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# LAB 1300C

POWER AMPLIFIER



**8 kg**

**2 × 650 W**

**19" × 2U × 310 mm**

**Full power: 20 Hz – 20 kHz**

Do you want to know more? Read on!

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**LAB.GRUPPEN**

# LAB 1300C

The LAB 1300C is a compact (2 unit high) light-weight (8 kg) power amplifier, designed for high quality sound systems and high power mobile use.

The chassis is made of 2 mm black anodized aluminium, with a 4 mm thick front panel. The switch-mode power supply is placed just behind the front panel to ensure noise free operation. Both the power supply and the two output channels are cooled by two proportional speed fans with airflow from front to back.

## POWER SUPPLY

The switch-mode power supply is the modern solution to the weight and size problem. With switch technology operating at a high frequency, it is possible to use ferrite transformers instead of heavy iron transformers and large electrolytic capacitors. Switch-mode technology has been applied in power-supplies in TV-sets during the latest 25 years. But in the LAB 1300C the power capacitance is 10 times larger.

In contrast to many of our competitors, who use so called push-pull converters and other designs, which require current limiting, we have designed the LAB 1300C to obtain the same characteristics as a conventional power supply. It works by injecting a magnetic pulse from the AC line during a pulse time segment, which is separated from the output charge current pulse. Because of this no current limiting is needed for the secondary side of the transformer, and high peak power and good bass response are guaranteed.



Transformer core made of ferrite, used in LAB 1300C, compared with conventional transformer with iron core.

## POWER SUPPLY STABILIZATION

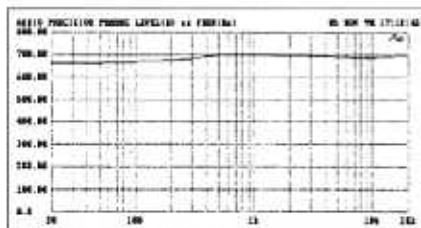
Thanks to the switch-mode power supply it is easy to get the DC rail voltage stabilized. This is made by controlling the magnetic energy in the ferrite transformer with a pulse width processor and magnetic "Flux Sense" windings.

The stabilization is so efficient that the maximum output power available from the amplifier is still 650 W per channel even if the line voltage varies between 180 and 260 V AC (90-130 V AC).

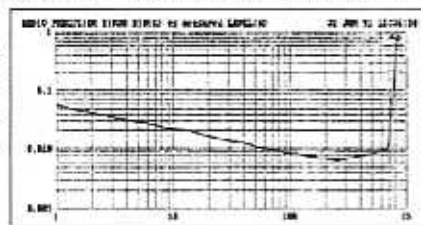
If for any reason (for example in large lightning systems) the line voltage decreases from 230 V to 180 V you only get 60% of the maximum available output power, i.e. 390 W instead of 650 W! (The output power is quadratically dependent of the rail voltage.)

## INPUT STAGE

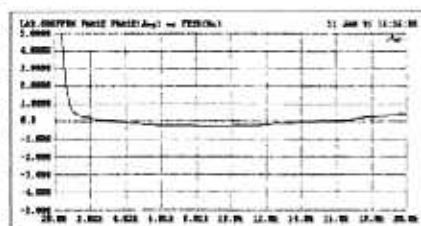
The input stage is designed totally discreet, that is without integrated circuits, to get the best optimization for linearity and bandwidth. The driver stage consists of an "enhanced cascode circuit", which is differentially symmetric



Power bandwidth of the LAB 1300C at 1% THD and 4 Ohms load.



Dynamic InterModulation distortion vs output power



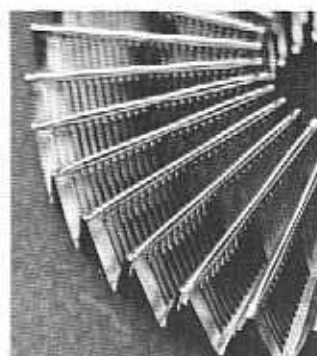
Deviation from perfect delay (phase distortion) is less than 1.1 deg. between 150 Hz - 20 kHz.

in class A, to achieve low distortion at high frequencies.

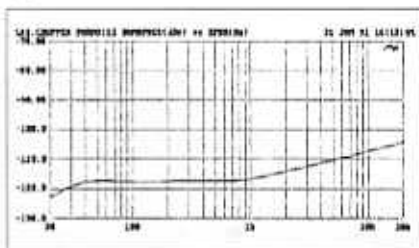
Experience has proven that the design of the circuit has given our power amplifier a high reliability.

