



Instruction Manual for
LIMITER AMPLIFIER 179-250-B

179-2510-B-4

LIMITER AMPLIFIER
179-250-B

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Draw No.:

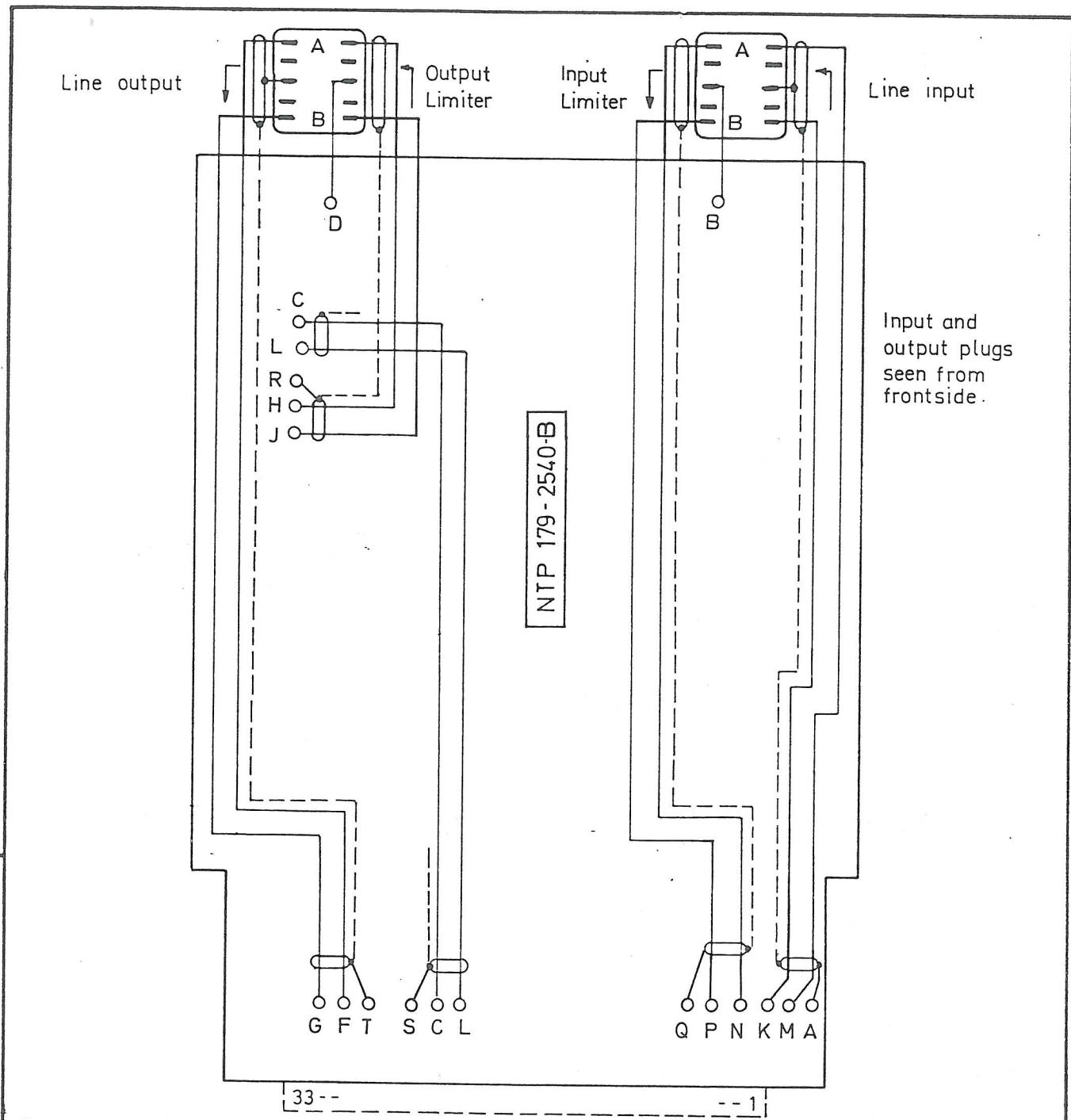
Supply Voltage	: 24V dc \pm 10% Positive Ground
Max. Ripple Voltage	: 0,1V pp 50Hz to 20 kHz.
Current Consumption steady state, no signal	: aprox. 75mA
" " " , during limit.	: aprox. 85mA incl. indicator diode.
" " " during heat up	: aprox. 250mA in 45 sec.
Temperature Range	: -20 $^{\circ}$ C to +60 $^{\circ}$ C (-4 to +140 $^{\circ}$ F)
Frequency Range within 0,5dB	: 20Hz to 20kHz
Input impedance at 1kHz	: 2k Ω \pm 15% Balanced Floating.
Output impedance	: 20 Ω \pm 15% Balanced Floating.
Minimum Load Impedance	: 200 Ω
Limiting Threshold (Input)	: +15, +6, 0, -6, -12, -18dBu \pm 0,5dB.
Output in Limiting Range	: +15dBu \pm 0,5dB.
Limiting Range depending on setting of input	
Limiting Threshold	: 6, 15, 21, 27, 30, 30dB (max. 30dB)
Input Overload Level	: +21dBu (8,6 V rms, sinus)
Distortion, 20Hz to 20 kHz, 0 to 20 dB lim.	: 0,5%
" " " 20 " 20 to 30 dB lim.	: 1%
Attack Time <u>see NOTE 1</u>	: See curve 179-2515
Recovery Time, depending on magnitude and duration of input signal	: See curves 179-2512/13 and 14.
Control Voltage Output <u>see NOTE 2</u>	: 1 Volt dc per 5 dB gain reduction.
Control Current Output for Instrument (An instrument with internal resistance of appr. 63 Ω such as NTP: D48PL or 179-900 should be used.)	: 0,25mA dc per 5dB gain reduction. Instrument 0-1mA dc, gives limiting indication 0-20dB (liniar dB scale)
Limiting Indicator Output (LED indicator)	: 10mA dc.
Signal to Noise Ratio at Limiting Threshold	: 84dB A-curve.
Frequency dependent Limiting Threshold:	
Terminal 24 connected to 25	: Time constant 50 μ Sec.
" 24 " " 26	: Time constant 75 μ Sec.
No connections	: Frequency Independent Threshold.

