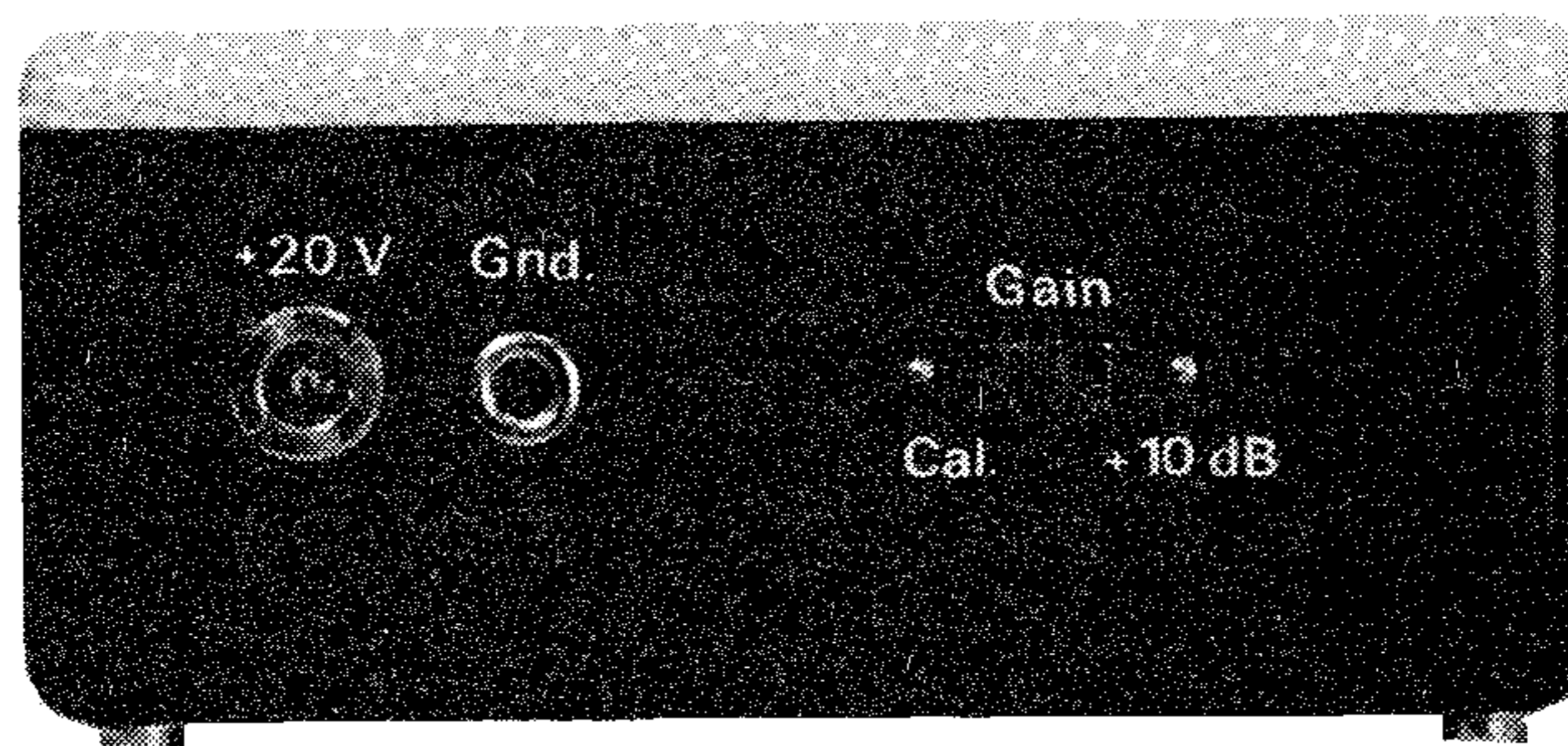