## OUTPUT STAGE

The LAB 1300C has a complementary output stage, a technology used for many years, thanks to its reliability, low distortion, low noise, and high current capacity. Twentyfour 250 W bipolar power transistors are mounted directly on a compact copper cooling system, called Intercooler. (Copper conducts heat twice as good as aluminium). This cooling system, has a special geometric design to obtain very efficient cooling by turbulent airflow.

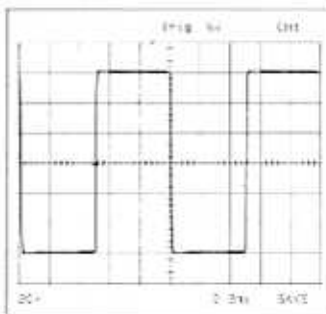


Efficient cooling system with turbulent airflow.

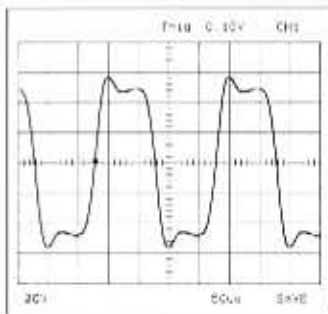


Noise distribution on the output of the LAB 1300C.

The output stage has a high current capacity, to meet the demands of today, such as low distortion and large signal noise ratio, which are needed to reproduce digitally recorded or processed music.



Square wave response at 1 kHz and 4 Ohms resistive load.



2  $\mu$ F reactive load (4 Ohms at 20 kHz). The amplifier delivers 635 W reactive power during the transition. The power amplifier is free from ringing in the audible frequency region.

## PROTECTION CIRCUITS

The LAB 1300C is completely short circuit protected even in reactive loads. The LAB 1300C is equipped with LAB. GRUP-PEN's specially designed short circuit protection, which permits very high peak currents, but still holds the transistors within the so-called "Safe Operation Area". This makes it possible to run loudspeakers with impedance variations which are considerably lower than the lowest permitted impedance of the power amplifier.

- Six more independent protection circuits, protect the LAB 1300C and the loudspeakers:

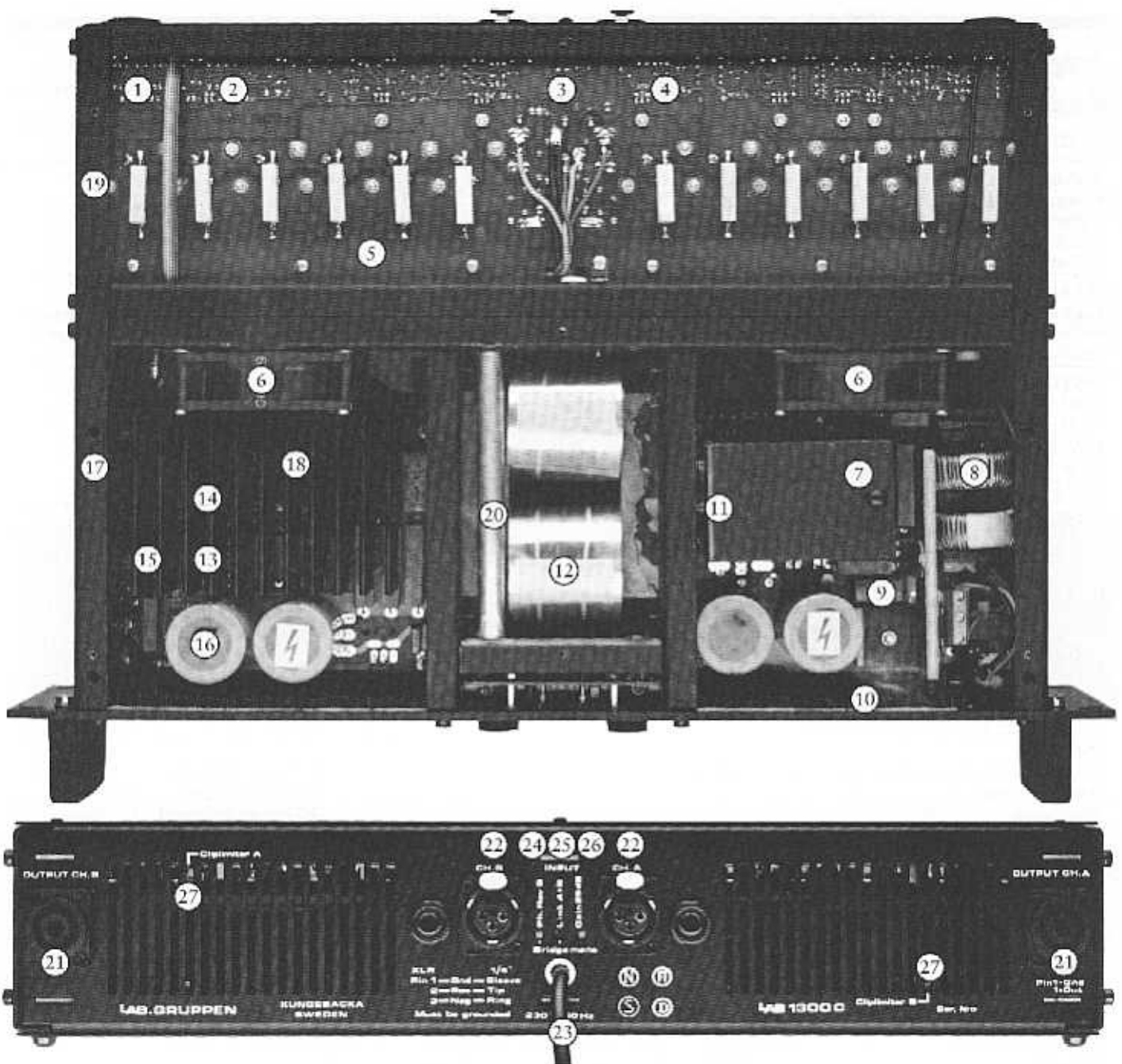
- Two DC protections; one DC current limiting protection, supplemented with fuses on each DC voltage power supply rail; and one DC voltage protection of the Crowbar type.