NOTE 1.

The output limiting level stated above applies to steady state conditions. Peaks shorter than the attacktime will be limited at a level max. 3dB above steady state conditions.

NOTE 2. Stereo Operation.

The Control Voltage of two units may be linked so as to obtain equal gain-reduction in the two stereo channels. In this mode terminals 18 "Stereo Control Voltage" and 15 "12Vdc equalizing" respectively of the two limiters are parallel connected.



Terminal:

- 1: Input cable screen, isolated.
- 2: A Input
- 3: B
- 4: As term.1., via input plug.
- 5: not connected=Input Threshold +15 dBu
- 6: conn.to term.5= " " + 6 dBu
- 7: " " 5= " " 0 dBu
- 8: " " 5= " " - 6 dBu
- 9: " " 5= " " -12 dBu
- 10: " " 5= " " -18 dBu
- 11,12,13 & 14: Supply +
- 15: 12V dc equalizing (stereo operation)
- 16: + Instrument output
- 17: -
- 18: Stereo Control
- 19,20,21 & 22: supply -
- 23: LED indicator (negative)
- 24: Deemphasis, see below
- 25: Conn.to term.24= 50 μ sec.
- 26: " " 24= 75 μ sec.
- 27: Output cable screen isolated.
- 28,29: A output
- 30,31: B "
- 32: As term. 27 via output plug
- 33: Housing.

1) 20/10-72 BM/LK 3/11/8-78 BM/H.
 2) 12/12-73 IW
 3) 24/1-74 BM/IW

Pos	Antal	Materiale	Behandl	Del af
Målestok				
Tolerance	mm			
Tegnet	13-9-72 IW	LIMITER AMPLIFIER 179-250-B		
Godkendt:	ØTJ	Terminals & Interconnections		
Revideret	4			
				NTP N. TØNNES PEDERSEN A/S
				179-2502-B-4

Normally the Limiter Amplifier will stay correctly adjusted, except when a component has failed and has been replaced; then it may be necessary to make certain adjustments. Before attempting to make any adjustments, note the tolerances stated in the Technical Specifications.

The functions of the trimpotentiometers are as follows:

- P1 Bias adjustment of Op. amp. A1
- P2 Compensates for individual pinch-off of the F.E.T.(Q1)
- P3 Compensates for individual slope $\frac{\Delta R_{SD}}{\Delta V_{GS}}$ of the F.E.T.
- P4 Linearity adjustment of the FET Attenuator circuit.
- P5 Adjustments for minimum distortion of the FET Attenuator.
- P6 Input common mode rejection.
Do not attempt to make any adjustments until the current consumption has fallen to a steady level approx. 75mA after 60 sec.
Correct sequence of adjustments is as follows:
See Note 1.
- a. Bias adjustment by P1

Conditions: No input signal.
Connect a DC voltmeter (or DC-oscilloscope sens. approx. 20mV/div.) between TP 3 and TP 2 (TP 2 ref.)
P1 is adjusted until the voltage measured is the same whether TP1 is connected to TP2 or not.

- b. Pinch-off adjustment by P2

Conditions: Input signal-18dBu 1kHz on terminal 2 and 3.
P2 is adjusted until the output voltage is +15dBu (Limiting Threshold -18dBu.: Term. 5 connected to term. 10).
The adjustment range can be altered by connecting or disconnecting R30 and / or R31.

- c. Slope dB/V and Linearity adjustment by P3 and P4

Conditions: Like referred under pos. b.

A floating external DC-source 0-6V is connected between terminal 17 and 18, terminal 18 positive. The DC voltage is set to 3.0 Volt, and P3 is adjusted so that the output level is 0dBu (15 dB attenuation). Now the DC voltage is set to 6.0 Volt, and P4 is adjusted until the output level is -15dBu (30 dB attenuation). Because of interaction between P3 and P4 the adjustments are repeated until correct output level is obtained.

- e. Distortion adjustment of P5.

Term. 5 still connected to term. 10.

Conditions: +8dBu 1kHz on term. 2 and 3

P5 is adjusted to minimum distortion.

