



# Five0

## by Montarbo

Professional Power Amplifier

*User's Manual*

English

LIBRA SERIES



## CONTENTS

Contents .....	1
Important precautions .....	2
Safety instructions.....	3
Features description .....	3
EX-factory settings .....	3
Front panel.....	4
Front panel description .....	4
Rear panel.....	5
Rear panel function description.....	5
Basic operation.....	7
Set up connection mode (LIBRA 600 LIBRA 1200).....	8
Set up connection mode (LIBRA 2000 LIBRA 2600) .....	9
Protection circuits .....	10
Applications .....	10
Maintenance and troubleshooting.....	10
Block diagram .....	11
Specifications.....	12



## IMPORTANT PRECAUTIONS



1. Read all documentation before operating your equipment.
2. Retain all documentation for further reference.
3. Mains voltage must correspond to rear unit label.
4. Damages caused by connecting to improper AC voltage are not covered by any warranty.
5. Always operate the unit with the AC ground wire connected to the electrical system ground.  
Precautions should be taken to avoid equipment faulty, improper or inefficient grounding.
6. After connection to power supply Standby LED is lit, showing that some components inside are already powered.
7. Do not connect any amplifier channel output into another channel input. Do not connect in parallel or series an amplifier output with any other amplifier output.
8. In system setup, amplifier's output power should be 50% greater than loudspeaker(s) rated handling power.
9. Make sure the signal is correctly connected to amplifier input channel following current input mode.
10. Please turn off the power switch when extracting the power cord and signal cable, or adjusting the input mode switch.
11. In order to split one signal to more than one amplifier, we suggest to use a signal distributor.
12. In typical use, please set the volume to -0dB position.
13. If you need to supply power to more than one unit power amplifiers, to eliminate the big surge current interference to electricity net, and preventing the voltage fluctuate abnormal when simultaneously switching on the amplifiers, we recommend you use the sequence power procedure.
14. Do not obstruct the air entrance and exit ports.

## Safety instructions

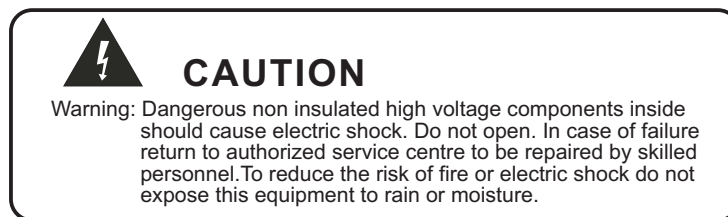
Read all safety instructions before operating the amplifier.

Install equipment as follows:

- Install in a flat place, not bending or curved.
- Do not install near water and moisture.
- Place power amplifier away from heat sources, such as radiators or other heat source.

Keep in mind the following instructions when connecting amplifiers:

- Read the user manual before connecting the amplifier.
- Properly connect each connection of the amplifier. If not, it may cause hum, damage and/or electric shock in case of disconnection.
- To prevent electric shocks, do not open top cover.
- Safely connect the power cord after checking the AC power.



## Features description

### 1. Power supply

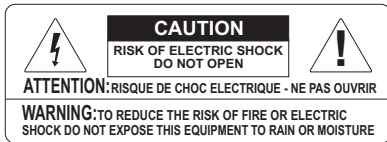
- 1.1 It is a very high density power level of SMPS power supply, thus supplying up to constant 3.2kw sine wave power in 2U height and 11 inch depth case. It is the top level in this industry.
- 1.2 It uses LLC SMPS to provide power safely and efficiently. It turn on ZVS when 0 voltage, and shut off ZCS when 0 current.
- 1.3 The normal SMPS load is invariable, but SMPS load of amplifier is fluctuating for fast impedance change in 0.0001s. Even the minimum time from 0 current to rated current is 0.0001s. The SMPS used by us has been designed to support critical working situation and fulfil the dynamic requirement of music playing.
- 1.4 Power circuit is fully protected to avoid high frequency current pass through the low frequency current capacitor & electro analysis.
- 1.5 SMPS has good performance from in 180V-260V range, therefore it will not be damaged by voltage fluctuations.

### 2. Amplifier

- 2.1 SMPS amplifier has very high working efficiency in 8-Ohm & 4-Ohm loads. LIBRA 1200 and 1600 are Class AB amplifiers, while LIBRA 2000 and 2600 are class 2H amplifiers. At rated power, all LIBRA series amplifiers working efficiency can reach 65% & 60% at 8-Ohm & 4-Ohm.
- 2.2 The output transistor are directly connected to the heat sink to increase the heat transmitting efficiency and extend the transistors life.
- 2.3 Central air passage and heat sink, as well as the 80x80 fan between the power supply module and main module increase the efficiency of fan and separate the 2 working modules as well as to decrease the noise.
- 2.4 The main amplifier circuit and protection system separately designed, improving the complete signal circuitry.
- 2.5 The amplifier case is made of steel and all the PCB is supported by copper column. It is more rugged and it represents professional amplifier higher quality.

