SPECIFICATIONS: P3000 entire unit

Measuring Standard IEC 268 part 3IHF-A
0 dBu = 775 mV (RMS)

A. POWER SUPPLY

1. voltage supply	AC
2. nominal supply voltage, depending on the model:	120V/230V/240V
3. nominal mains frequency:	50 - 60 Hz
4. nominal power consumption (2x1200W/4Ω):	4100 W
5. nominal power consumption (2x120W/4Ω):	1500 W
6. power consumption at 1/8 of the nominal power (150W/4Ω):	1650 W
7. deviation range of the power supply:	-10 % … +10 %

B. INPUT PROPERTIES

- level control fully open

Input	**Nominal input level (nominal source EMK) select jumper internally**			**Nominal output power**	**Nominal load impedance**
	0 dBu	**+6 dBu**	**+26 dB**		
Channel A/B	+1 dBu	+7 dBu	+14 dBu	750 W	8 Ω
Channel A/B	0 dBu	+6 dBu	+13 dBu	1200 W	4 Ω
Channel A/B	-2 dBu	+4 dBu	+11 dBu	1500 W	2 Ω
Channel BRIDGED	0 dBu	+6 dBu	+13 dBu	2400 W	8 Ω
Channel BRIDGED	-2 dBu	+4 dBu	+11 dBu	3000 W	4 Ω

Maximum input level: +21 dBu

C. OUTPUT PROPERTIES

- nominal output power with THD = 0.1 %, 20 Hz … 20 kHz, MBW = 80 kHz
- maximum output power at 1 kHz with THD = 1 %, MBW = 80 kHz

Output connector	**Nominal load impedance**	**Nominal output power Dual Mode**	**Maximum output power Dual Mode, THD=1 %**	**Single channel output power)[1]**	**Nominal output voltage**
SPEAKER A/B	8 Ω	750 W	850 W	950 W	77.5 V
SPEAKER A/B	4 Ω	1200 W	1300 W	1700 W	69.3 V
SPEAKER A/B	2 Ω	1500 W	1800 W	2000 W	54.8 V
SPEAKER BRIDGED	8 Ω	2400 W	2600 W	3400 W	138.6 V

)[1] measured with Dynamic Headroom Test-Signal according to IHF-A: 1 kHz Burst, 20ms ON, 480 ms OFF

D. Idling output voltage

Output connector	**SPEAKER A/B**	**SPEAKER BRIDGED**
Max. idling voltage	91 V (RMS)	182 V (RMS)

E. Stabilizing

with nominal load impedance, Dual Mode, standard output voltage

	8 Ω	**4 Ω**
Stabilizing	0.325 %	0.686 %
Stabilizing level	0.028 dB	0.059 dB

F. FREQUENCY RESPONSE

• -3 dB level drop, referenced to the level at the standard frequency of 1 kHz
• the power amplifier's border frequencies are at 13 Hz and 40 kHz respectively, referenced to -1 dB

Amplification frequency response

Input	Output	f (u)	f (o)	Remarks
INPUT A/B	SPEAKER A/B	<10 Hz	75 kHz	HI-LO-CUT Off
INPUT A/B	SPEAKER A/B	20 Hz	35 kHz	HI-LO-CUT On

Distortion-limited transmission range (performance bandwidth)

• THD = 0.1 %, 1/2 nominal power at 4 ohms, MBW = 500 kHz

Input	Output	f (u)	f (o)	Remarks
INPUT A/B	SPEAKER A/B	<10 Hz	48 kHz	HI-LO-CUT Off

G. PHASE RESPONSE ±30° (20 Hz - 20 kHz, HI/LO-CUT off)

H. INPUT IMPEDANCE 20 kΩ (20 Hz … 20 kHz)

I. AMPLITUDE NON-LINEARITY

	Amplitude non-linearity	Remarks
nominal overall distortion	<0.05 %	MBW = 80 kHz, f = 1 kHz
standard overall distortion	<0.02 %	MBW = 80 kHz, f = 1 kHz
IMD-SMPTE	<0.01 %	60 Hz, 7 kHz
DIM 30	<0.01 %	3.15 kHz, 15 kHz
DIM 100	<0.01 %	3.15 kHz, 15 kHz