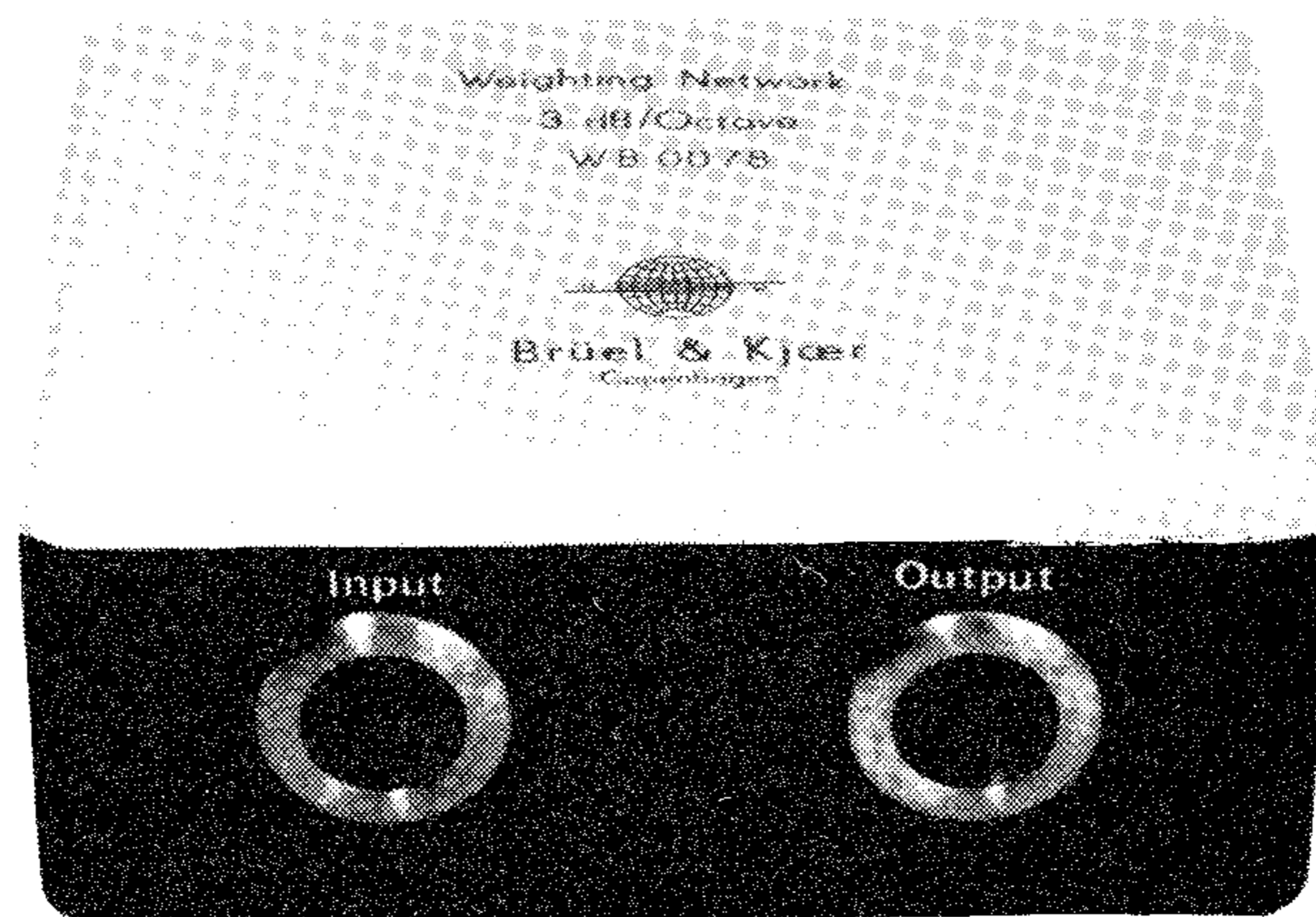