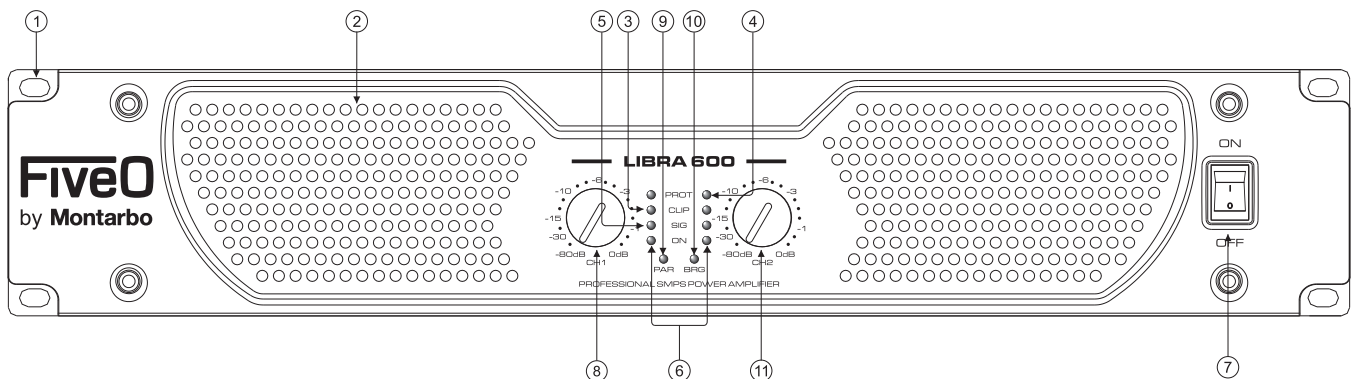
## Ex-factory settings

1. All the volume adjustment knobs were set at "-80dB" .
2. The power switch was set at "OFF".
3. Peration mode selector was set at "STEREO".
4. Input sensitivity switch was set at "1.0V".



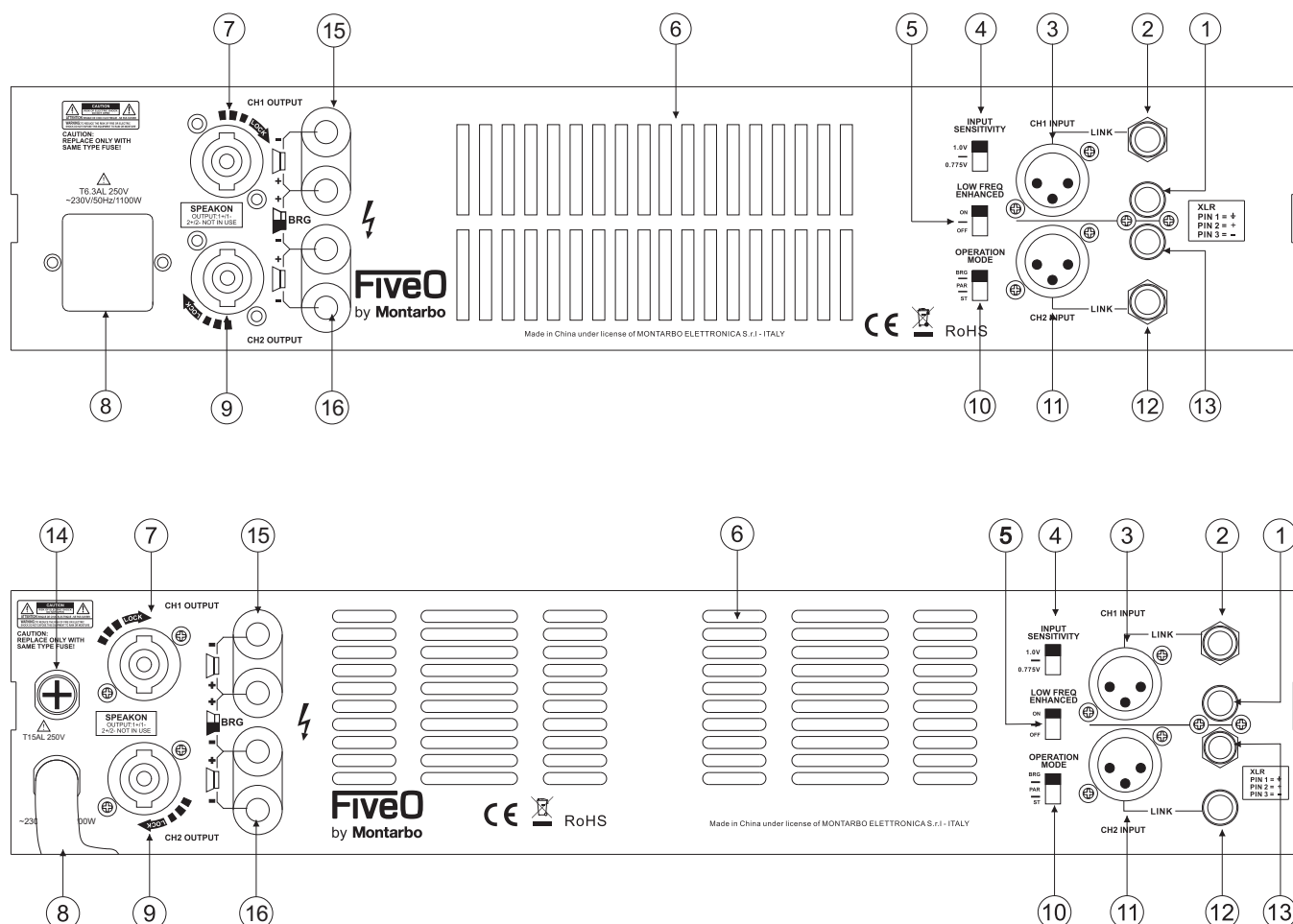
**Important:** Control functions and adjustment functions not described in the user's manual may cause mechanical danger or electrical shock.