J. CROSSTALK - at f = 1 kHz less than <-70 dB

K. DAMPING FACTOR - internal at f = 1 kHz >300
at f = 100 Hz >400

L. SLEW RATE - internal >40 V/µs

M. NOISE INTERFERENCE

- U(F) = external voltage un-weighted with B = 22 Hz … 22 kHz, effective value (IEC 268-1)
- U(G) = noise voltage, frequency-weighting filter according to CCIR-468-3, quasi peak weighted (IEC 268-1)
- U(A) = interference voltage A-weighted, dB(A), effective value (IEC 268-1)
- Signal-to-noise ratio referenced to a nominal output voltage of 69.3 V (1200W/4ohms)
- HI/LO-CUT ON, GND LIFT = GROUNDED

	Interference output voltage	S/N ratio	Equivalent input interference voltage	Equivalent input interference level	Residual interference output voltage
U(F)	< 615µV	> 101 dB	< 6.9µV	< -101 dBu	< 435µV
U(G)	< 3.65 mV	> 85.5 dB	< 41µV	< -85.5 dBu	< 1.55mV
U(A) i.s.=0dBu	< 490µV	> 103 dB	< 5.5µV	< -103 dBu	< 345µV
U(A) i.s.=6dBu	< 245µV	> 109 dB	< 5.5µV	< -103 dBu	< 170µV
U(A) Gain=26dB	< 110µV	> 116 dB	< 5.5µV	< -103 dBu	< 90µV

The S/N ratio (A-weighted) at max. output voltage at 4Ω is >103 dB.

N. DIMENSIONS

Height : 132.5 mm (3 HU)
Width : 483 mm
Depth : 426 mm

O. WEIGHT m = 29 kg

P. EXTENSIONS optionally available 2 x input transformer NRS 90176

MEASURED SPECIFICATIONS: P3000 entire unit

Measurement conditions, unless differently specified:

- tolerance of measured values: $\Delta X = \pm 1.5$ dB
- measuring frequency: f = 1 kHz
- stated levels refer to: U = 775 mV (0 dBu)
- level controls set to their clockwise limits
- pin assignment of the XLR-type connectors: PIN 1: GROUND
  PIN 2: + INPUT
  PIN 3: - INPUT
- source resistance for the induction via the XLR-type connector: R(Q) = 50 Ω
- MAIN-PCB numbers relate to the models as follows:

Type of unit	MAIN - PCB
P3000 / 120 V	86211
P3000 / 230 V	86207
P3000 / 240 V	86207

- MAIN-PCB and POWER-AMP-PCB are provided with service connectors.
  The Pin-assignment of these service connectors is as follows:

84157		**86207 86211**		**86207 86211**	
CNSERV	**Assignment**	**CNASERV**	**Assignment**	**CNBSERV**	**Assignment**
1	Kodierung	1	Limiter A&B OFF	1	n.c.
2	BIAS Hot - Side +	2	Service Limiter A	2	Service Limiter B
3	BIAS Hot - Side -	3	-15V	3	- 15 V
4	Hot - Out	4	GND	4	Fan voltage
5	BIAS Cold - Side +	5	+ 15 V	5	Service Fan Switch
6	BIAS Cold - Side -	6	heat sink temperature A&B	6	Service Fan Switch
7	GND	7	+ U1 front-end A	7	+ U1 front-end B
8	floating voltage +	8	- U1 front-end A	8	- U1 front-end B
9	floating voltage -	9	coding	9	coding

1. Operating voltage: U(B) = 120V/ 230V/ 240V
depending on the model: 50Hz ... 60Hz
2. Deviation limit of the operation voltage: ±10%
3. Power consumption (both channels driven):
3.1. at idling condition P(B) = 180 - 260 W
3.2. at standard operation (120W/4Ω) P(B) = 1500 W
3.3. at nominal condition (1200W/4Ω) P(B) = 4100 W
3.4. at 1/8 of the nominal power (150W/4Ω) P(B) = 1650 W

4. Settings / Adjustments
4.1. IDLING CURRENT ADJUSTMENT
Connect the DC-volt meter at the BIAS measuring points (refer to table) and adjust the idling current via the trim potentiometer (on the printed board assembly 84157). Adjust both channels of the power amplifier A&B.

