away from exposure to direct sunlight and other sources of excessive heat, humidity, dust and shocks.

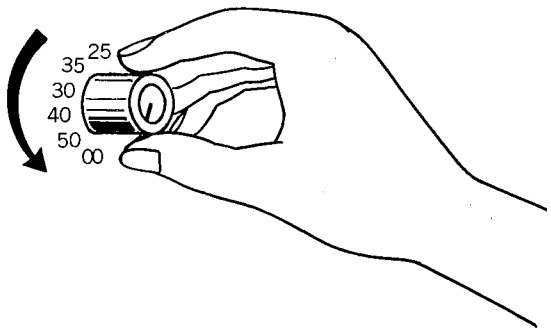
# & CONNECTIONS

## Connecting Up

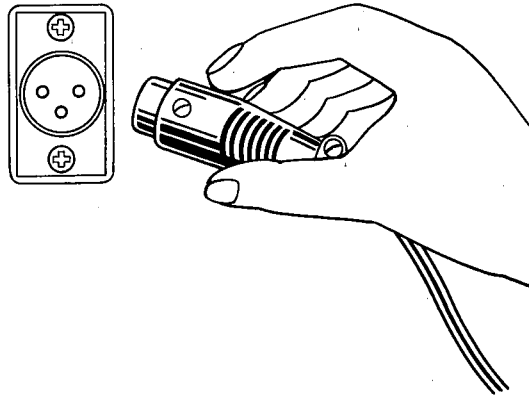
1. Before plugging in the power cord, make sure the **VOLTAGE SELECTOR** is properly set for your locality. (U.S., Canadian and Australian models are preset and thus don't have this feature.) For the British Standard model, please refer to the instructions on the right side of this page.



2. Set the front panel **VOLUME** controls to **zero** or **min** position and make sure the **POWER** switch is **OFF**.

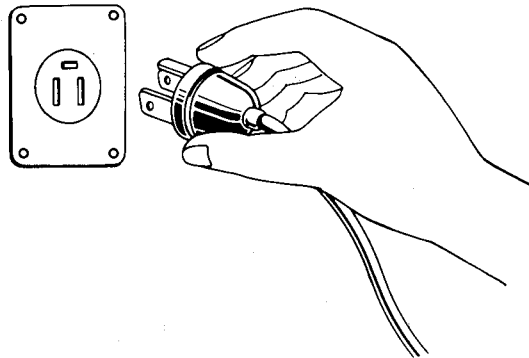


3. Connect your power amp, etc. to the **OUT**put jacks.



4. Connect the input cords from your instruments and/or mics to the **IN**PUT jacks.

5. Plug in the power cord.



6. Turn on the **POWER** switch. Pick the **ON** position which affords the lower hum level. (Only one **ON** position for Australian and European models).

7. Adjust the **VOLUME** and other controls. Now you are ready to mix sound sources as you like.

## FOR THE BRITISH STANDARD MODELS

As the colours of the wires in the mains lead of the apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows. The wire which is coloured **GREEN-and-YELLOW** must be connected to the terminal in the plug which is marked by the letter **E** or by the safety earth symbol  $\equiv$  or coloured **GREEN** or **GREEN-and-YELLOW**. The wire which is coloured **BLUE** must be connected to the terminal which is marked with the letter **N** or coloured **BLACK**. The wire which is coloured **BROWN** must be connected to the terminal which is marked with the letter **L** or coloured **RED**.

### IMPORTANT:

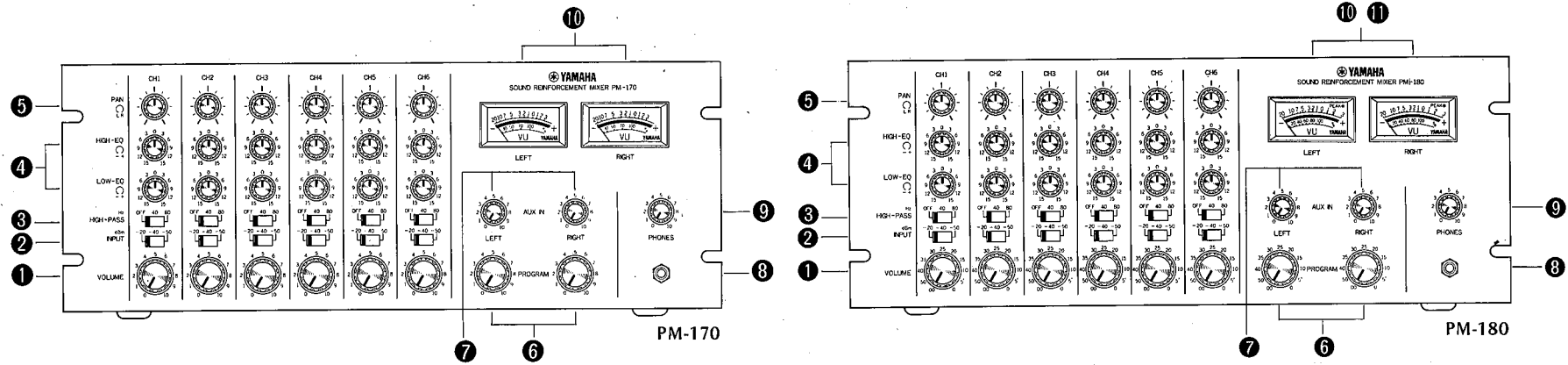
The wires in the mains lead are coloured in accordance with the following code.