## LIBRA series front panel function description



1. Installation Socket  
To be used to fix in 19" rack installation.
2. Air Entrance  
This part is the air entrance port. Don't block it.
3. CLIP LED (CLIP)  
When this LED is on the amplifier has reached its maximum output power (CLIP). The distortion is about 0.5%. Then you need to turn down the input signal to make sure the amplifier works properly.
4. Protection LED (PROT)  
When this LED is lit the amplifier is in protection status, which should be due to short-circuit, over-heat, DC and/or VHF (constant non-music high frequency signal self-excitation or long time high-frequencies feedback).
5. Signal Indicator (SIG)  
When this indicator on the amplifier input level is about 0.35V; in this case amplifier Houtputs signal.
6. "Power ON" Indicator  
When this indicator is on the main power supply system of amplifier is powered.
7. Power switch  
This switch is used to turn power on and off. Press the upper part to switch the amplifier on, press the lower part to switch off.
8. CH1 volume control  
In bridge mode, this knob controls two channels volume, while CH2 knob is disabled.  
In stereo or parallel mode: this knob controls CH1 volume only.  
Gain control range: -80dB~0dB, available turning angle is 280 degree.
9. "Parallel" indicator in orange color  
When this indicator is lit the amplifier is on parallel mode.
10. "Bridge" indicator in orange color  
When this indicator is lit the amplifier is on bridge mode.
11. CH2 volume control  
In bridge mode, this knob is disabled, the volume is controlled by CH1 knob only.  
In Stereo or Parallel mode, the knob just controls CH2 volume.  
Gain control range: -80dB~0dB, available turning angle is 280 degree.

## LIBRA series rear panel function description



1. CH1 unbalanced RCA input

2. CH1 1/4" LINK socket

It is a parallel connection with CH1 XLR input, providing output signal identical to the input signal.

3. Channel 1 XLR input

This XLR input is a balanced input to be connected to audio sources.

4. Input sensitivity switch

This selector is to select the input sensitivity between 0.775V and 1.0V

5. Low frequency increase function switch

When turn on this switch, low frequencies are boosted.

6. Air exit

This port is for air exit, do not block it.

7. CH1 SPEAKON output

Use this output socket (SPEAKON) to connect the speaker in Stereo mode: 1+ to speaker positive pole, 1- to negative speaker pole.

8. Power supply socket (built-in fuse) (LIBRA 600/LIBRA 1200)

This socket includes a standard fuse holder with fuse inside. It is used to protect amplifier from damages. If the amplifier is connected to power supply but the LED is not lit, please check the fuse status. If you found the fuse broken, you must replace it with a same specification.

## Rear panel description

### 9. CH2 Speakon output

Use this output socket (SPEAKON) to connect the speaker in Stereo mode: 1+ to speaker positive pole, 1- to negative speaker pole.

When the amplifier in Bridge mode, this connection is not active.

### 10. Operation mode selector

This switch is used to choose the operation mode of the power amplifier.

STEREO mode: Two channels have independent inputs and outputs.

PARALLEL mode: One channel input (input from CH1) and two channels independent level outputs.

BRIDGE mode: One channel input (input from CH1), output from positive poles of binding posts of CH1 and CH2.

### 11. CH2 XLR input

The XLR input is a balanced input to be connected to audio sources.

### 12. CH2 unbalanced RCA input.

### 13. CH2 1/4" LINK socket

It is a parallel connection with CH2 XLR input, providing output signal identical to the input signal.

### 14. Fuse socket (LIBRA 2000/LIBRA 2600)

This fuse socket contains a standard fuse, which works as protection in over current and trouble.

If the amplifier has been connected to power and the power stand-by LED is not lit, please check the fuse. If the fuse is burnt, you should replace it with the same type and value fuse.

### 15. Channel 1 speaker binding post output

Connect the red binding post to speaker positive (+) pole, and black binding post to speaker negative (-) pole. In bridge mode, use CH1 red binding post to connect the speaker negative (+) pole.

### 16. Channel 2 speaker binding post output

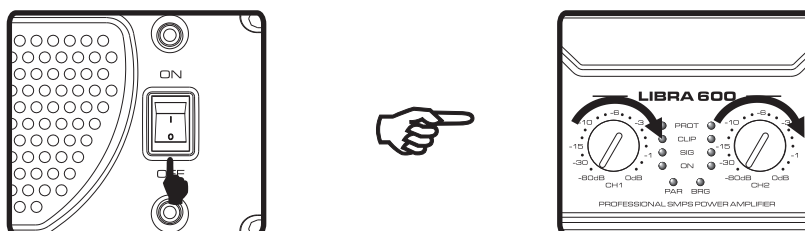
Connect the red binding post to speaker positive (+) pole, and black binding post to speaker negative (-) pole. In bridge mode, use CH2 red binding post to connect the speaker negative (-) pole.