Setting	Measuring point 1	Measuring point 2	U (DC)	BIAS trimmer
BIAS HOT A	CNSERV 2	CNSERV 3	15 mV	VR1
BIAS COLD A	CNSERV 5	CNSERV 6	15 mV	VR2
BIAS HOT B	CNSERV 2	CNSERV 3	15 mV	VR1
BIAS COLD B	CNSERV 5	CNSERV 6	15 mV	VR2

Adjusting the idling current has to be performed at normal room temperature. In case the power amplifier had previously been operated, it has to be given several hours to cool off.

4.2. FLOATING - SYMMETRY

Immediately after setting the idle current, a symmetry check of the floating voltage has to be performed. The power amplifier has to be operated in idling condition. DC-volt meters have to be connected between the measuring points 1 - 2, and 2 - 3. Using the FLOATING-trim potentiometers that are located on the printed board assembly 86207/86211, the floating voltage is set symmetric to the ground potential. Not the actual voltage value is relevant but the symmetry of the + floating voltage and the - floating voltage to the ground potential.

Setting	Measuring point 1	Measuring point 2	Measuring point 3	U(DC)	Trim potentiometer
FLOTING SYMMETRIE A	CNSERV 8 AMP-A	CNSERV 7 AMP-A	CNSERV 9 AMP-A	ca. ± 67V	VR102
FLOTING SYMMETRIE B	CNSERV 8 AMP-B	CNSERV 7 AMP-B	CNSERV 9 AMP-B	ca. ± 67V	VR202

4.3. VCA - OFFSET:

Rhythmically open and short-circuit the service switch S101 respectively S201 which are located on the printed board assembly 86207/86211. Use VR101 respectively VR201 to adjust the power amplifier outputs to their minimum offset (with oscilloscope to minimal peak value or to the audible minimal volume of the interfering pulse).

Instead of using the service switch, it is also possible to employ the service connector with short-circuited pins CNASERV 2 and CNASERV 3 for the power amplifier A, or short-circuited pins CNBSERV 2 and CNBSERV 3 for the power amplifier B.

4.4. ADJUSTING THE METER INSTRUMENTS

- level control set all the way to its clockwise position
- f = 1 kHz

Feed the signal to the inputs A or B so that the IN-LED just lights (U(E) approx. -34 dBu). Adjust the OUT-LED to approximately the same brightness, using the trim potentiometers VR600 respectively VR601 which are located on the printed board assembly 86207/86211.

4.5. ADJUSTING THE FANS

Close the service switch S001 on the printed board assembly 86207/86211 or insert a bridge between CNBSERV 5 and CNBSERV 6. Adjust the voltage at CNBSERV 4 to 27.5 V (DC), using the VR700. Switch the service switch back to normal or detach the bridge.

4.6. GAIN SELECTION:

The power amplifier's input sensitivity can be set using the jumpers J11 … J13 or J21 … J23 which are located on the printed board assembly 86207/86211. The stated values for the input sensitivity or gain are always referenced to the level control being set to its fully clockwise position.

CHANNEL A	CHANNEL B	SELECTION
J11	J21	Input Sensitivity 0 dBu
J12	J22	Input Sensitivity +6 dBu
J13	J23	Gain +26 dB

When shipped, the input sensitivity is set to a value of 0 dBu.