- Power Spectral Density Measurements with Constant Percentage Bandwidth Frequency Analyzers

Power Spectral Density Measurements with
Constant Percentage Bandwidth Frequency Analyzers

With the "Weighting Network, -3 dB/Octave" Type WB 0078 PSD measurements in absolute PSD unit $\frac{V^2}{Hz}$ can be made by means of frequency analyzers with constant percentage bandwidth.

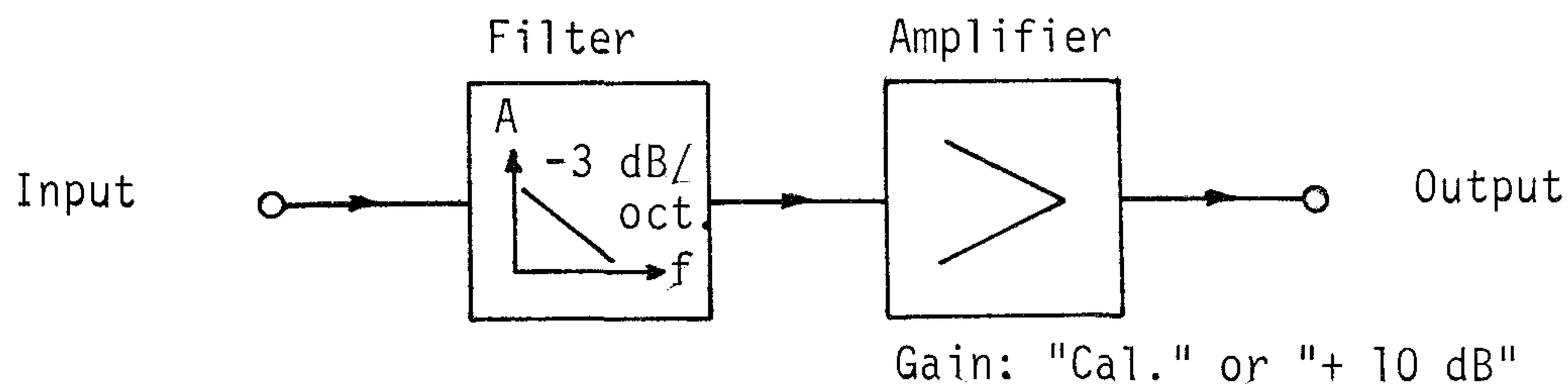


The WB 0078 can be used in connection with:

3347, 2606/1614-15, 2607/1614-15, 2113, 2114, and 2120.

In connection with instruments such as 2608/1614-15, 2107, and 2112 an external power supply is required.

Block diagram



WB 0078 consists of a -3 dB/Octave filter in the frequency range 2 Hz - 200 kHz followed by a calibrated low noise, wide band amplifier.

With the "Gain"-switch in position "Cal." and by using the PSD meter scales SA 0046 or SA 0055 (see fig. 4) measurements are made in the PSD units $\frac{V^2}{Hz}$ when 1/3 octave bandpass filter is used. Using filters with a bandwidth other than 1/3 octave will not give calibrated measurements, but of course still PSD measurements.

At very low signal levels the gain of the wide band amplifier can be increased by putting the "Gain"-switch in position "+ 10 dB". Full scale PSD values must then be multiplied by 10^{-1} .

The WB 0078 is very useful in connection with the 3347, thus having a real-time system for power spectral analysis of random signals.

This measuring system is also very convenient for analysis in the frequency domain of complex impulses.

Together with the Gauss-Impulse Multiplier Type 5623 it is possible to follow the PSD distribution through different time functions.

The WB 0078 can be connected in three different ways:

- 1) In series with the "Direct Input", (fig. 1)
- 2) In series with an external filter, (fig. 2)
- 3) As an "External Filter", (fig. 3)