**GREEN-and-YELLOW** ..... Earth  
**BLUE** ..... Neutral  
**BROWN** ..... Live

### WARNING:

This apparatus must be earthed.

# FRONT & REAR PANELS



## FRONT PANEL

### 1 CHANNEL VOLUME

The VOLUME control provides continuously variable adjustment of the channel output. The relative level applied to the left and right program mixing buses is determined with the PAN pot but VOLUME sets the overall level fed to the mix buses via the pan pot. Setting at -6dB (·) provides a nominal level when a signal is fed to the PM-180 at the same level as the level set by the INPUT level switch. Setting the control near the dot offers the best S/N ratio.

### 2 INPUT LEVEL SWITCH

This switch changes the input attenuation to accommodate nominal input signals of -50, -40 or -20dBm. These nominal sensitivities correspond to low-output dynamic microphones, electric instrument (pre-amplified) outputs, and low-level (hi-fi) line sources. When properly set, the INPUT switch provides the best combination of maximum headroom and minimum noise characteristics and, at the same time, it maintains a full range of VOLUME control rotation.

### 3 HIGH-PASS FILTER

This switch-actuated 6dB-per-octave HIGH-PASS filter can be used to "roll off" unwanted low frequency response without appreciably changing the nature of the mix. Rumble, wind noise, and dangerous "dropped mic" transients can be blocked from the mixer output, thereby, improving the sound (by lowering distortion and increasing headroom) and protecting speaker cones from excess excursion. The filter can improve many vocals by removing vocal P-pops and some breathing noises. In addition, the filter avoids

"bumpy" low frequency response caused when extreme bass leakage enters microphones and creates phase-dependent peaks and dips. There are three positions: OFF bypasses the filter entirely, 40Hz is a mild filter, 80Hz yields the most pronounced filter effect.

### 4 EQUALIZER

The LOW and HIGH EQ controls alter the frequency response of the channel input, allowing you to achieve a variety of tonal characteristics. A maximum of  $\pm 15$ dB of continuously variable shelving equalization is provided at 100Hz (LOW) and 10,000Hz (HIGH). Centering the EQ controls provides flat audio response by defeating the equalization.

### 5 PAN POT

This rotary control assigns the equalized, post-VOLUME control output of the channel to the left and right program mix buses. Centering the PAN POT places the signal equally in both buses (stereo center), while panning to one side or the other gradually assigns the signal to the left or right mix exclusively.

### 6 PROGRAM (MASTER VOLUME)

The left and right master PROGRAM controls set the overall volume of the stereo program outputs. In a stereo mix, they may be used to balance the image and for total program fades. When the mixer is used to feed two discrete monaural programs, rather than a single stereo program, each PROGRAM control serves as an independent output master.

### 7 AUX IN VOLUME

The left and right AUX IN controls attenuate signals from the respective auxiliary inputs and apply these signals to the left and right program mixing buses. AUX IN can be used to link two or more mixers, in which case these controls serve to balance the "local"

program mix with the externally mixed program. Alternately, the AUX IN controls can set the level of a stereo turntable preamp, taped programs, echo or reverb, or any suitable source connected to the auxiliary inputs.

### 8 HEADPHONE OUTPUT JACK

This stereo phone jack is for connection of almost any stereo headphones (8 ohms or higher impedance). The jack supplies enough drive for headphone monitoring in the loudest environments, and lets the operator listen to the program before turning up the master PROGRAM controls. Thus, any inputs may be previewed, and the mix adjusted prior to feeding the main outputs.