## Basic operation

### Switch on

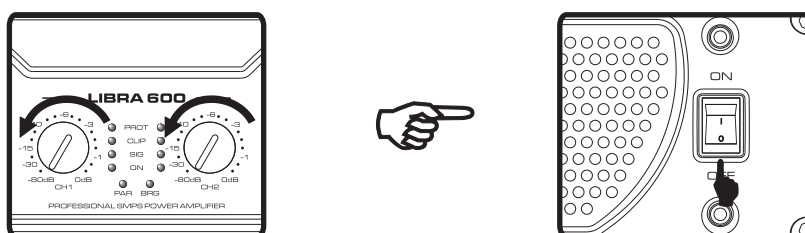
1. Connect to the signal source and then connect the plug to the power supply, thus the amplifier inside is powered and on standby status.
2. Switch on: Press the power switch at "I", then the amplifier turns on, the stand-by indicator is off and the power indicator (ON) is on.
3. When the amplifier is powered, the protection LED is on and the amplifier will automatically test for 10 seconds. The PROT LED will be turned off at the end of test. Then you may adjust front panel volume control knob to set desired volume.



### Switch Off

After using the amplifier, please adjust the CH1/CH2 volume control knobs to the lowest position (-80dB), then turn off safely the amplifier.

Switch Off: Press the power button to "O", then the amplifier turns off the power indicator (ON) turns off and the stand-by indicator is lit.

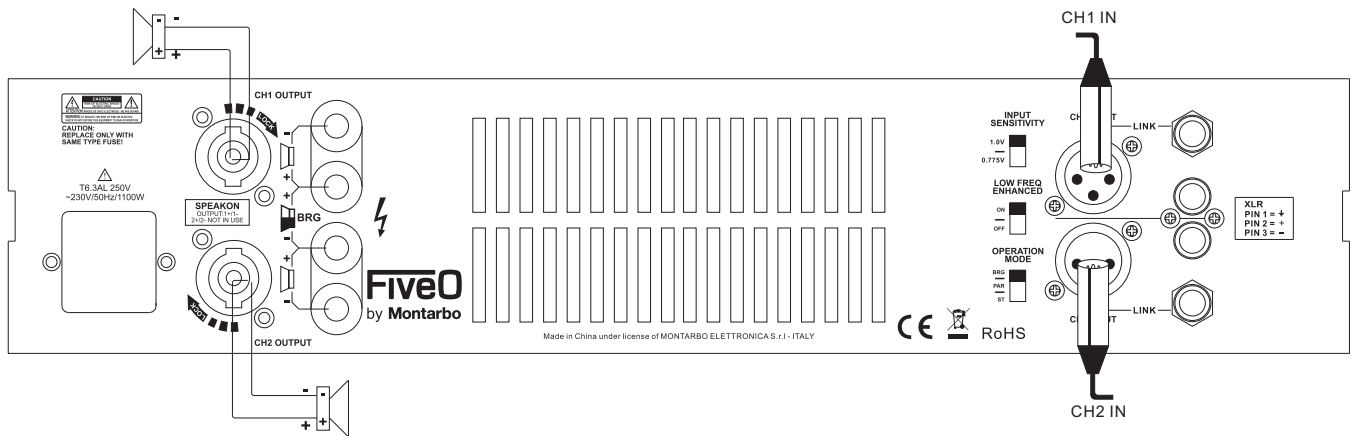


### Note:

1. Don't connect or disconnect the signal source when the amplifier is on, otherwise a noise - which could damage the amplifier and the speakers will be generated.
2. When the amplifier is connected to power supply, it is powered in "standby" working mode, although the power switch is at the "off" position.  
If you do not use the amplifier over 3 hours, you should disconnect the power cord.

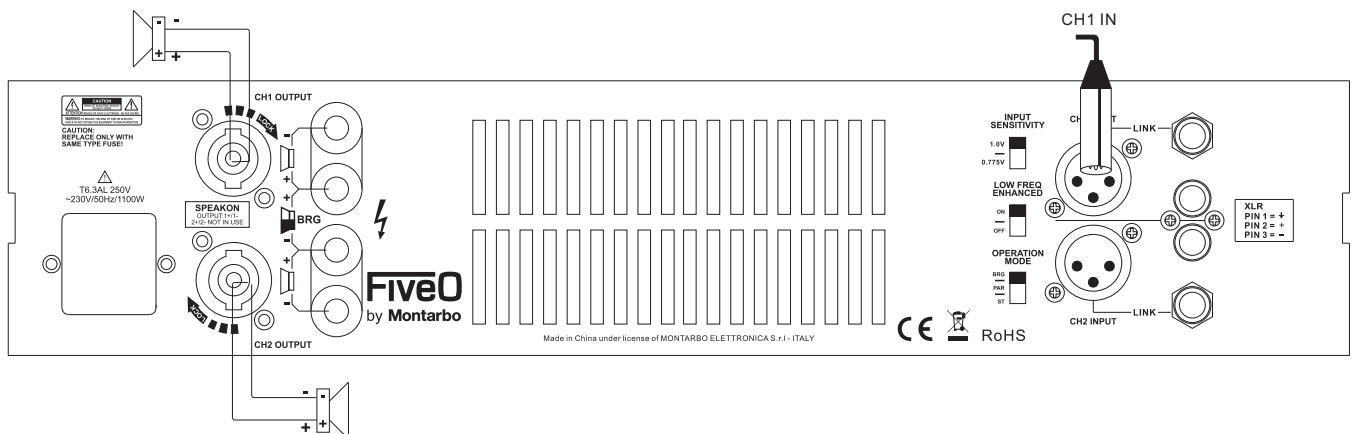
## Stereo mode/parallel mode/ bridge mode