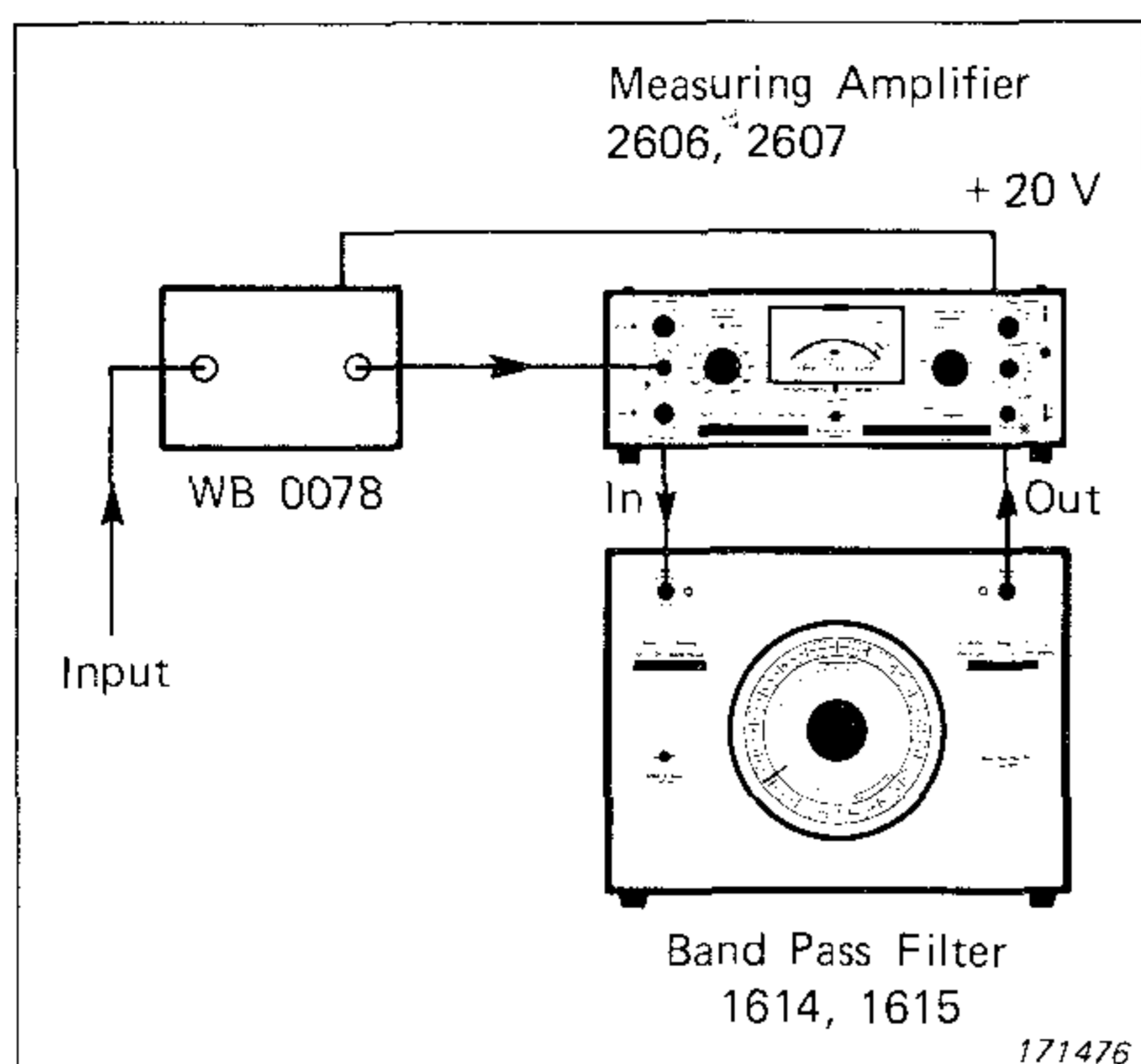


fig. 1

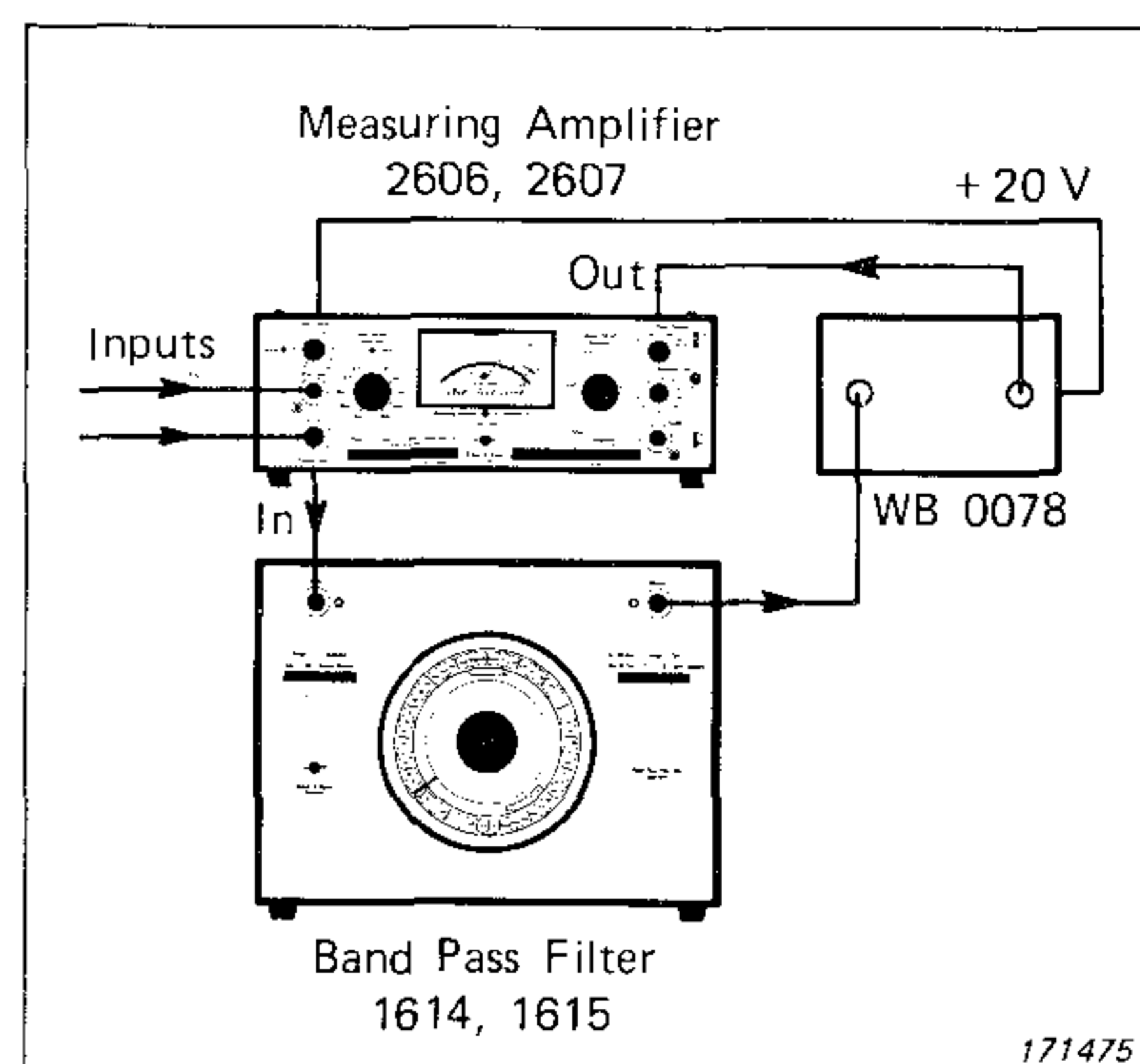


fig. 2

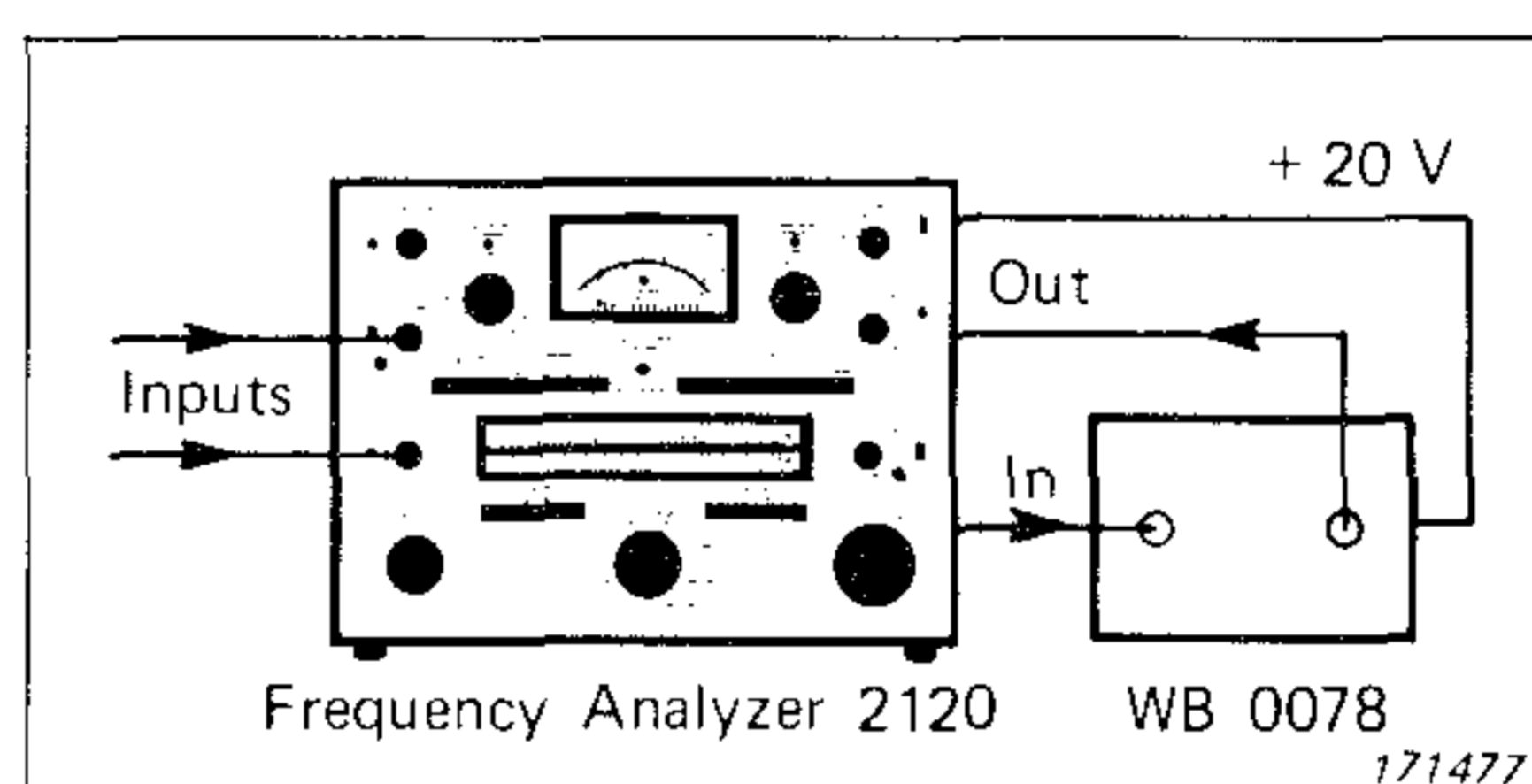


fig. 3

The WB 0078 has no built-in power supply, but a +20 V supply will often be available from the amplifier section of the frequency analyzer. The 20 V supply is fed through a special cable made for the type of analyzer used (see fig. 4).

Note: Only make connections to the ground socket, when use of an external power supply is required.

For information about interconnections, PSD range, attenuator settings, meter scales, supply sockets, and supply cables, see fig. 4, page 4.

Note: The WB 0078 has to be interconnected in such a way that overload can be detected by means of the overload function in the amplifier section of the analyzer.

On page 5 a read-out (3347) from analysis of a sine-squared impulse is shown (fig. 5).