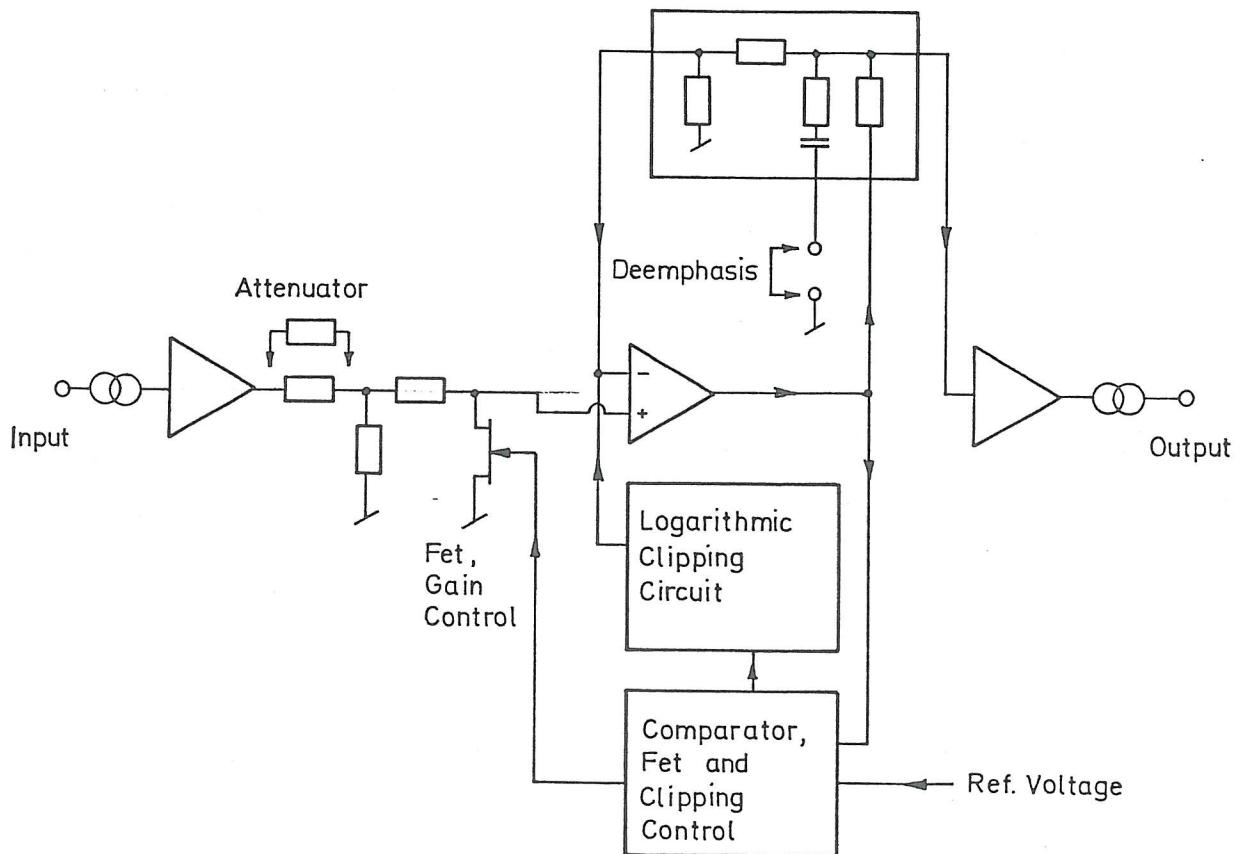
Because of interaction between P5 and P2, the adjustment mentioned under pos. b might be carried out once more.

f. Input transformer symmetrically balancing by P6

Conditions: Input terminals 2 and 3 are connected together, and an input signal of +15dBu level 15 kHz is applied between term. 2/3 and term. 24. Trimmer potentiometer P6 is turned to maximum attenuation of the output signal, which means best common mode rejection.

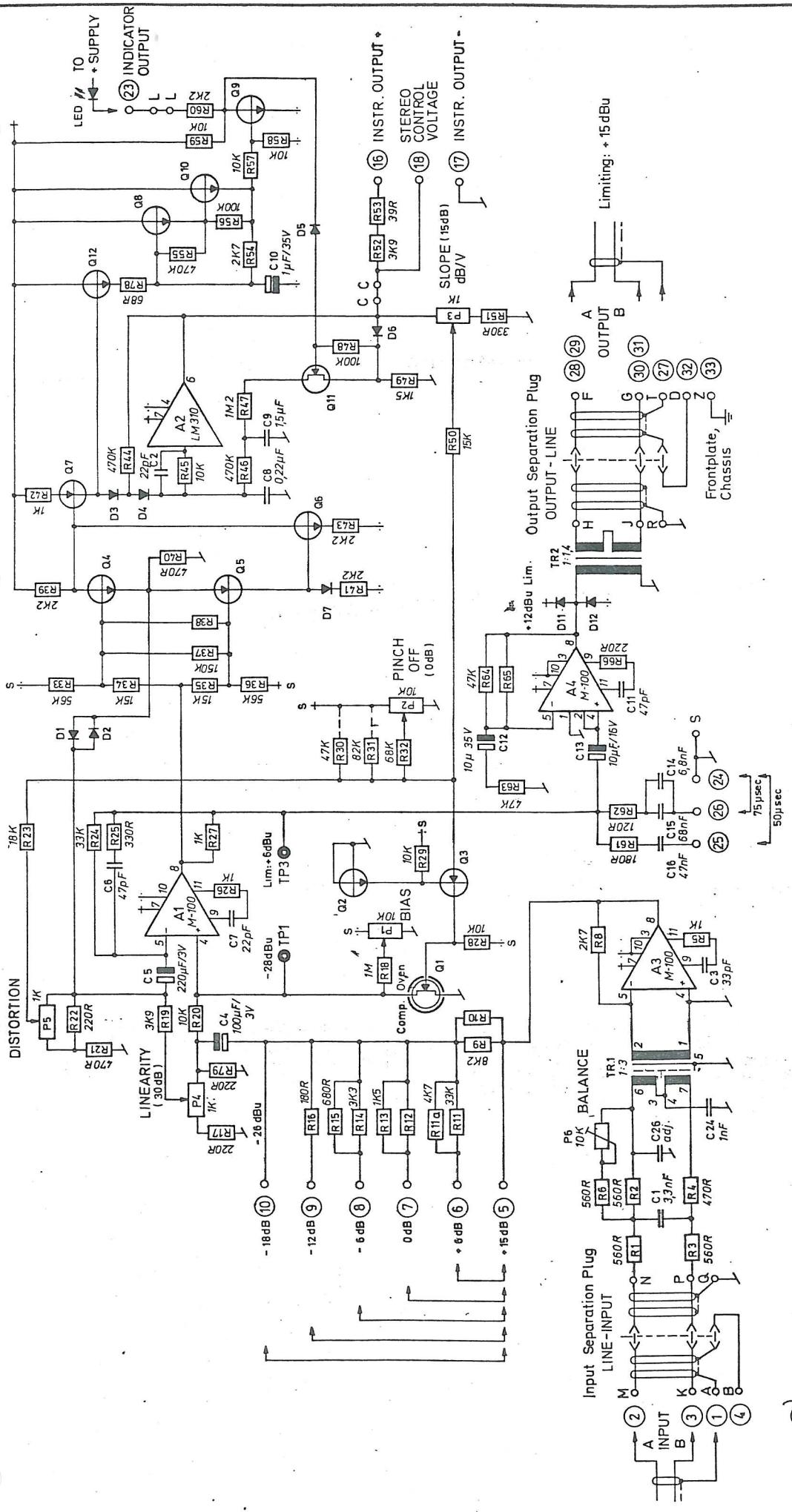
g. The Adjustment mentioned under position b is checked again, and if necessary carried out once more.