5. Function test

5.1. OUTPUT - offset voltage

DC-voltage measuring at the loudspeaker outputs CHANNEL A/B with U(DC) ≤ ±10 mV.

5.2 LIMITER

5.2.1. Attenuation test

Both channels separately driven with a 1 kHz signal up to U(A) = 89 V (without load). Increase the input voltage by 10 dB. The LIMITER LED lights and the output voltage ascents by approx. 0.5 dB to 91 volts, with slight

clipping. The distortion rate of the limited signal is at THD = 1 % … 2 %. Increasing the input signal up to a value of +21 dBu should not result in remarkably higher clipping.

5.2.2. LIMITER FAST/SLOW-Test

- tests have to be performed for both channels of the power amplifier individually: testing has to be performed without load resistors connected.

1.) Drive the power amplifier with a burst signal (f = 1 kHz, 1-10 cycles, rate: ≈ 0.5 sec.) and U(E) = +10 dB above the nominal input voltage.

2.) When monitoring the output signal via oscilloscope, continuously press the FAST/SLOW-switch.

- SLOW: after 2-3 signal periods, the limiter controlled the major distortion down to a minor residual distortion (THD = 1 % … 2 %).
- FAST: already after 1-2 signal periods, the limiter controlled the major distortion down to a minor residual distortion (THD = 1 % … 2 %).

When shipped, the appliance is set to SLOW!

5.3. POWER-ON DELAY:

Approximately 2 seconds after switching the power on, the relays E1 and E3 which are located on the printed board assembly 86207/86211 and the relay E1 on the printed board assembly 84157 (channel A/B) pull simultaneously.

5.4. FAN CONTROL:

Upon powering-on the power amplifier, the fans will run for approximately 2 seconds and stop when the power amplifier has re-gained its "normal" temperature. In idling condition (power-on, no signal present) the fans are switched between the SLOW and OFF mode, depending on the heat sink's temperature. When the switch S001 on the printed board assembly 86207/86211 is closed, the fans will run with FAST speed. When shipped, the S001 switch is set to "OPEN"!

Connecting a variable resistor (approx. 50 kΩ) between CNBSERV 5 and CNBSERV 6 allows for testing the functioning of the fans. During operation, CNASERV 6 can be utilized to monitor the temperature of the heat sink.

FAN SPEED	**U(DC) CNASERV 6**	**U(DC) CNBSERV 4**	**Remarks**
Stufe 0	< 6.5 V	0 V	Fans are not running
Stufe 1	6.5 V ... 7.5 V	12.5 V	
Stufe 2	7.5 V ... 9 V	19.5 V	
Stufe 3	9 V ... 12.5 V	27.5 V	
Protect	> 12.5 V	27.5 V	Power amplifier is switched off

5.5. SOAR-PROTECTION TEST:

Channels separately driven up to 69.3 V on 4 Ω. Parallel connect a 0.1 Ω resistor. The protection circuit reacts and tries continuously to re-start! The protect-LED blinks in the same rhythm.

5.6. SHORT-CIRCUIT CURRENT-LIMITING TEST

testing has to be performed for both channels of the power amplifier individually:

- drive the channel with a burst signal (f = 1 kHz, 1-10 cycles, rate ≈ 1 sec.) without load, with U(A) = 89 V
- connect a load resistor of 1 Ω.
- the short-circuit current-limiter limits the output voltage at the load resistor symmetrically (monitor via oscilloscope!) to a peak voltage value of 45 V (approx. 45 A).

5.7. DC-VOLTAGE-PROTECTION TEST

- HI/LO-Cut off, Limiter set to SLOW
  testing has to be performed for both channels of the power amplifier individually:
- drive the power amplifier with a test signal (f = 7 Hz) and without load resistor connected.
- at an input voltage of approx. 3 Vpeak the protection circuit reacts and tries continuously to re-start! The protect-LED blinks with the same frequency.
- Repeat the test with f = 14 Hz; the power amplifier should not switch off.