### 9 PHONES VOLUME

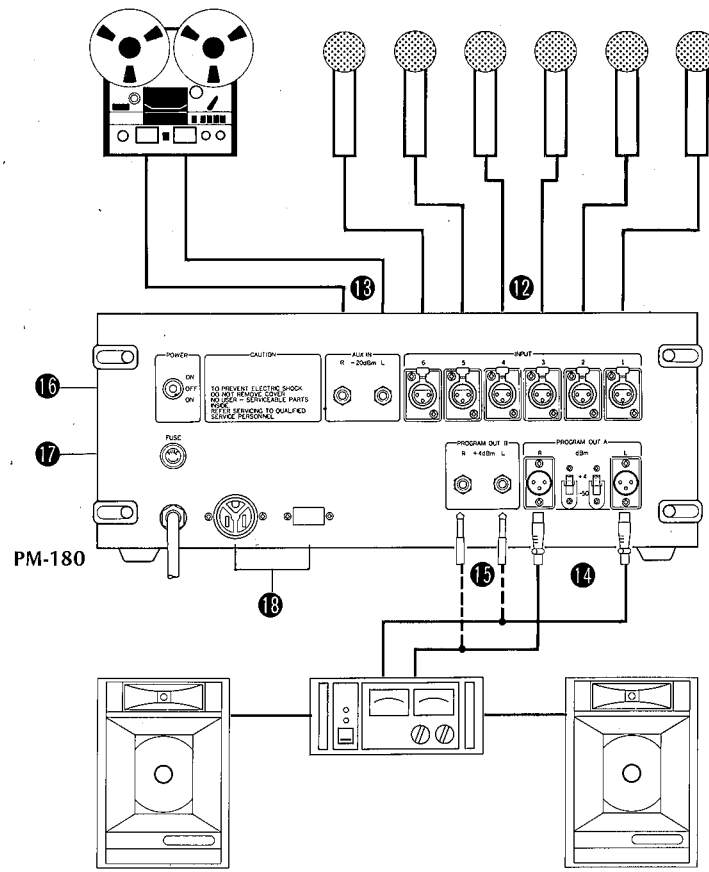
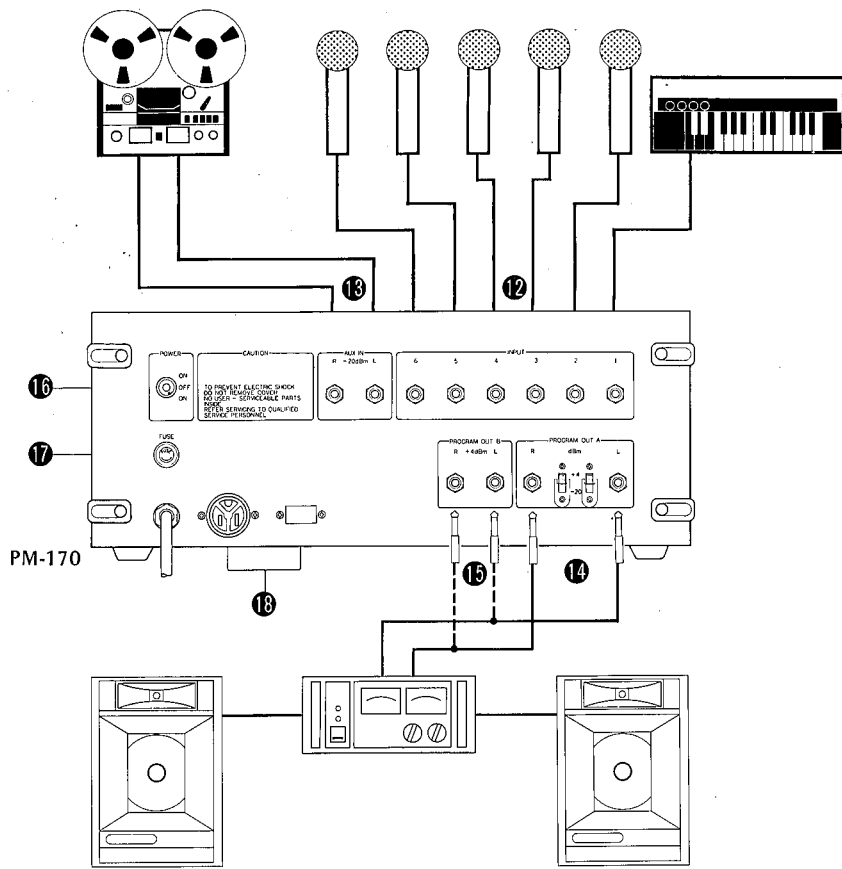
This 2-gang control simultaneously sets the volume in the left and right sides of the headphone output.

### 10 VU METERS

These illuminated, precision meters provide a visual indication of the average audio level of the program buses. Zero (0) VU is equal to the nominal program output level, depending on the setting of the rear-panel PGM OUT A LEVEL switches. 0 VU indicates an output of +4dB (1.23V) program level, when the switches are up.