Note 1 : During alignment of the unit no deemphasis should be used: Term. 25 and 26 must not be connected.



Block diagram Limiter 179-250-B

1/ Diagram ændret d. 7/3-74 BM/IW



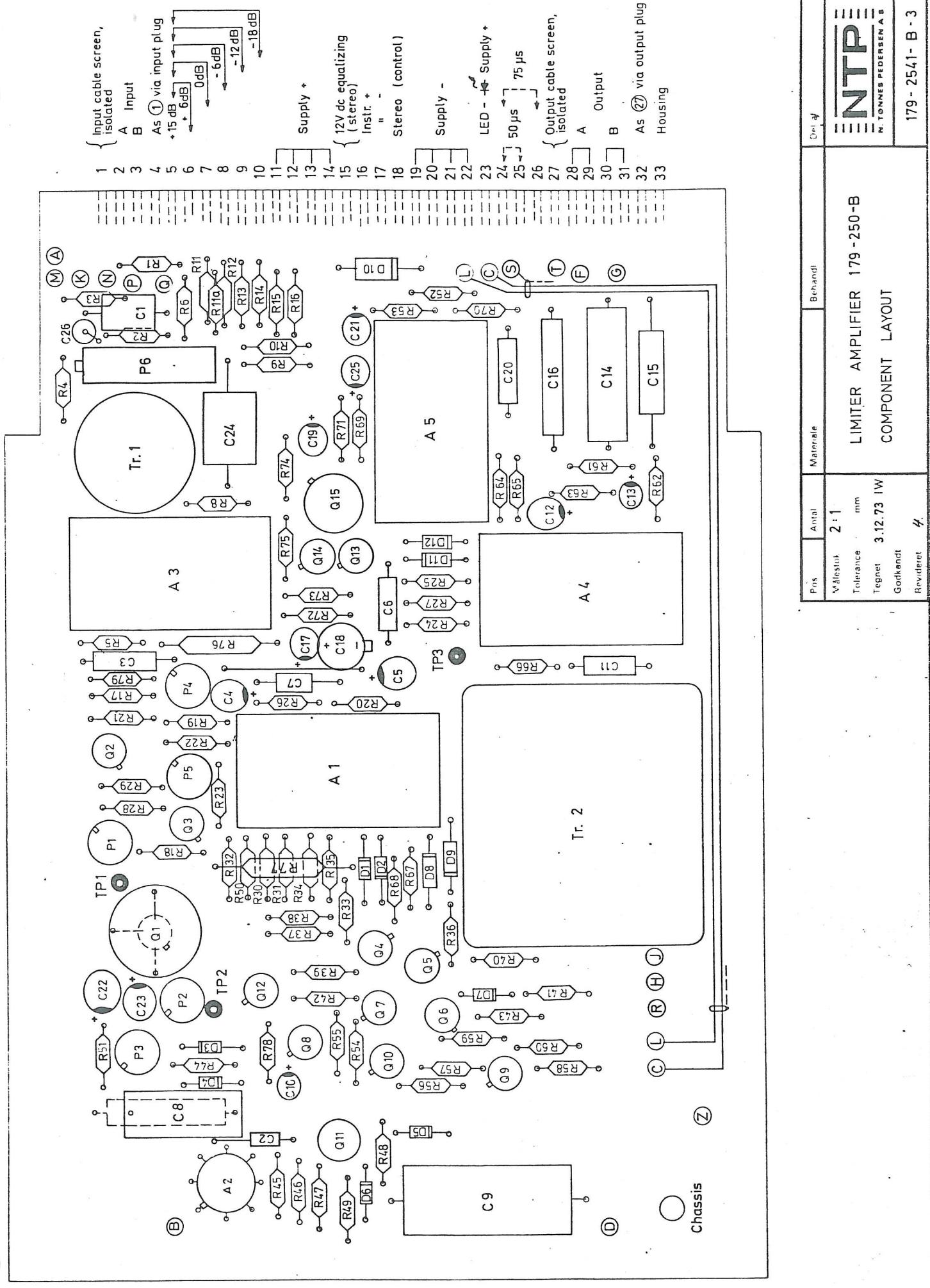
Terminal numbers in circles correspond
to 33-pole ISEP card connector.

Pos.:	Aantal:	Material:	Behandl.:	Del. af
Målestok :				
Tegnet :	28.11.73	W		
Godkendt:	B.M.			
Revideret:	B.			
LIMITER AMPLIFIER	179 - 250 - B			
Diagram				