### stereo mode



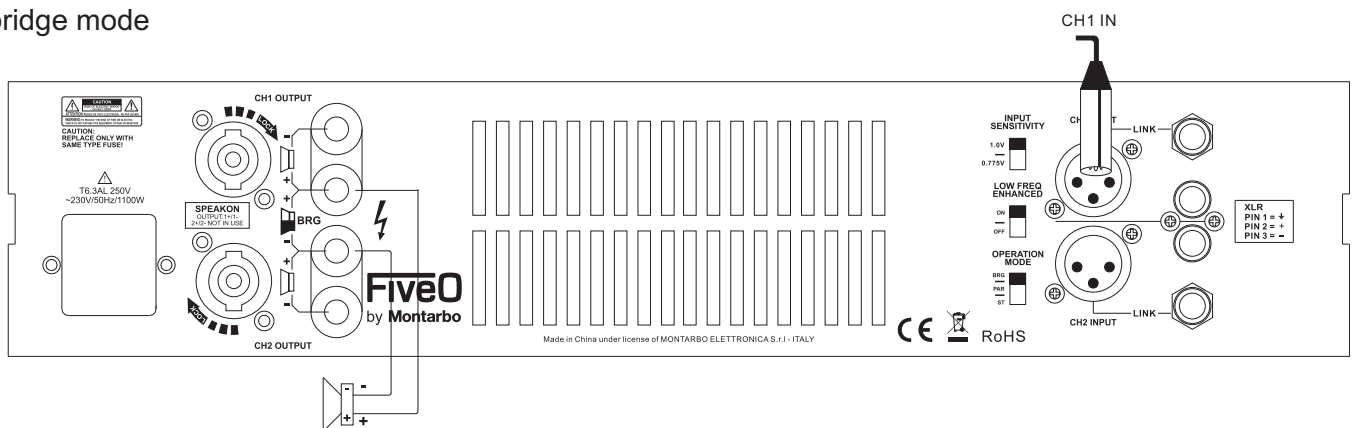
In this mode, after connecting two SPEAKON cables to the speakers, connect the sound source (such as mixer, CD player, etc.) output to both amplifier input channels. Finally set the mode at “STEREO” and adjust both channels volume knobs to a suitable position.

### parallel mode



In this mode, after connecting two SPEAKON cables to the speakers, connect the sound source (such as mixer, CD player, etc.) output to both amplifier channels input. Finally set the mode at “PARALLEL”, and adjust both channels volume knobs to a suitable position.