### 11 PEAK INDICATORS (PM-180)

These LED's (Light Emitting Diodes) turn on when the instantaneous output level reaches 10dB above nominal level. Faster than the averaging characteristic of the true VU meter, the LED gives the operator a means to evaluate actual output headroom, and consequently the peak loads placed on amplifiers and speakers or on tape recorders. [There is still 10dB of headroom (to +24dB, 12.3V) above the LED turn-on point before clipping occurs.]



## REAR PANEL

### 12 CHANNEL INPUTS

The unbalanced phone jacks (PM-170) or the transformer-isolated (floating) XLR connectors (PM-180), inputs to channels 1 through 6, accept audio from any source of  $-50\text{dB}$  ( $2.5\text{mV}$ ) to  $-20\text{dB}$  ( $78\text{mV}$ ) nominal level. Higher levels may be accommodated by turning down the VOLUME. Alternately, to accommodate higher levels without loss of headroom, use external attenuation pads.

### 13 AUXILIARY INPUTS

The AUX IN inputs are unbalanced phone jacks, and are high impedance, so they accept low or high impedance sources. With a nominal input sensitivity of  $-20\text{dB}$  ( $78\text{mV}$ ), these jacks are suitable for connection of hi-fi tape machines, many echo and reverb units, and some mixers. AUX IN also is suitable for connection of hi-fi type RIAA turntable preamps, enabling records to be played without using input channels.

### 14 PROGRAM OUTPUT A (PM-170)

These unbalanced phone jacks carry the left and right program outputs of the mixer. The outputs are low impedance and have a nominal  $+4\text{dB}$  ( $1.23\text{V}$ ) output level, making them suitable for driving 600 ohm or higher impedance inputs. Alternately, the left and right PROGRAM A outputs may be switched to  $-20\text{dB}$  ( $78\text{mV}$ ) nominal level, making them suitable for driving medium level line inputs (typical of hi-fi or semi-professional equipment).

### 14 PROGRAM OUTPUT A (PM-180)

These transformer-isolated (floating) XLR connectors carry the left and right program outputs of the mixer. The outputs are low impedance and have a nominal  $+4\text{dB}$  ( $1.23\text{V}$ ) output level, making them suitable for driving 600 ohm or higher impedance inputs. Alternately, the left and right PROGRAM A outputs may be switched to  $-50\text{dB}$  ( $2.5\text{mV}$ ) nominal level, making them suitable for driving 150 ohm or higher impedance (microphone level) inputs.

### 15 PROGRAM OUTPUT B

These unbalanced phone jacks carry the left and right program outputs, and are identical to the PROGRAM A outputs except that the level is fixed at  $+4\text{dB}$  ( $1.23\text{V}$ ) nominal (unaffected by the output level switches). PGM OUT B may be used at the same time as PGM OUT A, thereby, enabling the mixer to drive more than one set of inputs without need for complicated "Y" or adapter cables.

### 16 POWER SWITCH

Equipped with two ON positions to minimize hum without having to reverse the power cord (except for Australian and European models).

### 17 FUSE HOLDER

This fuse protects the primary (AC line) side of the power supply. If a fuse blows, be sure to replace it with one of the same type and rating as noted on the chassis.

### 18 AC OUTLET and / or VOLTAGE SELECTOR

Not provided in certain areas.

# PM-170/180 SPECIFICATIONS

## GENERAL SPECIFICATIONS

Model	PM-170	PM-180
Number of Inputs	6 Input Channels, 1 Auxiliary Stereo Input (AUX IN)	
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	±0.5dB (50Hz ~ 15KHz)	
Total Harmonic Distortion	Less than 0.1% at +20dB (7.8V) (30Hz ~ 25KHz)	Less than 0.1% at +20dB (7.8V) (30Hz ~ 30KHz)
Hum and Noise (20Hz ~ 20KHz)	-118dBm (Equivalent Input Noise) -66dB (0.388mV) (Master Volume & one Input Volume at nominal level)	-123dBm (Equivalent Input Noise) -69dB (0.275mV) (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 -20dBm), -21dB (69mV) (Input Level Switch at -50dBm)	
Maximum Output Level	+24dB (12.3V) (at less than 0.1% T.H.D.)	
Crosstalk	-60dB (at 1KHz adjacent inputs)	
Equalization	±15dB (LOW, HIGH)	
High-Pass Filter	6dB per octave roll-off below 40Hz or 80Hz	
Power Requirements	110, 117, 130, 220 or 240V AC, 50/60Hz, 15W	
Finish	Black	
Dimensions (W x H x D)	48 x 18.2 x 25.3cm (18-7/8 x 7-1/8 x 10")	
Net Weight	8Kg (17.6 lbs.)	9Kg (19.8 lbs.)