- Thermal protection; prevents the LAB 1300C from being overheated. The temperature indicators on the front panel are switched on, as a warning, before the thermal protection occurs.

- AC protection; shuts down the outputs if the line voltage is outside the operating voltage of the LAB 1300C.

- VHF protection (Very High Frequency); protects the loudspeakers against strong non-musical signals above the audible area.

- Clip limiter; prevents severely clipped waveforms from reaching the loudspeakers, but maintains full peak power.



## TOP VIEW

1. VHF protection (Very High Frequency) protects the loudspeakers against strong non-musical signals above the audible area.

2. Thermal protection prevents the LAB 1300C to be overheated, works separately for each channel.

3. DC voltage protection of Crowbar type, works in that way that the output is short circuited to protect the load.

4. Short circuit protection, a dynamic current limiter which permits very high peak currents, but yet holds the transistors within the so called "Safe Operation Area". The LAB 1300C manages longterm short circuit operations.

5. Intercooler system made of massive copper, (copper

conducts heat twice as good as aluminium).

6. Two proportional speed fans.

7. 80 V DC capacitors.

8. AC line noise filter.

9. Soft start with no power line current inrush.

10. Foam filter for front to back cooling.

11. FRED rectifier (Fast Recovery Epitaxial Diode).

12. Ferrite transformer stores magnetic energy. The transformer contains "Magnetic Flux Sense" windings to provide stabilized output power.

13. DC voltage set.

14. Output power set.

15. Pulswidth processor, in a custom MSI integrated circuit with over/under voltage protection. "Magnetic Flux Sense" circuits and soft start.

16. High voltage capacitors.

17. Switch mode power supply stabilized to provide full power if the AC line varies between 180 V and 260 V AC (90-130 V).

18. MOS switch array.

19. Two channel bipolar transistor amplifier. The output constituted of twenty-four 250 W transistors.

20. Faraday's tube.

## REAR PANEL

21. OUTPUT, Neutric speaker connectors:  
2 x 350 W into 8 Ohms  
2 x 650 W into 4 Ohms

2 x 900 W into 2 Ohms

22. Electronically balanced inputs. XLRs connected according to IEC 268 standard (pin 2+). 1/4" TRS jacks in parallel.

23. Operating voltage 130 - 270 V AC (65 - 135 V). Minimum start voltage 190 V AC (95 V).

24. Phase reverse of channel B. Set LAB 1300C for bridge mono mode.

25. Link of channel A and B.

26. Gain and sensitivity switch, normally 37 dB gain (0.775 V, 0 dBu for full power in 4 ohms) or press switch for 29 dB gain (1 V for 100 W into 8 ohms).