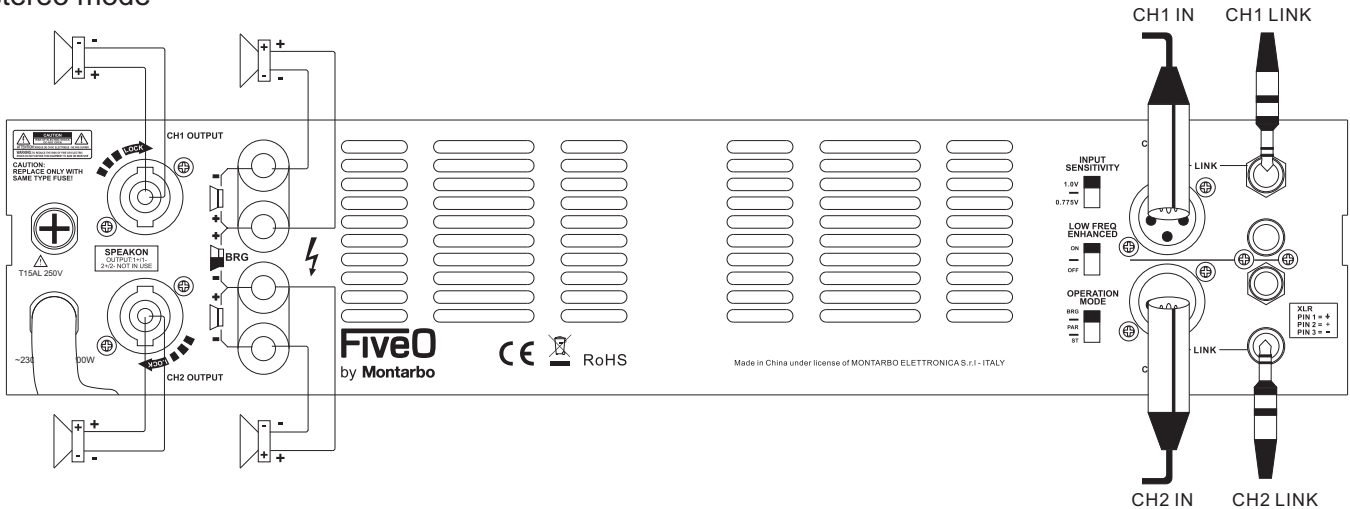
### bridge mode



In this mode, after connecting one cable from binding posts to the speakers, connect the sound source (such as mixer, CD player, etc.) output to amplifier CH1 input. Finally set the mode at “BRIDGE”, and adjust CH1 volume knob to a suitable position.

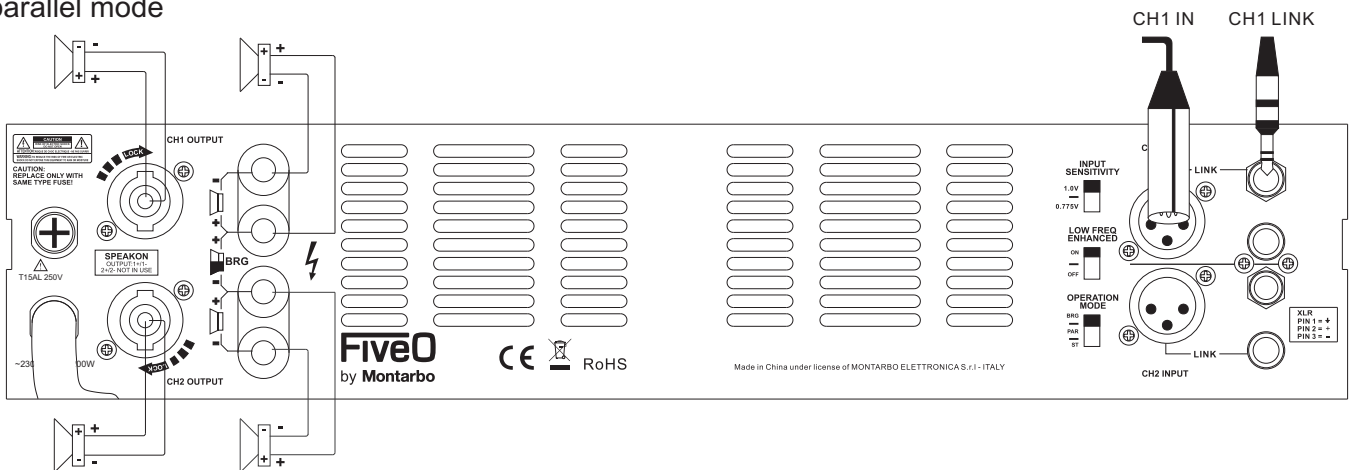
## Stereo mode/parallel mode/ bridge mode

### stereo mode



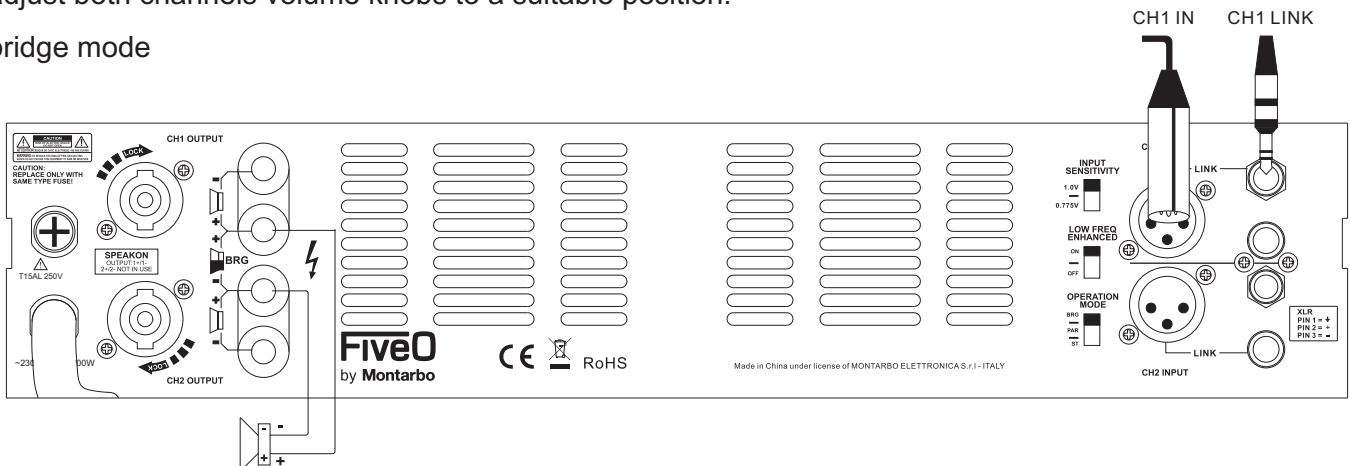
In this mode, after connecting two SPEAKON cables to the speakers, connect the sound source (such as mixer, CD) output to the two amplifier channels input. Finally set the mode at “STEREO”, and adjust both channels volume knobs to a suitable position.