## INPUT SPECIFICATIONS

Model	Connection	Level Switch	Impedance		Sensitivity* (at Max. Gain)	Input Level		Connector** in Mixer
			Actual	Nominal Source		Nominal	Max. before Clip	
PM-170	INPUT (1 ~ 6)	-50dB	20KΩ	150Ω ~ 600Ω Mics & Lines	-62dB (0.6mV)	-50dB (2.5mV)	-21dB (69mV)	Phone Jack
		-40dB	30KΩ	600Ω ~ 10KΩ Mics & Lines	-52dB (2mV)	-40dB (7.8mV)	-11dB (218mV)	
		-20dB	35KΩ			-32dB (20mV)	-20dB (78mV)	+9dB (2.2V)
	AUX IN (L,R)		30KΩ	5KΩ Lines	-32dB (20mV)	-20dB (78mV)		Phone Jack
PM-180	INPUT (1 ~ 6)	-50dB	850Ω	150Ω ~ 600Ω Mics & Lines	-62dB (0.6mV)	-50dB (2.5mV)	-21dB (69mV)	XLR-3-31
		-40dB	3KΩ		-52dB (2mV)	-40dB (7.8mV)	-11dB (218mV)	
		-20dB	5KΩ		-32dB (20mV)	-20dB (78mV)	+9dB (2.2V)	
	AUX IN (L,R)		30KΩ	5KΩ Lines	-32dB (20mV)	-20dB (78mV)		Phone Jack

## OUTPUT SPECIFICATIONS

Model	Connection	Level Switch	Impedance		Power Output Level		Connector** in Mixer
			Actual	Nominal Load	Nominal	Max. before Clip	
PM-170	PGM OUT A (L, R)	+4dB	5Ω	600Ω	+4dB (1.23V)	+24dB (12.3V)	Phone Jack
		-20dB	100Ω		-20dB (78mV)	0dB (775mV)	
	PGM OUT B (L, R)		5Ω	600Ω	+4dB (1.23V)	+24dB (12.3V)	Phone Jack
	HEADPHONES		4.7Ω	8Ω	-10dB (250mV)	+4dB (1.23V)	Stereo Phone Jack
PM-180	PGM OUT A (L, R)	+4dB	120Ω	600Ω	+4dB (1.23V)	+24dB (12.3V)	XLR-3-32
		-50dB	80Ω		-50dB (2.5mV)	-30dB (25mV)	
	PGM OUT B (L, R)		5Ω	600Ω	+4dB (1.23V)	+24dB (12.3V)	Phone Jack
	HEADPHONES		4.7Ω	8Ω	-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.

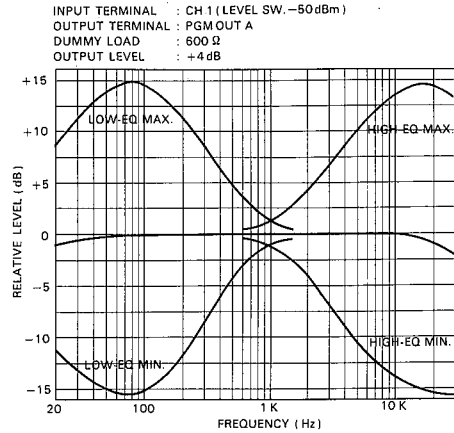
In the above specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V.



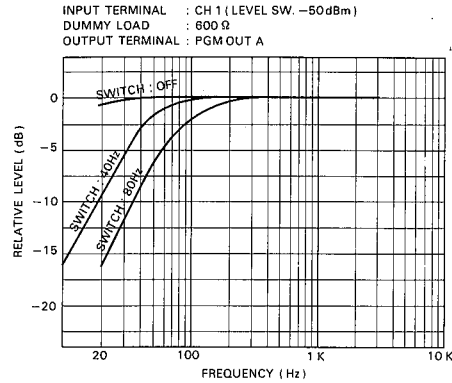
# FREQUENCY RESPONSE & DIMENSIONS

## Frequency Response Curves

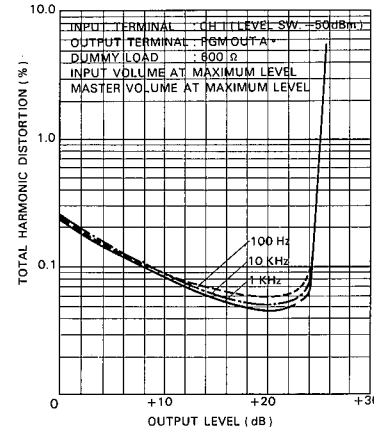
Frequency Response  
PM-170/180



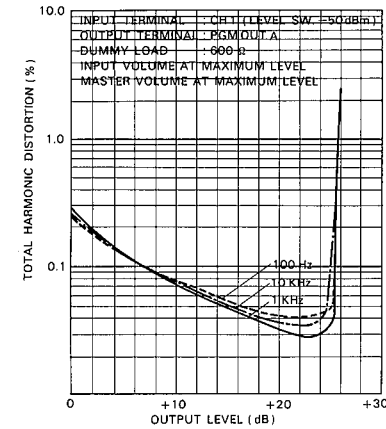
High-Pass Filter  
Frequency Response  
PM-170/180