5.8. HF-PROTECTION TEST

Caution: it is mandatory to drive the power amplifier without load resistors connected. Set the fan service switch to ON and the HI/LO-Cut to OFF. Switch off the limiter via S102 or by disconnecting the bridge between CNASERV 1 and CNASERV 3. Drive the power amplifier with a with 7 Vrms and a sine burst of **f = 60 kHz**

(100 ms ON, 900 ms OFF), applied to each channel at a time. The protection circuit has to react. The power amplifier tries to re-start continuously while the PROTECT LED blinks with the same frequency.
Repeat the test with **f = 30 kHz** and the limiter set to ON; the power amplifier should not switch off.

6. Level CHANNEL A&B:

- set the level control to its fully clockwise position.
- set the INPUT ROUTING switch to: DUAL / STEREO.
- HI-LOW-CUT switch is ON (as factory pre-set!).
- BRIDGED MODE: NORMAL
- LIMITER: SLOW (as factory pre-set!)
- THD < 0.1 %

6.1. NOMINAL LEVEL

Input	U(E)	Measuring point	U(A)	Load resistor	Jumper on 86207/86211
CH. A/B	0 dBu	SPEAKER A/B	69.3 V	4 Ohm	select J11,J21
CH. A/B	+ 6 dBu	SPEAKER A/B	69.3 V	4 Ohm	select J12,J22
CH. A/B	+ 13 dBu	SPEAKER A/B	69.3 V	4 Ohm	select J13,J23
CH. A/B	+1 dBu	SPEAKER A/B	77.5 V	8 Ohm	select J11,J21
CH. A/B	-2 dBu	SPEAKER A/B	54.8 V	2 Ohm	select J11,J21

6.2. MAXIMUM INPUT LEVEL: U(E) = +21 dBu (9 Vrms)

7. INPUT-ROUTING switch

DUAL / STEREO (as factory pre-set!)

- channel A and B have to be driven separately.

PARALLEL / MONO

- channel A and B are paralleled at the input. Both channels can be driven using a common signal source.

8. Level BRIDGED MODE

- set the level control all the way to its fully clockwise position.
- HI-LOW-CUT switch is ON (as factory pre-set!).
- BRIDGED MODE: BRIDGED
- LIMITER: SLOW (as factory pre-set!)
- THD < 0.1 %

BRIDGED: Double the output voltage is presented at the BRIDGED OUT connector. It is mandatory to use the CHANNEL A input connector. The CHANNEL B input connector is without function.

Input	U(E)	Measuring point	U(A)	Load resistor	Remarks
CH. A	0 dBu	BRIDGED OUT	109.5 V	4 ohms	select J11,J21
CH. A	0 dBu	BRIDGED OUT	138.5 V	8 ohms	select J11,J21

9. GROUND LIFT switch

Test the functioning of the switch using an ohm-meter:
The circuit ground (at the input or the output connector) is measured versus the common ground of the enclosure (contact at the ground terminal, located on the rear panel - or common ground of the mains cord).