### parallel mode



In this mode, after connecting two SPEAKON cables to the speakers, connect the sound source (such as mixer, CD) output to the two amplifier channels input. Finally set the mode at “PARALLEL”, and adjust both channels volume knobs to a suitable position.

### bridge mode



In this mode, after connecting one cable from binding posts to the speakers, connect the sound source (such as mixer, CD) output to amplifier CH1 input. Finally set the mode at “BRIDGE”, and adjust CH1 volume knob to a suitable position.

## Protection circuits

### 1. CLIP/Limit

This function is used for preventing dangerous clip signal, which should damage the speakers, CLIP/Limit monitors the distortion produced by amplifier output, when distortion exceeds 0.5%, CLIP/Limit will reduce the input signal to ensure signal without distortion (CLIP).

Note: If input signal already has clip or exceeds linearity working range of input circuit, then the CLIP/Limit is not active!

### 2. Over-heat protection

If the amplifier works at full loading for a long time, the fans could reach the highest speed. If this status continue and the temperature rise up to 105, the amplifier will go into over-heat protection status and the protection indicator (PROT) on the front panel is lit and there's no output.

Therefore, the users are suggested to correctly operate the amplifier, the accepted load should be not lower than 2 ohm, and the airflow must be abundant and free. The status of no power output is due to over-heat protection, which usually won't happen if the environment temperature is under 30.

### 3. VHF protection

If the amplifier output reaches a certain level with large amount of frequencies exceeding 10KHz, such as MIC feedback noise, then the amplifier may go into VHF protection after 3 seconds, the protection indicator (PROT) on the front panel will be on and the amplifier will have no output, but it will be recovered automatically after 10 seconds protection circuit activation. If the output signal does not change, the VHF protection will continue to be active.

### 4. Short-circuit protection

All LIBRA series amplifiers have short-circuit protection. This protection make the output transistors working at safe range. When output is in short-circuit, the protection indicator (PROT) on the front panel will be lit and the amplifier has no output. The amplifier will be recovered after 10 seconds after the end of short-circuit removal.

### 5. AC local power protection

If the AC mains voltage is lower than the minimum allowed working voltage (~160V), the power supply will be automatically turned off until when the mains voltage returns in regular range.

### 6. DC protection

If the output signal has large DC voltage ( $\approx 2.6V$ ), in order to protect the speaker, the DC protection circuit will be activated. In this case the protection indicator (PROT) on the front panel will be on and the amplifier will have no output.

## Applications

The LIBRA series amplifiers are suitable for live concert, disco, night Club, etc.

## Maintenance and troubleshooting

Below are some simple methods to check if the amplifier has been damaged or less:

### 1. No output

If the signal LED is lit by sufficient signal, then the amplifier shall be fine, please check whether the speaker(s) output(s) is(are) well connected or not.