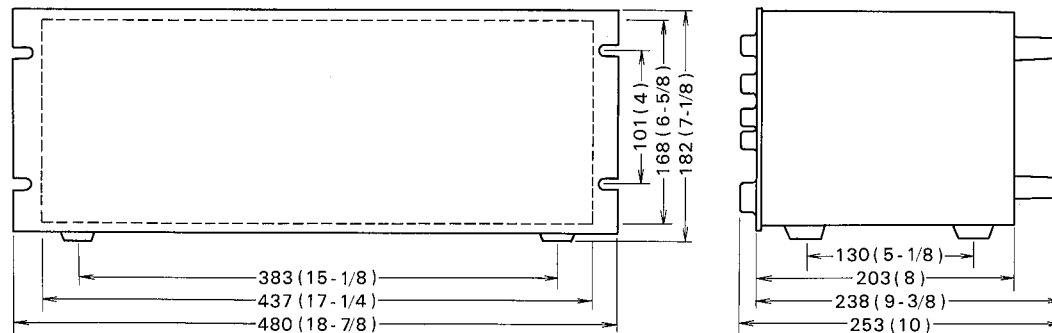
Total Harmonic Distortion  
PM-170



Total Harmonic Distortion  
PM-180



## Dimensions



Standard 19" rack mounting  
that is rugged and ideal for  