Fig. 4

Note: "Power Supply from Socket"

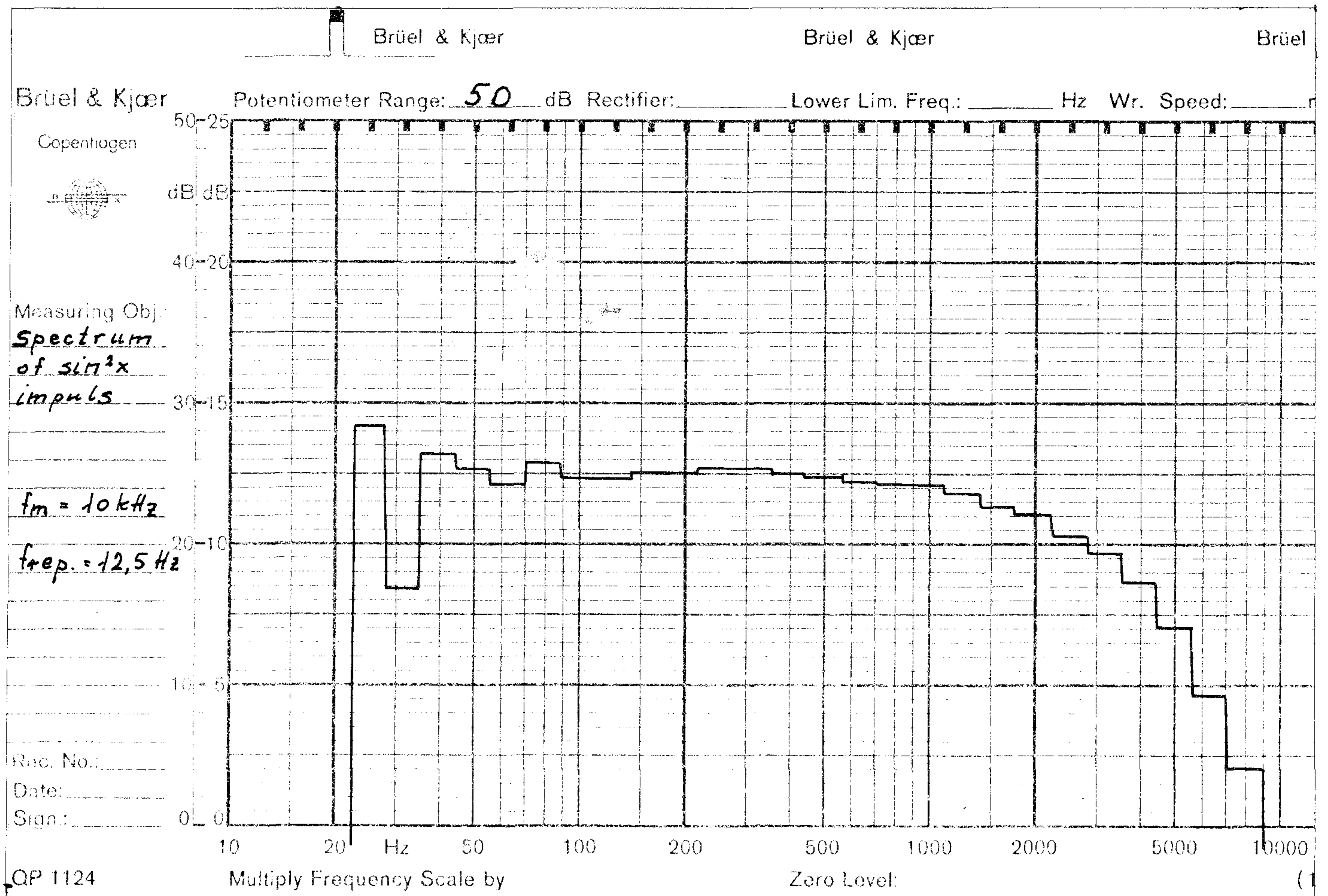
2113: Valid from serial no. 35 08 83

2114: Valid from serial no. 32 64 44

APPLICATIONS FOR WB 0078

Type	Connect to:	X ¹ PSD Range in pos. Cal. (FSD)	X ² PSD Range in pos. +10dB(FSD)	Input Att. max. pos.	Output Att. max. pos.	Meter ^{XX} Scale	Power Supply from socket	Power Supply cable	Remarks
3347	Direct Input	$10^{-10} - 1$ Nixie: 10^{-10} dBre: 10^{-10} "	$10^{-11} - 10^{-1}$ Nixie: 10^{-11} dBre: 10^{-11} "	1 V		SA 0046	Pen Lift	WL 0055	x: Only valid with 1/3 oct. filters and nominal sensitivity.
2606/ 1614-15	Ext. Fil. Outp. Direct Input	$10^{-10} - 10^4$ Nixie: 10^{-10} dBre: 10^{-10} "	$10^{-11} - 10^3$ Nixie: 10^{-11} dBre: 10^{-11} "	1 V	x 0.3	SA 0046	Overload	WL 0056	
2607/ 1614-15	Ext. Fil. Outp. Direct Input	$10^{-10} - 10^5$ Nixie: 10^{-10} dBre: 10^{-10} "	$10^{-11} - 10^4$ Nixie: 10^{-11} dBre: 10^{-11} "	1 V		SA 0055	Averaging Time	WL 0057	
2113	Direct Input	$10^{-10} - 1$	$10^{-11} - 10^{-1}$	1 V		SA 0046	Overload	WL 0056	x: Only valid with "Bandwidth" in pos. "1/3 oct." & nom. sensitivity.
2114	Direct Input	$10^{-10} - 1$	$10^{-11} - 10^{-1}$	1 V		SA 0055	Averaging Time	WL 0057	
2120	Ext. Filter Direct Input	$10^{-10} - 10^5$ Nixie: 10^{-10} dBre: 10^{-10} "	$10^{-11} - 10^4$ Nixie: 10^{-11} dBre: 10^{-11} "	1 V		SA 0055	Averaging Time	WL 0057	
2608/ 1614-15	Direct Input	-	-	1 V		Not inter-changeable scales.	External supply		xx: Accessories available
2107	Ampl. Input	-	-	Meter Range max. pos. 1 V			necessary		
2112	Ampl. Input	-	-				+ 20 V; 10 mA		