NTP

N. T. NÆS PREDERØEN A/S

179 - 2530 - B - 3



179-2541-B-3

NTP
N. TONNES PEDERSEN A/S

179-2541-B-3

COMPONENT LAYOUT

Værestok
Toleranc
Tegnet
Godkendt
Revideret

2 : 1
mm
3.12.73 W

3.5.77 BH/W

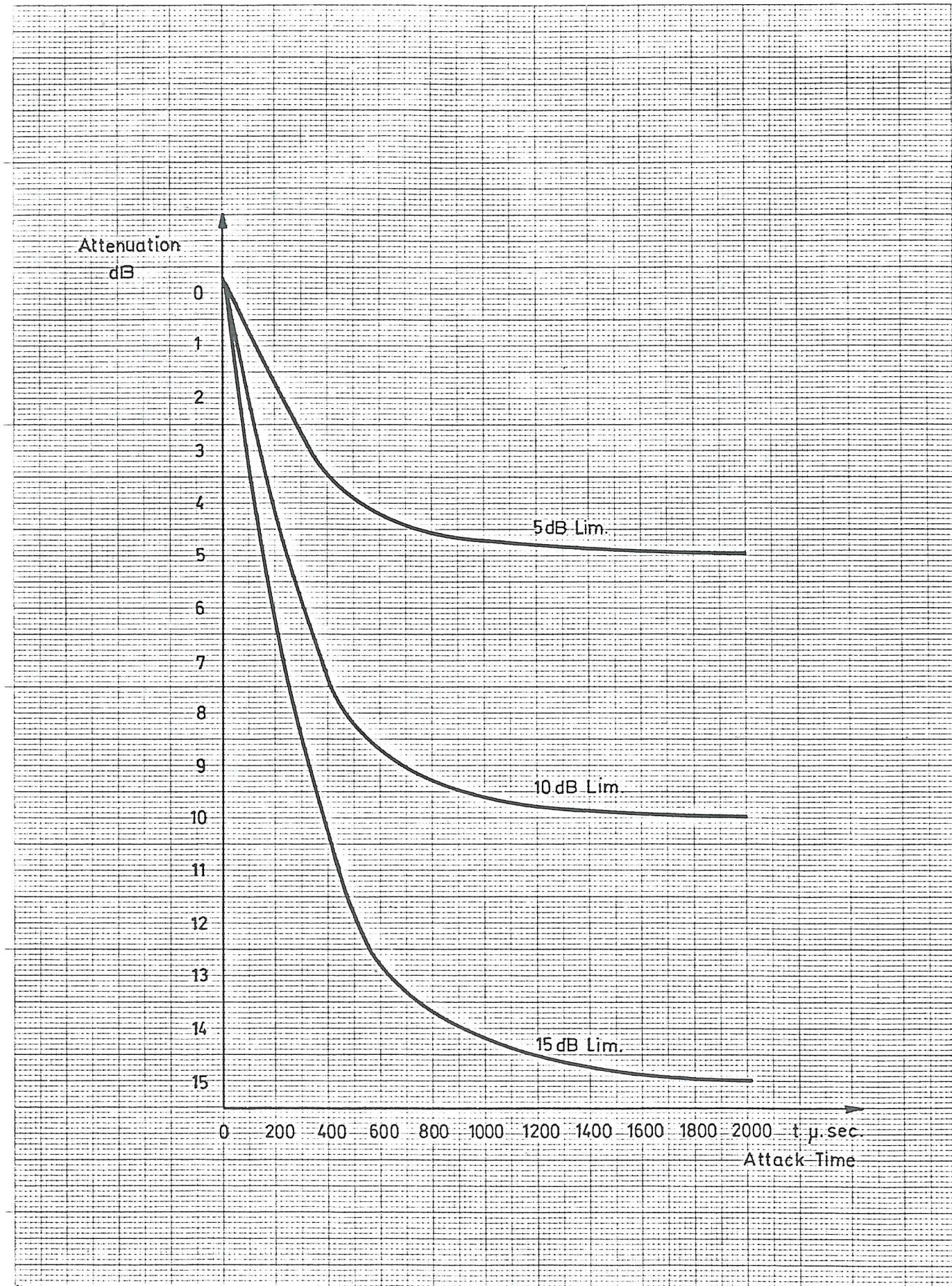
2.12.75 W (R79+C26)