27. Clip limiter on-off.

# LAB 1300C Specifications

| MAX OUTPUT POWER <sup>1)</sup> | FTC<br>20 Hz – 20 kHz<br>at 0.1% THD | EIA<br>1 kHz<br>at Clip level | IHF<br>Peak Power<br>20 ms burst | Calculated <sup>2)</sup><br>Peak Power |
|--------------------------------|--------------------------------------|-------------------------------|----------------------------------|--|
| 8 ohms stereo                  | 325 W                                | 350 W                         | 385 W                            | 390 W                                  |
| 4 ohms stereo                  | 600 W                                | 650 W                         | 750 W                            | 780 W                                  |
| 2 ohms stereo <sup>3)</sup>    | 800 W                                | 900 W                         | 1000 W                           | 1500 W                                 |
| 8 ohms bridged                 | 1300 W                               | 1400 W                        | 1500 W                           | 1560 W                                 |
| 4 ohms bridged <sup>3)</sup>   | 1600 W                               | 1800 W                        | 2000 W                           | 3100 W                                 |

## SPEAKER PROTECTION

Each channel is fuse protected on the positive and negative power supply rails. Electronic short-circuit protection with a progressive characteristic. The output power is progressively reduced at impedances below 1.3 ohms. The power amplifier can be run into short-circuits for a long time without damage, and is open circuit and mismatch proof.

## DISTORTION

|                                    |        |       |
|------------------------------------|--------|-------|
| THD 20 Hz – 20 kHz and 1 W – 600 W | 4 ohms | 0.08% |
| THD at 1 kHz and 600 W             | 4 ohms | 0.03% |
| DIM 30 at 300 W                    | 4 ohms | 0.02% |
| CCIF (13 and 14 kHz) at 200 W      | 4 ohms | 0.02% |
| SMPTE (60 Hz and 7 kHz) at 300 W   | 4 ohms | 0.05% |

## POWER BANDWIDTH

|           |                           |
|-----------|---------------------------|
| Slew rate | 10 Hz – 50 kHz<br>40 V/μs |
|-----------|---------------------------|

|                  |       |           |
|------------------|-------|-----------|
| OUTPUT IMPEDANCE | 1 kHz | 0.07 ohms |
|------------------|-------|-----------|

|                               |             |
|-------------------------------|-------------|
| HUM AND NOISE below max power | < -10.5 dBA |
|-------------------------------|-------------|

|                    |        |       |
|--------------------|--------|-------|
| CHANNEL SEPARATION | 1 kHz  | 90 dB |
|                    | 10 kHz | 75 dB |

## PHASE AND DELAY

|  |        |
|--|--------|
| Deviation from perfect delay 150 Hz – 20 kHz | ±2°    |
| Total delay input to output at 4 ohms        | 4.1 μs |

## INPUTS

|   |                   |
|---|-------------------|
| Sensitivity, switchable for full output into 4 ohms | 0.775 or 1.8 Vrms |
| Gain switchable                                     | 37 dB or 29 dB    |
| Impedance   | 20 kohms balanced |
| Common mode rejection at 1 kHz                      | 75 dB             |

## FRONT PANEL

|                |  |
|----------------|--|
| Gain controls  | (2) channel A - B                                      |
| Output display | (2) red + (10) green LED's<br>Fast peak - slow release |
| Temp indicator | (2) yellow LED's<br>80°C at heatzink                   |
| VHF indicator  | (2) yellow LED's<br>> 20 kHz at full power             |
| On indicator   | (2) green LED's<br>DC rail voltage for channel A/B     |

## REAR PANEL

|                   |   |
|-------------------|---|
| Input connectors  | (2) XLR type 3 pin female (pin 2+), and (2) 1/4" jack |
| Output connectors | (2) Neutric 4-pole speakon connectors (pin 1+ output) |
| Switches:         |   |
| Gain              | 37 dB or 29 dB  |
| Link              | Tandem mono, channel A + B                            |
| Rev B             | Phase reverse of channel B                            |
| Clip limiter      | On - Off  |

## POWER

|                       |                  |                           |
|-----------------------|------------------|---------------------------|
| Operation voltage     | 130 V – 270 V AC | Option<br>65 V – 135 V AC |
| Minimum start voltage | 190 V AC         | 95 V AC                   |
| Full output power     | 180 V – 260 V AC | 90 – 130 V AC             |

|                    |                  |
|--------------------|------------------|
| OVERALL DIMENSIONS | 483 mm (19") W   |
|                    | 88 mm (3.5") H   |
|                    | 310 mm (12.4") D |

|        |               |
|--------|---------------|
| WEIGHT | 8 kg (18 lbs) |
|--------|---------------|

|           |                                     |
|-----------|-------------------------------------|
| APPROVALS | SEMKO, DEMKO, NEMKO, FEMKO, EMC, CE |
|-----------|-------------------------------------|

1) Specifications measured with 230 V regulated AC.

2) Calculated by using peak-voltage and nominal speaker impedance.

3) Though the LAB 1300C can drive a 2 ohms load, we recommend you to keep the load impedance on 4 ohms or above in professional applications, which demand large amounts of continuous power.

LAB GRUPPEN reserve the right to alter functions or specifications without prior notice.

# LAB.GRUPPEN

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