permanent installation.

Unit: mm (in.)

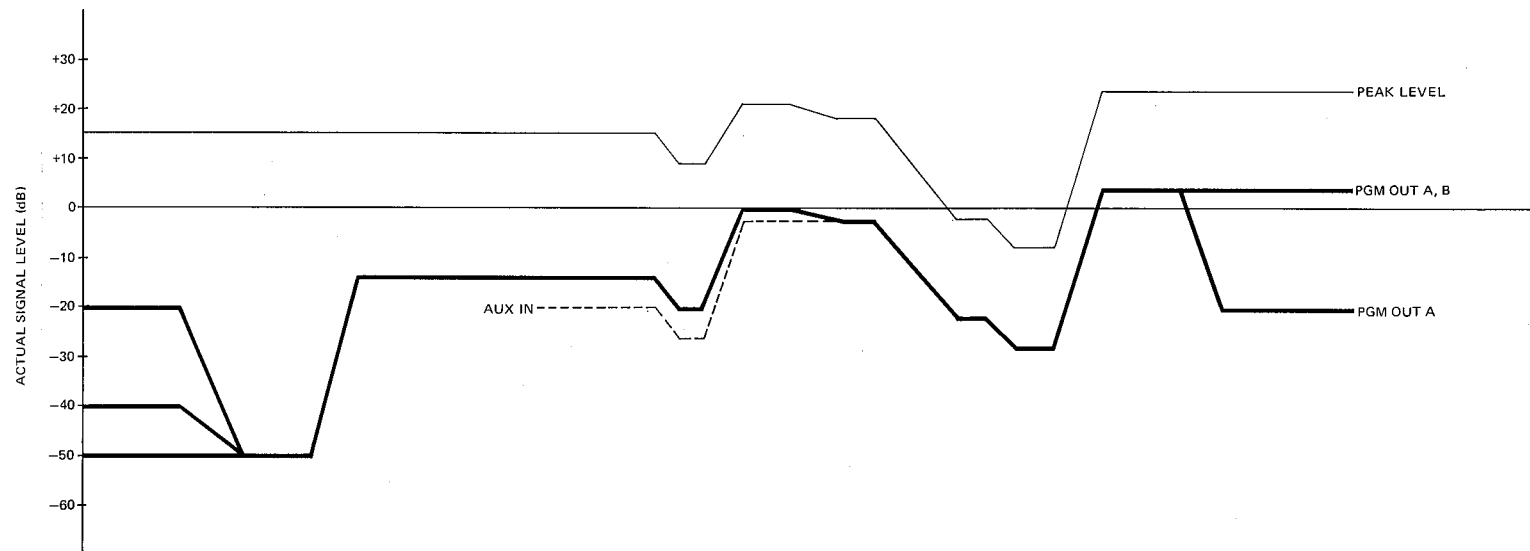
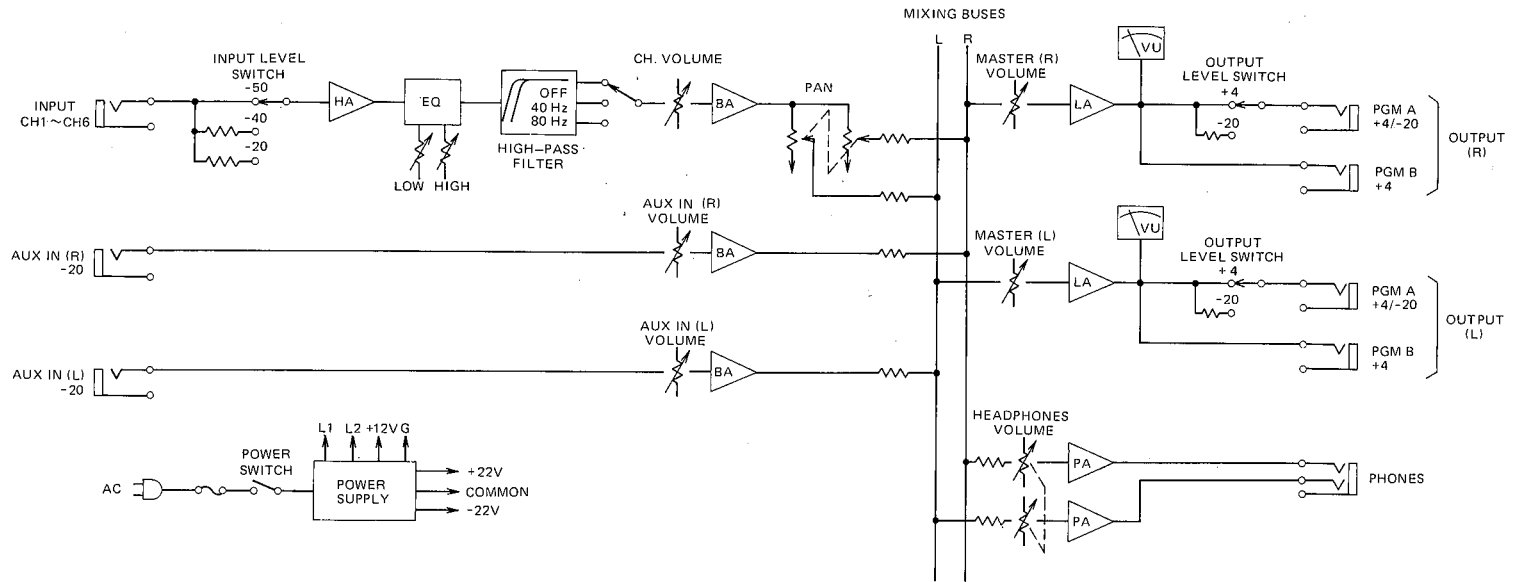
## REGARDING DESIGNATION OF INPUT AND OUTPUT LEVELS