3.5.77 BH/W (R79+C26)

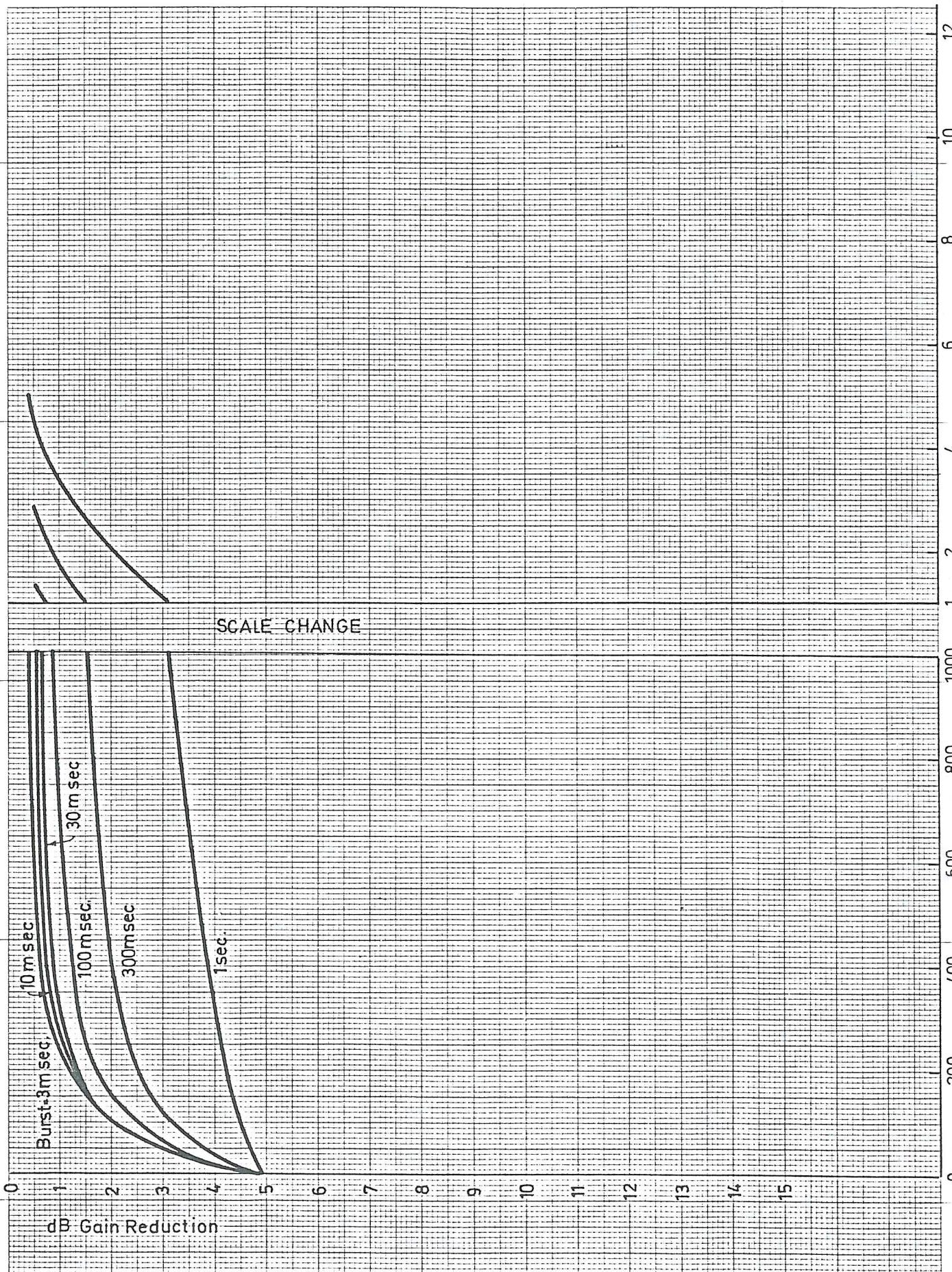
Ref. no.	Qty.	Description	Value / Size			Type no.	Manufacturer
R69	1	Resistor, carbon	22R	1/8W	5%	SBB 0207	Beyschlag
R53	1	" "	39R	"	"	" "	"
R78	1	" "	68R	"	"	" "	"
R62	1	" "	120R	"	"	" "	"
R16,61	2	" "	180R	"	"	" "	"
R17,22,66, 71,79	5	" "	220R	"	"	" "	"
R25,51	2	" "	330R	"	"	" "	"
R 4,21,40	3	" "	470R	"	"	" "	"
R1,2,3,6	4	" "	560R	"	"	" "	"
R15	1	" "	680R	"	"	" "	"
R67,68	2	" "	820R	"	"	" "	"
R5,26,27,42 70	5	" "	1k	"	"	" "	"
R13,49	2	" "	1k5	"	"	" "	"
R39,41,43, 60	4	" "	2k2	"	"	" "	"
R 8,54	2	" "	2k7	"	"	" "	"
R14	1	" "	3k3	"	"	" "	"
R19,52	2	" "	3k9	"	"	" "	"
R11a	1	" "	4k7	"	"	" "	"
R72	1	" "	6k8	"	"	" "	"
R 9	1	" "	8k2	"	"	" "	"
R20,28,29, 45,57,58, 59,74	8	" "	10k	"	"	" "	"
R34,35,50	3	" "	15k	"	"	" "	"
R23,73	2	" "	18k	"	"	" "	"
R75	1	" "	22k	"	"	" "	"
R11,24	2	" "	33k	"	"	" "	"
R30,63,64	3	" "	47k	"	"	" "	"
R33,36	2	" "	56k	"	"	" "	"
R32	1	" "	68k	"	"	" "	"
R31	1	" "	82k	"	"	" "	"
R48,56	2	" "	100k	"	"	" "	"
R37	1	" "	150k	"	"	" "	"
R44,46,55	3	" "	470k	"	"	" "	"
R18	1	" "	1M	"	"	" "	"
R47	1	" "	1M2	"	"	" "	"
R76,77	2	Resistor, carbon	39R	1/3W	5%	" "	"
P 3, 4, 5	3	Resistor, trim	1k	"	"	3329-1-102	Bourns
P 1, 2	2	" "	10k	"	"	3329-1-103	"
P 6	1	" "	10k	"	"	3009-1-103	"
C 2, 7,20	3	Capacitor, styroflex	22p/160V	5%	B31310	Siemens	
C 3	1	" "	33p/160V	"	"	"	"
C 6,11	2	" "	47p/160V	"	"	"	"
C24	1	" "	1n/630V	"	B31063	"	
C 1	1	" "	3n3/160V	"	B31310	"	
C14	1	" "	6n8/ 63V	"	46802	Copax	
C 8	1	Capacitor, polyester	220n/250V	"	B32234	Siemens	
C 9	1	" "	1u5/63V	"	MKT1813	ERO	
C16	1	Capacitor, polycarbonate	47n/63V	2%	KC 1853	"	

Ref. no.	Qty.	Description	Value / Size	Type no.	Manufacturer
C15	1	Capacitor, polycarbonate	68n/63V	2 1/2	ERO
C10	1	Capacitor, tantal	1u/35V	ETP 1	ERO-tantal
C13,21,25	3	" "	10u/16V	ETP 2	"
C12,17	2	" "	10u/35V	ETP 3	"
C19	1	" "	22u/16V	ETP 3	"
C23	1	" "	33u/10V	"	"
C 4	1	" "	100u/3V	"	"
C22	1	" "	100u/10V	ETQ 5	"
C 5	1	" "	220u/3V	"	"
C18	1	Capacitor, electrolytic	15u/40V	2222-015-47159	Philips
D10,11,12	3	Diode	1N4002		
D 3, 4, 5, 6, 7	5	"	1N4148		
D 1, 2	2	"	BAX 13		Philips
D 8, 9	2	" , zener	1N821		Motorola
Q 2, 4, 6, 8, 9, 10, 12	7	Transistor	BC 237		
Q 3, 5, 7, 13,14	5	"	BC 307		
Q15	1	"	BC 141-16		Siemens
Q 1	1	" , FET	ZN5486		National
Q11	1	" , FET	ZN 4302		Amelco
A 2	1	Op.amp	LM 310AH		
A1,3,4,5	1	"	M 100 C		NTP
	1	Component oven	5 ST 1-2		Jermyn
TR 1	1	Transformer		STR45/BV376 203 655	Beyer
TR 2	1	"		1,6CAKP 13.590	J. Schou
	1	Connector		12-210-001	ITT
	1	Isolating sheet		14-007-002	ITT
	2	Rivets		14-014-002	ITT
	2	Male connector		STR-B-17 174	STR
	2	Female "		STR-B-17 156	STR
	4	Guides for box		211-009	Zellweger,Uster
	1	Fastening screw		211-010	" "
	1	Screen box		211-020-216	" "
	1	Front plate		179-2550	A.Nielsen :Zellw
	1	Mounting plate		179-2551	"
	2	" piece		179-2552	"
	4	Stand off		179-2554	Hillebrandt
	1	Rivet		351-1054	"
	3	Copper tube rivet		S 6086	United Shoe
	1	P.C. board		179-2540	Poxy Print