Fig. 5



Specifications for WB 0078

Filter slope: - 3 dB/Octave

Frequency Range: 2 Hz - 200 kHz $\left\{ \begin{array}{l} 10 \text{ Hz} - 40 \text{ kHz: } \pm 0.5 \text{ dB} \\ 2 \text{ Hz} - 200 \text{ kHz: } \pm 1.0 \text{ dB} \end{array} \right.$

Gain: "Cal.": 9 dB ; "+ 10 dB": 19 dB.

In position "Cal." the filter and amplifier has 0 dB amplification at 4,3 Hz, where a 1/3 octave filter has a bandwidth of 1 Hz (23%).

Input Impedance: > 400 k Ω

Output Impedance at 1 kHz: < 500 Ω

Minimum Load Impedance: 146 k Ω

Maximum undistorted output voltage: $\pm 6 \text{ V}$

External Power Supply: + 20 V $\pm 0.5 \text{ V}$; 10 mA

Selfgenerated noise from output measured in 1/3 octave wide bands:

"Gain" in pos.	"Cal."	-	"+ 10 dB"
$f_c < 10 \text{ kHz}$	$V_n < 3 \mu\text{V}$		$V_n < 5 \mu\text{V}$
$f_c < 40 \text{ kHz}$	$V_n < 5 \mu\text{V}$		$V_n < 7 \mu\text{V}$
$f_c = 80 \text{ kHz}$	$V_n < 8 \mu\text{V}$		$V_n < 10 \mu\text{V}$
$f_c = 160 \text{ kHz}$	$V_n < 15 \mu\text{V}$		$V_n < 17 \mu\text{V}$

Accessories supplied with Type WB 0078:

WL 0055 power supply cable for connection to 3347 (2130).
WL 0056 - - - - - 2606 - 2113.
WL 0057 - - - - - 2607 - 2114 - 2120.
JP 0006 plug for external power supply.

Accessories Available:

SA 0046 PSD meter scale for Type 2606, 2113, 3347 (2130).
SA 0055 PSD meter scale for Type 2607, 2114, 2120.

Dimensions:

Height: 53 mm
Width: 113 mm
Depth: 87 mm

KEJ / GP

7/71



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Brüel & Kjær

DK-2850 NÆRUM, DENMARK

Telephone: +45 2 80 05 00

TELEX: 15316