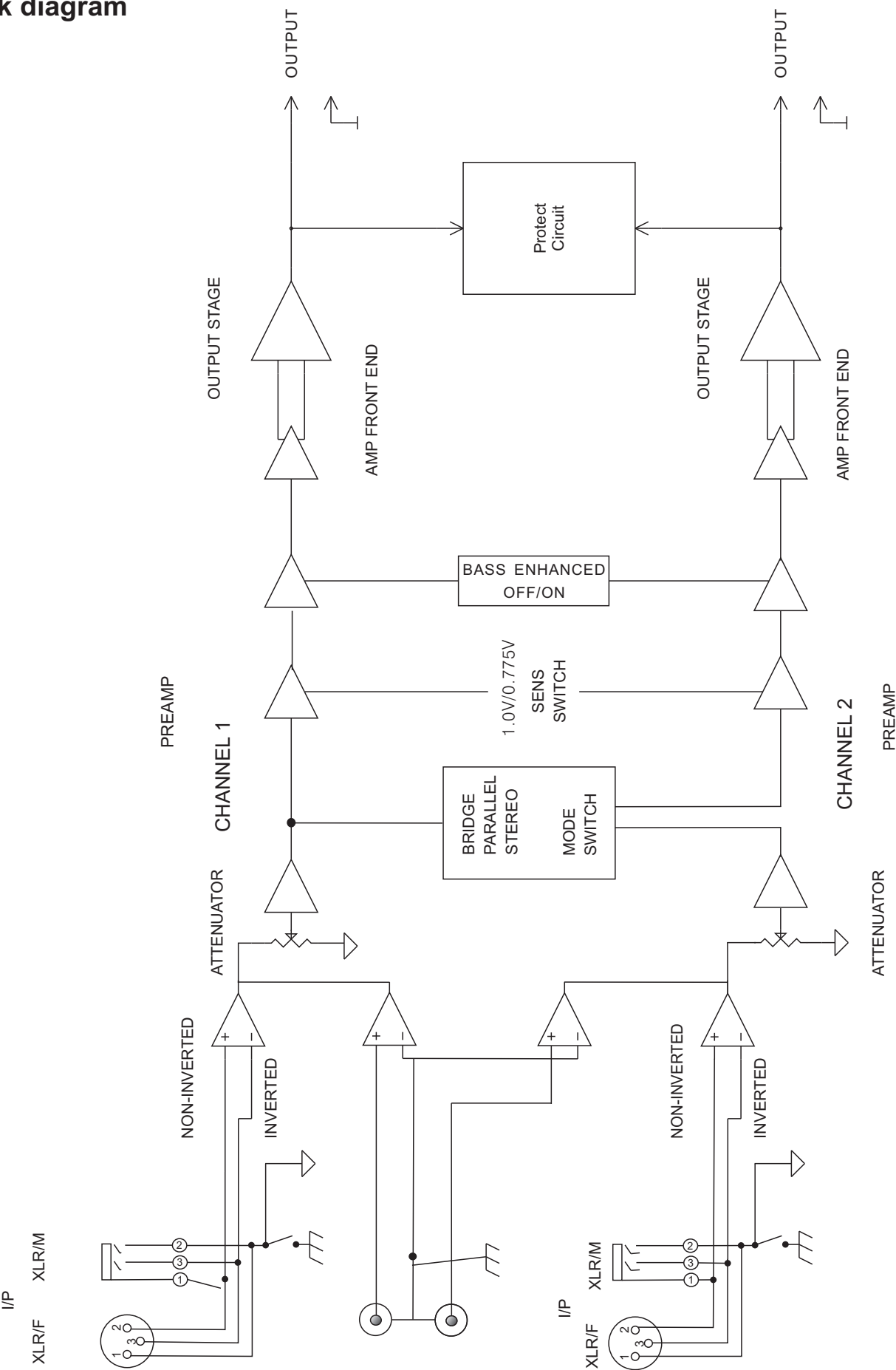
### 2. Low signal output

If the signal LED is lit and clip LED also lit, then please check whether the output connection(s) is(are) short-circuited or not. If the signal LED is lit, and the protect LED is also lit, then the amplifier shall be in protection status. There are two possibilities: one maybe over-heat protection, another maybe VHF protection. Cancelling the input signal, then you can test whether it is VHF protection or not. If the amplifier chassis temperature is very high, that shall be over-heat protection. If the input voltage is too low, it may lead to voltage protection, the lowest operating AC voltage is 160V.

### 3. If the failure is still existing after checking the above suggestions, please return the equipment to the authorized service agent, it shall be repaired by skilled personnel.

Note: If the amplifier is still in guarantee period, please keep the case in good conditions, don't disconnect any mechanical parts, otherwise it will not be guaranteed!

Block diagram



## Specifications

Model	Tolerance	LIBRA 600	LIBRA 1200	LIBRA 2000	LIBRA 2600
8ohm stereo power*	-2.5%,10%	200WX2	310WX2	450WX2	600WX2
4ohm stereo power*	-2.5%,10%	300WX2	500WX2	750WX2	1000WX2
2ohm stereo power**	---	450W x2	600WX2	1000WX2	1250W X2
8ohm bridge power*	-2.5%,10%	600W	1000W	1500W	2000W
4ohm bridge power**	---	600W	1200W	2000W	2600W
Frequency response	+0/-0. 5dB	20Hz-20KHz@8 $\Omega$			
THD+N	$\pm 0.01\%$	$<0.1\%$	$<0.1\%$	$<0.1\%$	$<0.1\%$
Slew Rate	$\pm 2V/s$	20V/s	20V//s	20V/s	20V/s
Damping Factor	+30/-10	$>100$	$>200$	$>200$	$>200$
Dynamic Range	$\pm 5dB$	$\geq 80dB$	$\geq 80dB$	$\geq 80dB$	$\geq 80dB$
S/N rate	$\pm 5dB$	$\geq 85dB$	$\geq 90dB$	$\geq 90dB$	$\geq 90dB$
Crosstalk	$\pm 5dB$	$\geq 65dB$	$\geq 70dB$	$\geq 70dB$	$\geq 70dB$
Input Sensitivity	$\pm 50mV$	1.0V/0.775V	1.0V/0.775V	1.0V/0.775V	1.0V/0.775V
Voltage Gain	$\pm 0.5dB$	34.2dB	36.1dB	37.8dB	39dB
Input Impedance	---	Balanced 20K Unbalanced 10K	Balanced 20K Unbalanced 10K	Balanced 20K Unbalanced 10K	Balanced 20K Unbalanced 10K
Output Impedance	---	$\geq 2 \Omega$	$\geq 2 \Omega$	$\geq 2 \Omega$	$\geq 2 \Omega$
Output Circuitry	---	Class AB	Class AB	Class 2H	Class 2H
Total Efficiency	$\pm 5\%$	62%	$\geq 65\%$	$\geq 68\%$	$\geq 68\%$
G.W. ( kg )	$\pm 0.5$	7KG	9KG	11KG	11KG
Packing Dimensions(mm)	$\pm 0.5$	595x460x170	595x510x170		

Power has been tested under EIAJ standard.



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by **Montarbo**

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