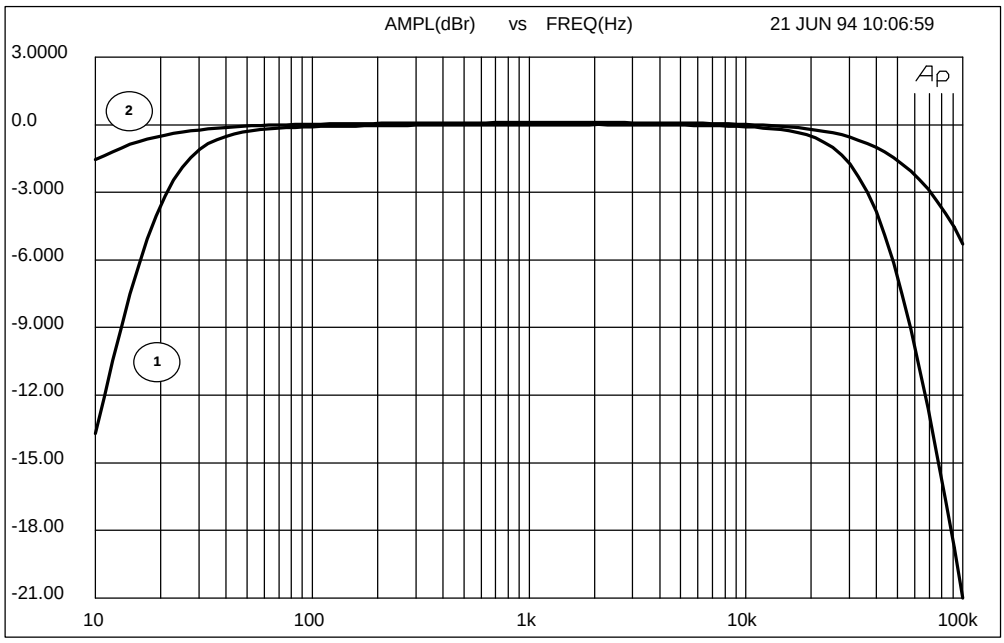
10. Amplitude - Non-Linearity

- testing with load resistor 8 ohms, dual mode
- MDW = 80 kHz
- input sensitivity = 0 dBu
- power amplifier's condition as shipped from the factory

Measurement	at nominal voltage U(A) = 63.2 V	at nominal voltage U(A) = 20 V	Remarks
THD+N (f = 1 kHz)	< 0.005 %	< 0.005 %	
THD+N (f = 10 kHz)	< 0.02 %	< 0.01 %	
IMD-SMPTE	< 0.01 %	< 0.01 %	60 Hz, 7 kHz
DIM 30	< 0.007 %	< 0.005 %	3.15 kHz, 15 kHz

DIM 100	< 0.009 %	< 0.005 %	3.15 kHz, 15 kHz

11. Frequency Response



Plot 1: HI/LO-Cut on Plot 2: HI/LO-Cut off

12. Noise Interference

- U(F) = external voltage un-weighted with B = 22 Hz … 22 kHz, effective value (IEC 268-1)
- U(G) = noise voltage, frequency-weighting filter according to CCIR-468-3, quasi peak weighted (IEC 268-1)
- U(A) = interference voltage A-weighted, dB(A), effective value (IEC 268-1)
- Signal-to-noise ratio referenced to a nominal output voltage of 69.3 V (1200W/4ohms)
- HI/LO-CUT ON, GND LIFT = GROUNDED, input sensitivity = 0 dBu

	Interference output voltage	**S/N ratio**	**Equivalent input interference voltage**	**Equivalent input interference level**	**Residual interference output voltage**
U(F)	< 615µV	> 101 dB	< 6.9µV	< -101 dBu	< 435µV
U(G)	< 3.65mV	> 85.5 dB	< 41µV	< -85.5 dBu	< 1.55mV
U(A)	< 490µV	> 103 dB	< 5.5µV	< -103 dBu	< 345µV

13. Crosstalk

- at f = 1 kHz < -70 dB

14. DAMPING FACTOR - internal >300

- internal with f = 1 kHz

15. SLEW RATE >40 V/µs

- internal

16. Factory Defaults

- ***Caution:*** make sure to ckeck these settings:

Function	**Location**	**Control**	**State**	**Setting**
Input Sensitivity L & P	86207/86211	Jumper J11/J21	plugged in	0 dBu
Limiter Off Switch	86207/86211	S102	open	Limiter on
Limiter Service	86207/86211	S101 / S201	open	
Fan Service	86207/86211	S001	open	
Input Routing	rear panel	slide switch	Dual/Stereo	Dual Mode
HI/LO-Cut Filter	rear panel	slide switch	on	Filter on
Bridged Mode	rear panel	slide switch	Normal	Dual Mode
Limiter	rear panel	slide switch	Slow	Limiter slow
CIR.GND to Chassis	rear panel	slide switch	Grounded	