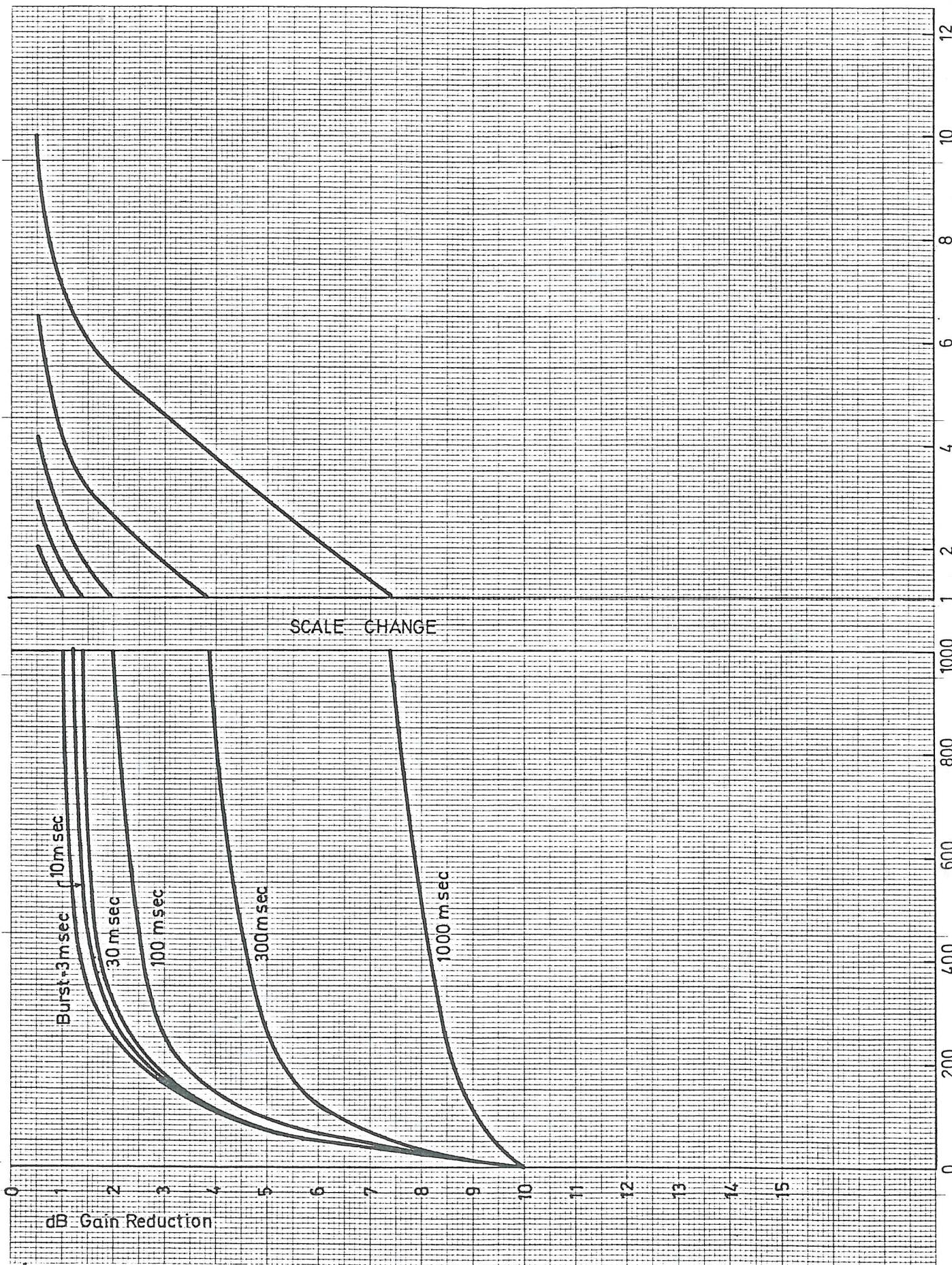




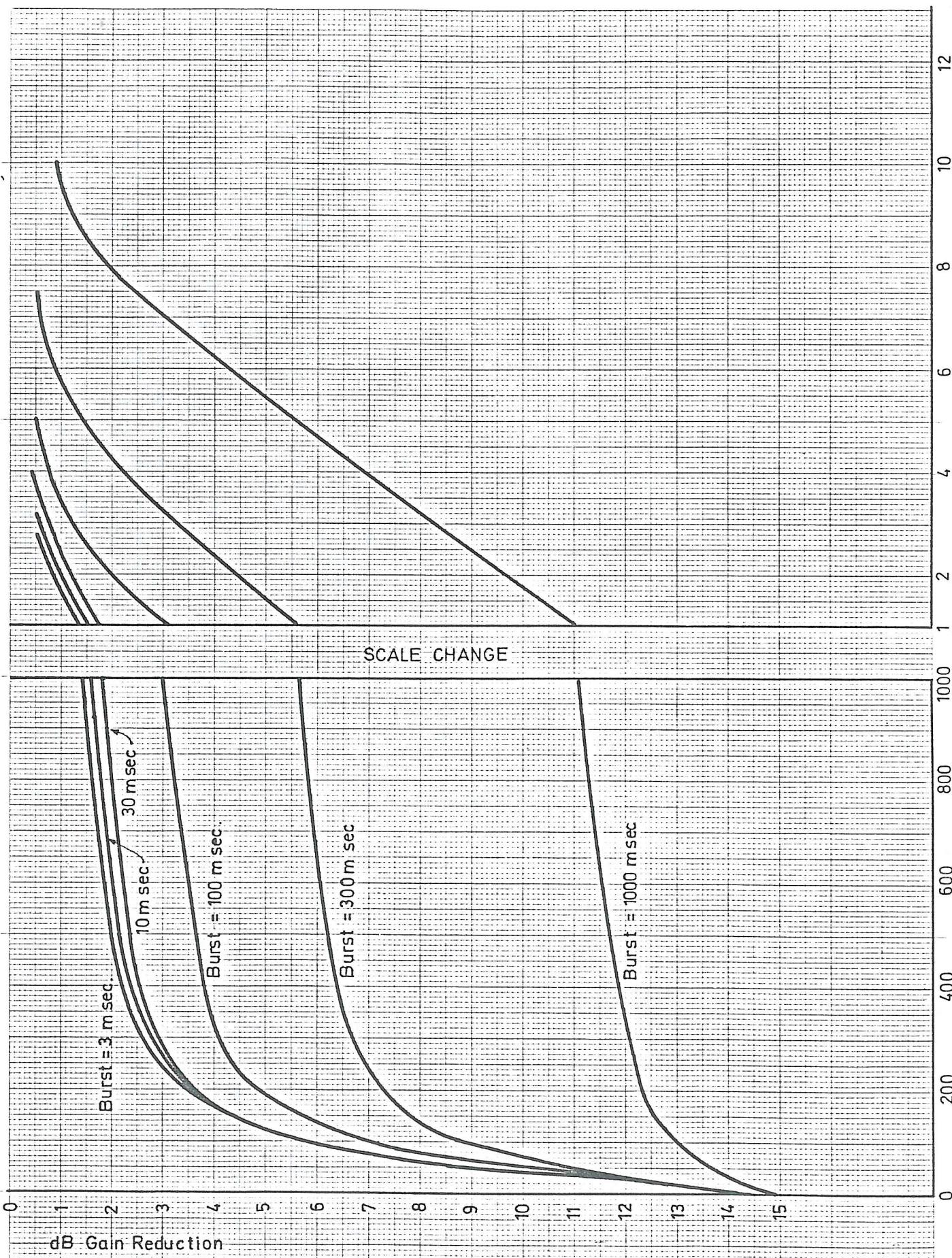
Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: \pm mm				
Tegnet : 19.6.73 IW		Limiter Amplifier 179-250-A/B		
Godkendt: 1/5-74 D.M.		Attacktime Characteristics		
Revideret :				
				NTP N. TØNNES PEDERSEN A/S
				179-2515 - A-4



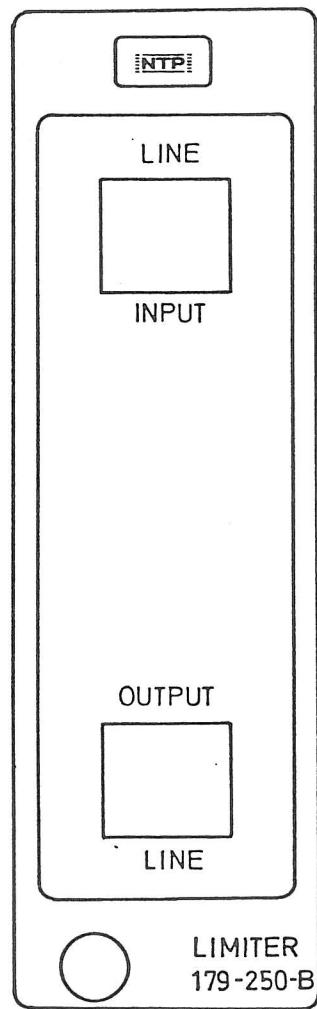
Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: \pm mm				
Tegnet : 19.6.73 IW				
Godkendt: 1/5 - 74 B.M.				
Revideret :				
Limiter Amplifier 179-250-B Recovery Characteristics at 5dB Gain Reduction Tone burst 5kHz 3ms to 1000ms				
NTP N. TØNNES PEDERSEN A/S				179-2512-B-4



Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: + mm				
Tegnet : 19.6.73 IW				
Godkendt: 1/5-74 BM				
Revideret :				
Limiter Amplifier 179-250-B Recovery Characteristics at 10dB Gain Reduction. Tone burst 5kHz 3ms to 1000ms				
NTP N. TØNNES PEDERSEN A/S				
179-2513 - B - 4				



Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerance: + mm				
Tegnet : 19.6.73 IW				
Godkendt: 1/5 - 74 3.1				
Revideret :				
Limiter Amplifier 179-250-B				NTP N. TONNES PEDERSEN A/S
Recovery Characteristics at 15 dB Gain				
Reduction.				
Tone burst 5kHz 3ms to 1000ms				179-2514-B-4



Module 16M

Painted : G16

Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :	1:1			
Tolerance:	± mm			
Tegnet :	11.12.73 IW			
Godkendt:	V6-24 B.M.	LIMITER AMPLIFIER 179-250-B	ISEP - Cassette	NTP N. TØNNES PEDERSEN A/S
Revideret :		Front plate	Lay-out	179-2559 - A-4