In these specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V. "dB" is a voltage level, whereas "dBm" is a power level. 0dBm is referenced to 1 milliwatt (0.775V driving a 600 ohm termination). For example, when 12.3V is fed to a high impedance, the level is designated "+24dB". When +24dB (12.3V) drives a 600 ohm termination, the level is designated "+24dBm".

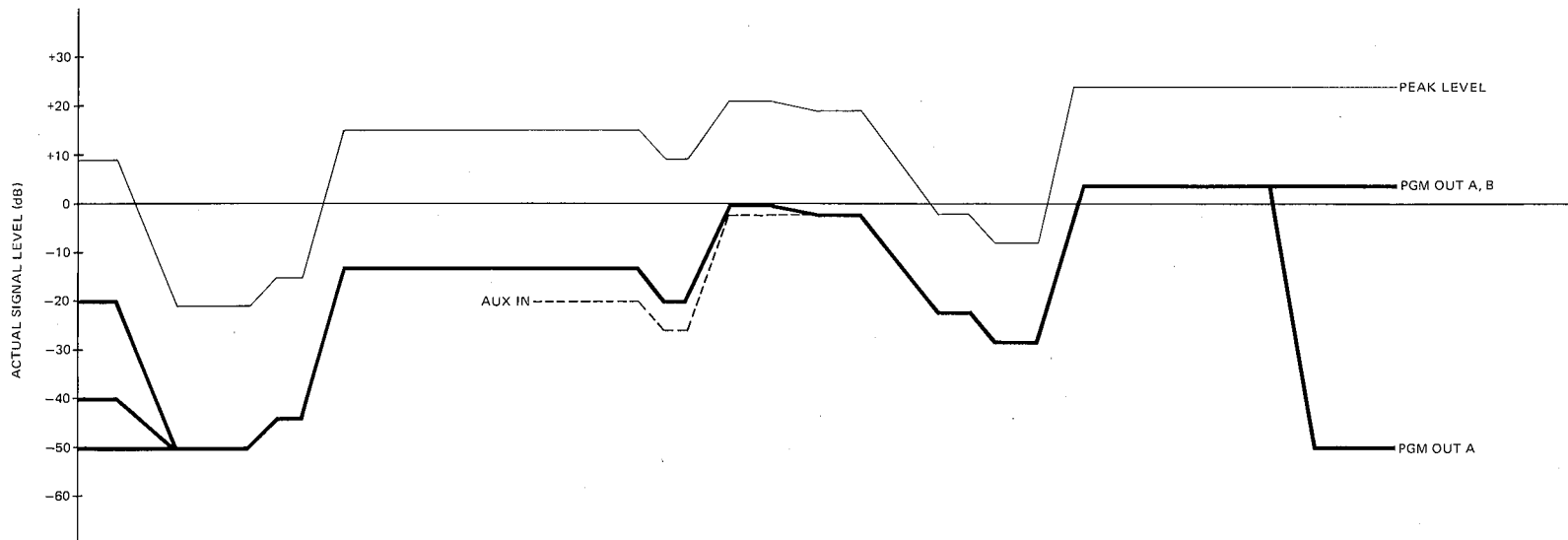
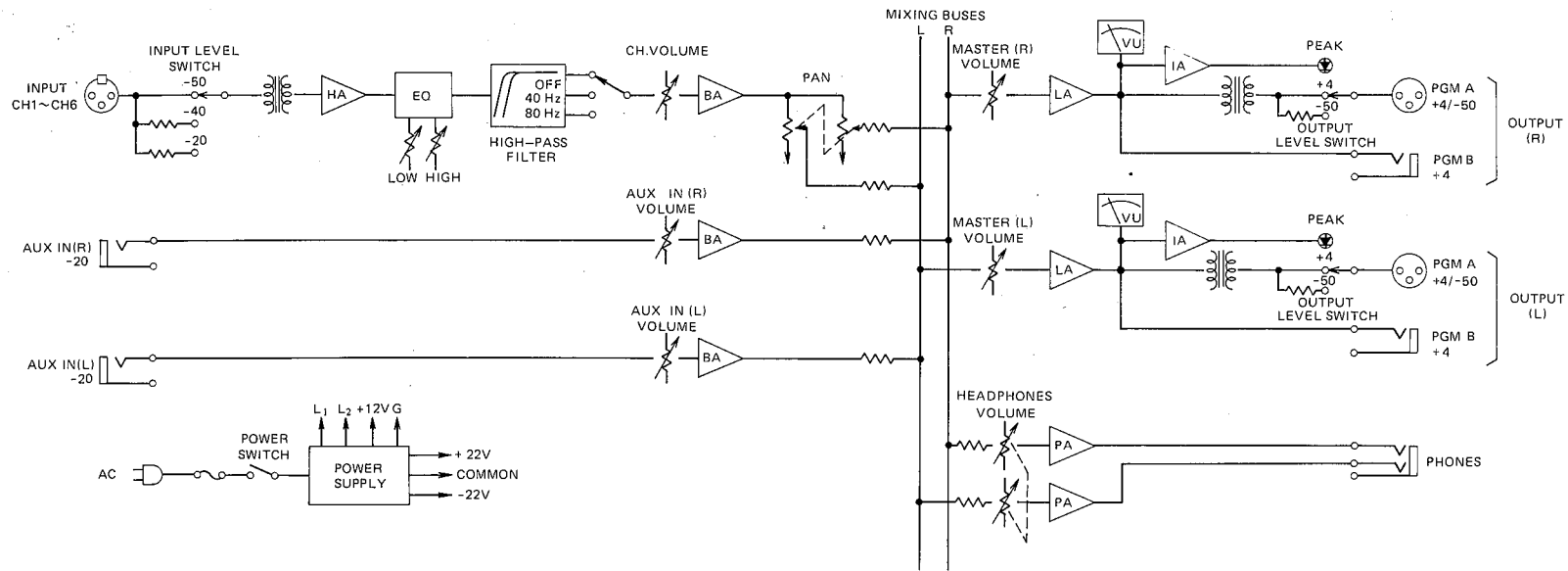
If the voltage remains the same when the termination changes, the power level changes; +24dB (voltage) driving a 300 ohm termination would be +27dBm (power), and +24dB driving a 150 ohm termination would be +30dBm. The level in "dB" is specified, wherever applicable, (1) to avoid confusion when the mixer is connected to various low impedance circuits, and (2) to be more accurate in specifying levels across high impedance circuits.

# BLOCK & LEVEL DIAGRAMS

## PM-170 Block & Level Diagrams



# PM-180 Block & Level Diagrams



SINCE 1887  **YAMAHA**  
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN