Service Instructions
Vibration Meter

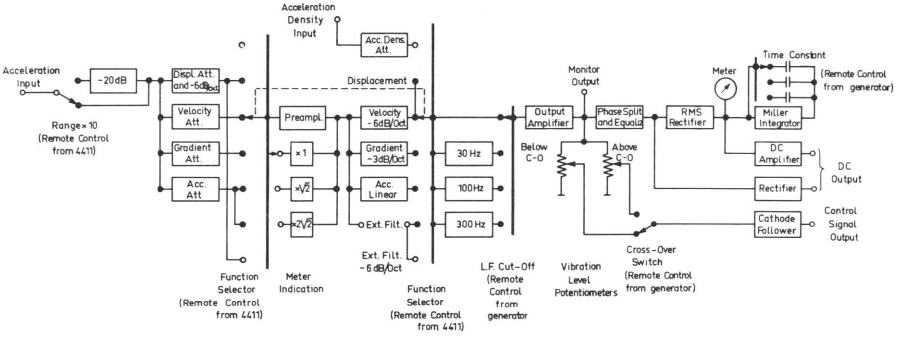
Consisting of:

Removal of the Case.

After removing the four HEX/HD screws on the front panel, it is possible to slide the chassis and the front panel out of the rack or the wooden case.

The metal case can be pulled out after the two screws on the back panel have been removed.

Block Diagram



Trouble Shooting.

If the reason for a fault is not an obvious one such as a dead tube or transistor, broken down resistor, blown or disconnected fuse etc., then first test the voltages of all the tubes and compare them with the voltages shown in the circuit diagram in order to localize the defect. Should this method of finding the fault prove unsuccessful, then check the instrument by adapting the method described in the adjustment procedure. When the trouble has been found and remedied, the voltages and adjustments which are influenced by the remedy must be rechecked.

The tolerances stated in the instructions can only be used as a guide for adjustment and control, but any deviations must not be corrected without being sure that the tolerances of the instruments used for making the adjustment are so small as to have no influence on the measurements.

The instructions in this Manual are given purely as a guide to the service of equipment with minor faults. Some faults, as f.inst. small deviations in tolerances require for their correction special control equipment and extensive experience, and in these cases it is necessary to send the instrument to the factory.

Spare Parts.

Please state type and serial number of apparatus when spare parts are ordered.

Instruments Necessary for Service and Repair:

Frequency Analyzer type 2107
(Electronic Voltmeter type 2409)
Oscilloscope
Beat Frequency Oscilloscope type 1013
Beat Frequency Oscilloscope type 1017
Frequency Counter
Multimeter (50 μA)

Meter Circuit

valid from serial no. 172571

1.1. Mechanical Zero-point

METER TIME CONSTANT: "Off"

Adjust meter scale for 0.

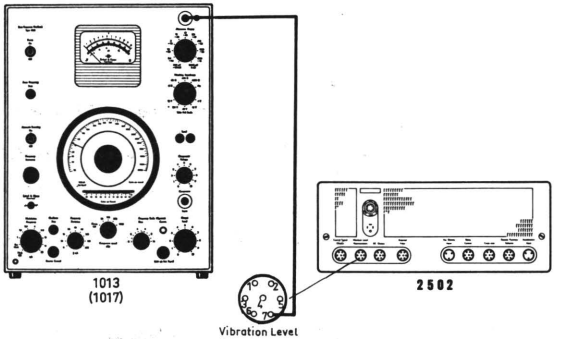
1.2. Electrical Zero-point

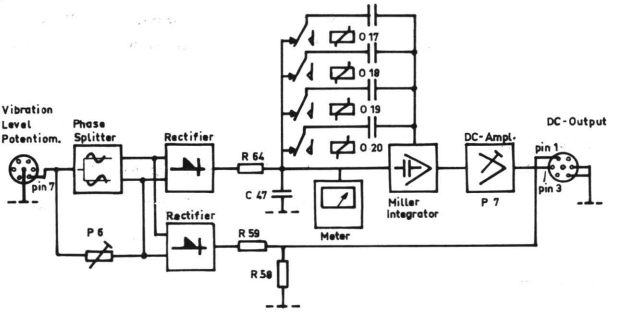
METER TIME CONSTANT: "1 sec."

Connect pin 7 of "Vibration Level Potentiometer" socket to ground.

Check that the pointer is still at 0.

Tolerance: ½ pointer "width".





1.3. Sensitivity

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input signal for full scale deflection on type 2502.

Input voltage: Approx. 9 V.

1.4. Balance

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,

Measure the voltage across R 135 and R 136. Approx.: 9 V, max. difference: 0.3 dB. (located on printed circuit XC 0258)

continued

1.5. Frequency Response

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for a 9,8 V deflection on type 2502.

Check the frequency response from 5 Hz to 100 kHz.

Tolerance: ± 0,2 V. (+ tolerance of type 1013, 1017: 0,5 dB)

If necessary adjust P 6 at 100 kHz. (located on printed circuit XC 0258)

1.6. Overload

METER TIME CONSTANT: "10 sec."

V 1 removed.

Frequency: 1000 Hz. Input voltage: 12 dB above full deflection on type 2502.

Check with an oscilloscope across R 135 and R 136 that the signal is not distorted.

1.7. DC Amplifier

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,

Measure the DC voltage on "DC Output" socket, pin 3: -6.5 V.
Tolerance: ± 2%.

If necessary short-circuit C 47 to ground and adjust P 7 for 0 V on "DC Output" socket, pin 3.

(C 47 is located on printed circuit XC 0258 and P 7 on XC 0226)

1.8. Meter Time Constant

METER TIME CONSTANT: "30 sec."

V 1 removed.

Frequency: 1000 Hz . Adjust input voltage for a 10 V deflection on type 2502.

The meter time constant means the time it takes the meter pointer to fall from 10 V to 3,5 V when the input signal is disconnected.

In position "30 sec" the meter time constant should be 30 sec.

Check METER TIME CONSTANT in position 0,3 - 1 - 3 - 10 sec.

1.9. Ripple

a. METER TIME CONSTANT: "All positions except 0,3 sec."

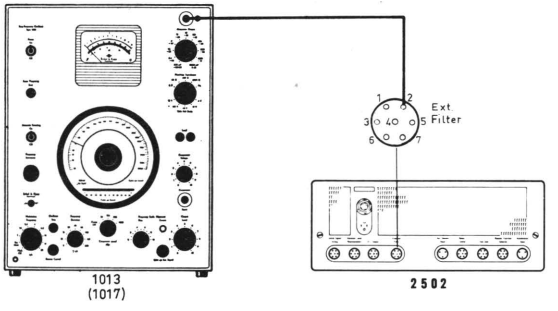
V 1 removed.
Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,
Measure the ripple on pin 3 of "DC Output" socket by means of voltmeter type 2409.

Tolerance: Max. 1 mV.

b. METER TIME CONSTANT: "0,3 sec."

As item a.

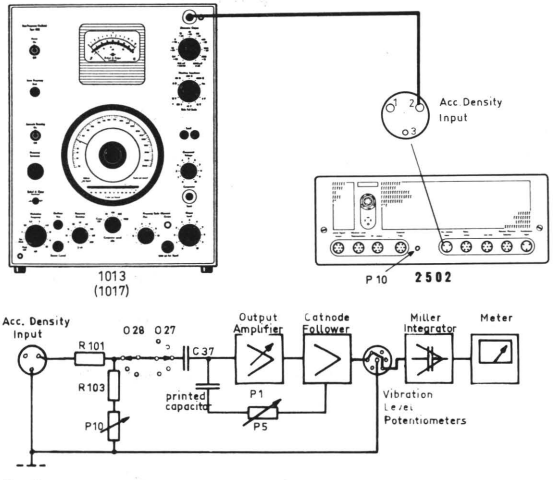
Tolerance: Max. 5 mV.



2.1. Sensitivity

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Ext. Filter"

Frequency: 500 Hz. Adjust input voltage for a 10 V deflection on type 2502.
The input voltage should be approx. 10 mV.



2.2. Acceleration Density

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Acc.Den."
ACCEL. DENSITY RANGE: "0,01"

Input signal: 100 mV, 500 Hz.
Deflection on type 2502: Full scale (20 dB)
If necessary adjust P 10

continued

2.3. Frequency Response

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Acc. Den."
ACCEL. DENSITY RANGE: "100"

Input signal: 10 V, 1000 Hz.

Deflection on type 2502: 100 g^2/cps

Check the frequency response from 10 - 100.000 Hz.
Tolerance: ± 2%

If necessary change value of C 79 (located on printed circuit XC 0258)

ACCEL. DENSITY RANGE to "0,01"

Input signal: 100 mV, 1000 Hz.

Deflection on type 2502: 1 g^2/cps

Check the frequency response again: ± 2%.

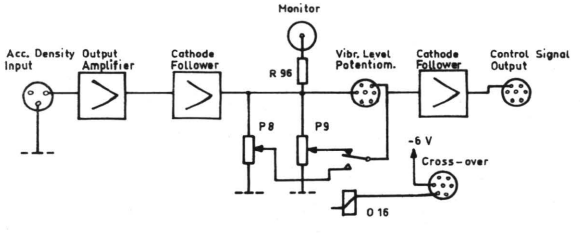
If necessary adjust P 5 at 100 kHz. (located on printed circuit XC 0258)

2.4. Overloading

FUNCTION SELECTOR: "Acc. Den."

Input frequency: 1000 Hz.

Connect an oscilloscope to "Vibration Level Potentiometer" socket pin 3, and check that the signal is not distorted until 12 dB above full scale deflection on type 2502.



2.5. AC Output

a. FUNCTION SELECTOR: "Acc. Den."
LEVEL BELOW CROSS-OVER: "0"
ACCEL. DENSITY RANGE: "100"

Frequency: 1000 Hz. Adjust the input voltage for 10 V on "Vibration Level Potentiometer" socket pin 3.

The voltage on "Monitor" socket should be 10 V.

The output on "Control Signal Output" socket pin 1 should be max. 1 dB below 10 V.

b. LEVEL BELOW CROSS-OVER to "10"

Output voltage on "Control Signal Output": 22-26 dB below 10 V

c. LEVEL ABOVE CROSS-OVER to "0"

Connect a shorting link on "Cross-over" socket between pin 3 and 6 in order to energize relay O 16.

Output on "Control Signal Output" socket pin 1 should be max. 1 dB below 10 V.

d. LEVEL ABOVE CROSS-OVER to "10"

Output voltage on "Control Signal Output": 22-26 dB below 10 V

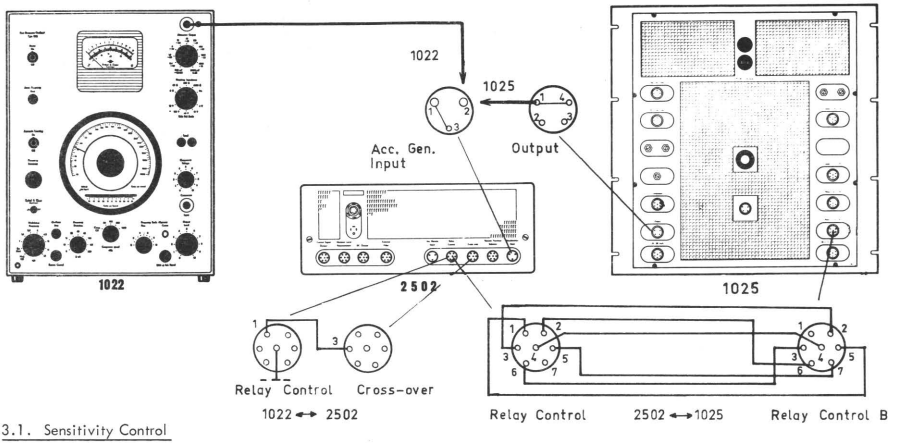
2.6. Noise and Hum

FUNCTION SELECTOR: "Acc. Den."
ACCEL. DENSITY RANGE: "100"

The instrument must be in its case or in another way effectively screened.

Disconnect signal input and check noise and hum on "Vibration Level Potentiometer" socket pin 3.

Max. 10 mV.



3.1. Sensitivity Control

METER TIME CONSTANT: "1 sec."
METER INDICATOR: "RMS"

The 2502's meter should read the values given in the table (within 4%) under the stated conditions.

It will be necessary to select suitable settings of the four RANGE selectors according to the meter readings.

Readings in the 3 programmed "AUTO" positions of FUNCTION SELECTOR depends on whether or not the cross-over relays are energized via pin 1 of "Relay Control".

If a type 1008, 1019, 1025 or 1040-1042 is used, the "Relay Control" will be energized automatically.

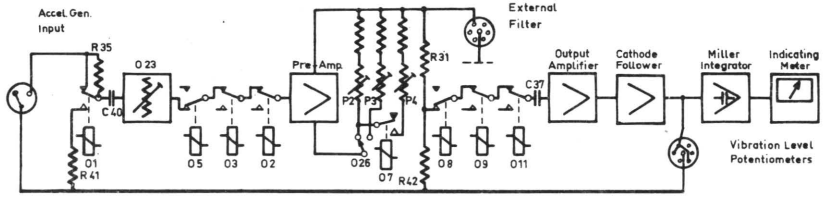
If a type 1022 (1013 and 1017) is used, the - 6 V can be taken from pin 3 on the "Cross-over" socket on type 2502.

Input to ACC.GEN.	10 Hz 100 mV	40 Hz 100 mV	125 Hz 1 V	500 Hz 1 V	2000 Hz 1 V	8000 Hz 1 V
Relay Control energized 1) on pins				5 2) 3 2	5 2) 3 2	5 2) 3 2
"Accel." g	10	10	100	100	100	100
"Grad" g/sec.	1,26	0,63	3,57	1,78	0,893	0,447
"Vel." in/sec.	61,6	15,4	49,2	12,3	3,1	
"Displ." inches	0,98	0,0613	0,0627	0,00392		
"Auto" D-A			0,0627 in 100 g			
"Auto" V-A			49,2 in/sec. 100 g			
"Auto" A-G			100 g 3,57 g/sec.			

Notes: 1) 6 V negative with respect to pin 4.
2) Energizing these pins should suppress low-frequency noise from the generator but should not affect the sensitivity at the signal frequency.

If the sensitivities are wrong, make the following adjustments. After each adjustment check the values given in the table.

continued



3.2. Acceleration Sensitivity Adj.

a. ACCEL. RANGE: "100"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Acceleration"

Frequency: 500 Hz. Adjust the input voltage to exactly 1 V.

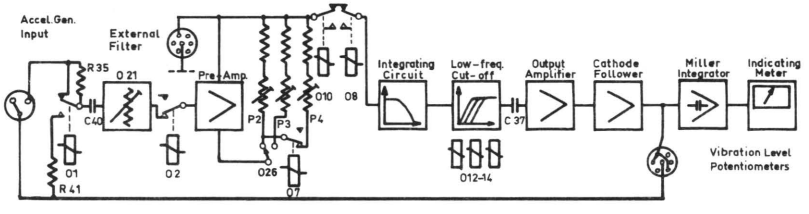
It is recommended to use an electronic counter to monitor the test frequency.

Adjust P 3 for a 100 g deflection. (located on printed circuit XC 0258)

Adjust the input voltage for a 11 dB deflection on type 2502.

b. METER INDICATION to "A.V. peak"

Adjust P 2 for a 20 dB deflection. (located on printed circuit XC 0258)



3.3. Displacement Sensitivity Adj.

a. DISPLACEMENT RANGE: "μ.01"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Displacement"

Input frequency: 500 Hz. Input voltage exactly 2.55 V.

Connect "Relay Control" pin 4 to ground and pin 5 to -6 V on "Cross-over" pin 3 in order to energize O 14 for a better low frequency stability.

Adjust P 4 (on printed circuit XC 0258) for full scale deflection.

Adjust the input voltage for a 11 dB deflection on type 2502.

b. METER INDICATING to "D peak-peak"

The deflection should now be 20 dB.

Remove connection to "Cross-over" socket pin 3.

c. DISPLACEMENT RANGE to "1"
METER INDICATION to "RMS"

Input frequency: 5 Hz. Input voltage exactly 25.5 mV.

Adjust P 1 to 4% below full scale deflection.

3.4. Range x 10

a. ACCEL. RANGE: "100"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Acceleration"

Input signal: 1 V, 500 Hz

Deflection on type 2502: 20 dB.

b. FUNCTION SELECTOR to "Auto"
ACCEL. RANGE to "10"

Connect "Remote Function Selector" pin 4 to ground and pins 2 and 7 to -6 V on "Cross-over" pin 3 in order to energize Range x 10 Relay O 1
Deflection on type 2502: 20 dB.

3.5. Noise and Hum

Type 2502 must be in its case or in other way effectively screened.

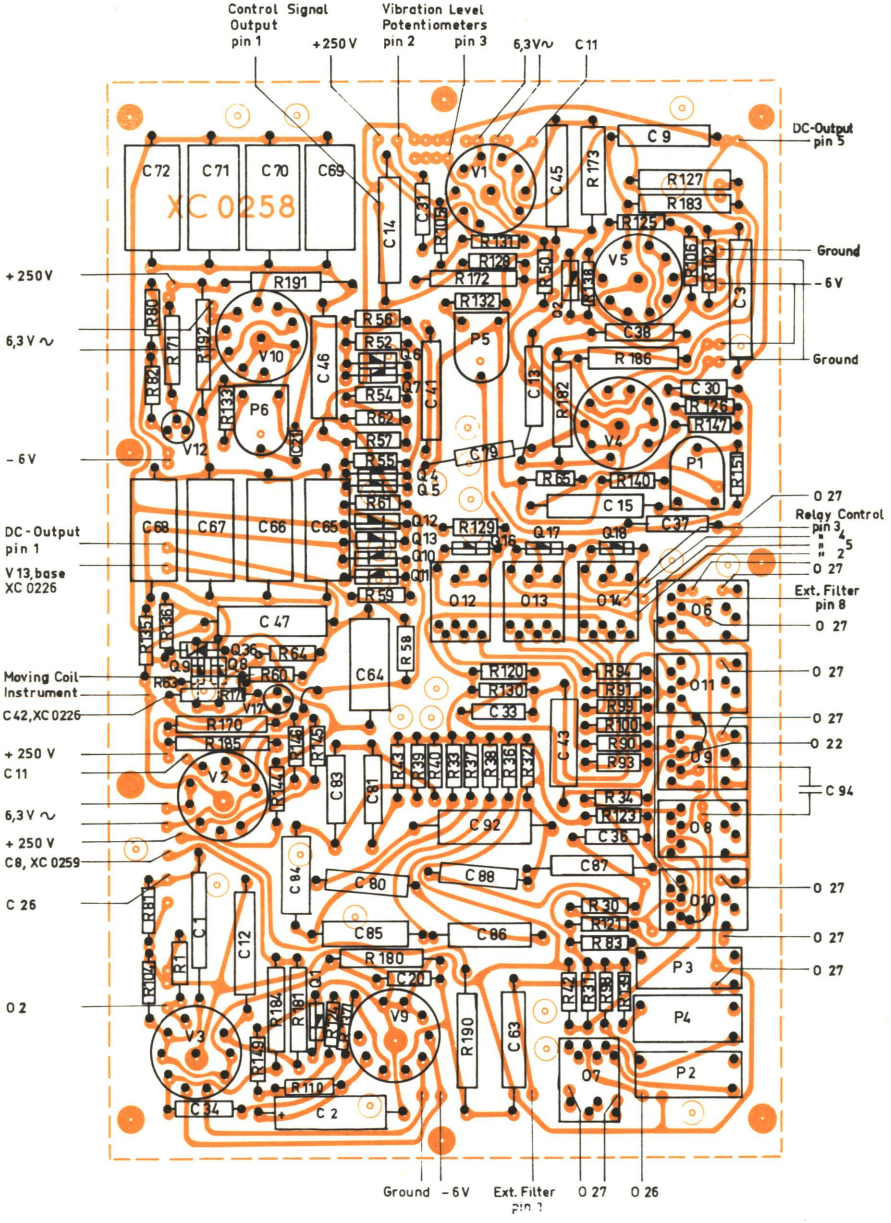
Measured on "Vibration Level Potentiometer" socket pin 3 in the frequency range 20-40000 Hz.

Switches in all positions.

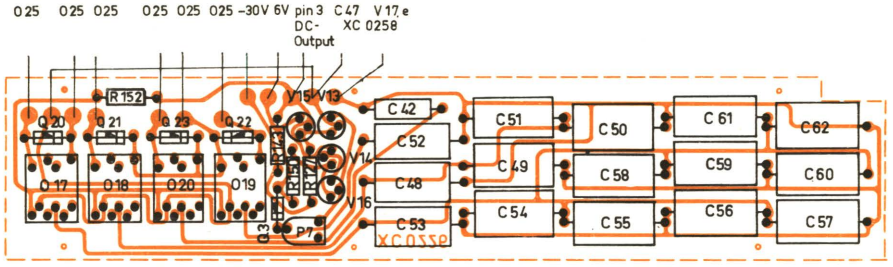
Max. noise and hum: 75 mV.

Position of Components

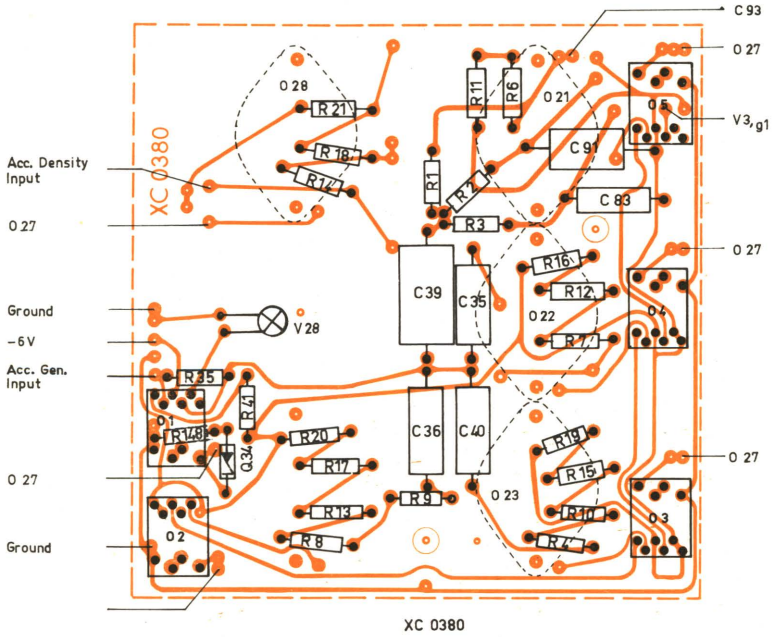
valid from serial no. 172571



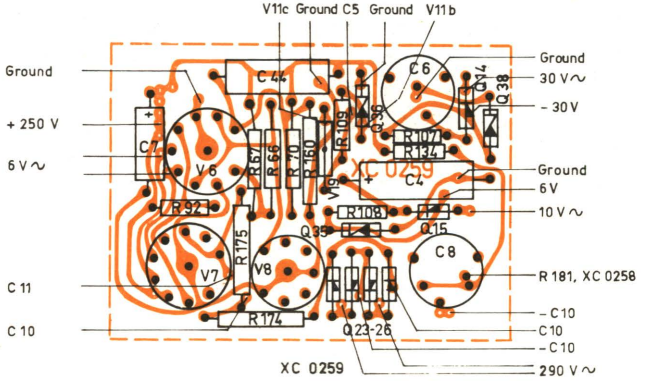
XC 0258



XC 0226



XC 0380



Parts - List

2502.5

valid from serial no. 172571

CAPACITORS:

CIRCUIT DIAGRAM REF.	COMPONENT TYPE		STOCK REF.
C 1-4	Electrolytic	640 µF/ 16 V	CE 0209
C 5	"	2 x 2000 µF/ 16 V	CE 0311
C 6	"	320 µF/ 64 V	CE 0511
C 7	"	1 µF/350 V	CE 0512
C 8	"	2 x 50 µF/250 V	CE 0706
C 9	"	8 µF/350 V	CE 0802
C 10,11	"	2 x 50 µF/450 V	CE 0909
C 12	"	4 µF/350 V	CE 0708
C 13,14	"	4 µF/250 V	CE 2034
C 15	"	250 µF/ 10 V	CE 8944
C 20	Ceramic	20 pF/400 V	CK 0093
C 21	"	12 pF/400 V	CK 0095
C 30	Polyester	33 nF/250 V	CS 0007
C 31	"	0,1 µF/250 V	CS 0013
C 32,33	"	0,15 µF/250 V	CS 0015
C 34	"	0,22 µF/250 V	CS 0017
C 35,36	"	0,33 µF/250 V	CS 0019
C 37,38	"	0,47 µF/250 V	CS 0021
C 39-42	"	0,68 µF/250 V	CS 0023
C 43-48	"	1 µF/250 V	CS 0025
C 49-72	"	2 µF/250 V	CS 0028
C 79	Polystyrene	400 pF/125 V	CT 1011
C 80	"	±1% 62,6 nF/125 V	CT 1100
C 81	"	" 6,26 nF/250 V	CT 1203
C 82,83	"	" 9,9 nF/250 V	CT 1204
C 84	"	" 19,8 nF/250 V	CT 1206
C 85	"	" 31,3 nF/250 V	CT 1207
C 86	"	" 43,8 nF/250 V	CT 1209
C 87,88	"	" 89 nF/ 63 V	CT 1500
C 89,90	"	" 110 nF/ 63 V	CT 1501
C 91	"	" 99 nF/ 63 V	CT 1503
C 92	"	" 139 nF/ 63 V	CT 1504
C 93	"	+0,-1% 1 µF/100 V	CT 5000
C 94	"	" 2 µF/100 V	CT 5041

RESISTORS:

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 1	Carbon	1/4 W			RH 0002
R 2-3	"	1/3 W	0,5%	1 MΩ	
R 4	"	"	"	200 kΩ	
R 5	"	"	"	111,1 kΩ	
R 6-8	"	"	"	100 kΩ	
R 9	"	"	"	45,6 kΩ	
R 10	"	"	"	20 kΩ	
R 11	"	"	"	11,11 kΩ	
R 12-14	"	"	"	10 kΩ	
R 15	"	"	"	2 kΩ	
R 16	"	"	"	1,111 kΩ	
R 17,18	"	"	"	1 kΩ	
R 19	"	"	"	222,2 Ω	
R 20,21	"	"	"	111,1 Ω	
R 30	"	"	"	800 kΩ	
R 31	"	"	"	200 kΩ	
R 32	"	"	"	116 kΩ	
R 33	"	"	"	90,3 kΩ	
R 34	"	"	"	80 kΩ	
R 35	"	"	"	48,9 kΩ	
R 36	"	"	"	41 kΩ	
R 37	"	"	"	30,7 kΩ	
R 38	"	"	"	29 kΩ	
R 39	"	"	"	10,6 kΩ	
R 40	"	"	"	9,1 kΩ	
R 41	"	"	"	6,03 kΩ	
R 42	"	"	"	1,64 kΩ	
R 43	"	"	"	2 kΩ	
R 50	"	"	1%	1,11 MΩ	
R 51	"	"	"	300 kΩ	
R 52	"	"	"	266 kΩ	
R 53	"	"	"	320 kΩ	
R 54	"	"	"	250 kΩ	
R 55	"	"	"	200 kΩ	
R 56	Carbon	1/3 W	1%	191 kΩ	
R 57	"	"	"	127 kΩ	
R 58	"	"	"	125 kΩ	
R 59	"	"	"	75 kΩ	
R 60,61	"	"	"	100 kΩ	
R 62	"	"	"	87 kΩ	
R 63	"	"	"	60 kΩ	
R 64	"	"	"	50 kΩ	
R 65	"	"	"	1 kΩ	
R 66,67	"	"	"	12,5 kΩ	
R 70	"	1/2 W	"	460 kΩ	
R 71	Metal	"	2%	237 kΩ	RF 0400
R 80	"	"	"	2150 Ω	RF 0401
R 81	Carbon	1/3 W	"	500 Ω	
R 82	"	"	"	75 Ω	
R 83	"	"	"	60 kΩ	
R 90	"	"	5%	1 MΩ	
R 91,92	"	"	"	315 kΩ	
R 93,94	"	"	"	100 kΩ	
R 96	"	"	"	18 kΩ	
R 98	"	"	"	40 kΩ	
R 99	"	"	"	31,5 kΩ	
R 100	"	"	"	10 kΩ	
R 101	"	"	"	20 kΩ	
R 102	"	"	"	3 kΩ	
R 103	"	"	"	2,2 kΩ	
R 104	"	"	"	3 kΩ	
R 105	"	"	"	1,6 kΩ	
R 106	"	"	"	800 Ω	
R 108	"	"	"	315 Ω	
R 109	"	"	"	40 Ω	
R 110	"	"	"	360 Ω	
R 120-123	"	"	10%	6,3 MΩ	
R 124,125	"	"	"	3,15 MΩ	
R 126,127	"	"	"	2 MΩ	
R 128,129	"	"	"	1 MΩ	
R 130	"	"	"	630 kΩ	
R 131	"	"	"	500 kΩ	
R 132,133	"	"	"	100 kΩ	
R 134	"	"	"	125 kΩ	
R 135,136	"	"	"	40 kΩ	
R 137,138	"	"	"	10 kΩ	
R 139	"	"	5%	40 kΩ	
R 140	"	"	10%	20 kΩ	
R 141,142	"	"	"	6,3 kΩ	
R 143	"	"	"	5 kΩ	
R 144,145	"	"	"	31,5 kΩ	
R 146	"	"	"	1,25 kΩ	
R 147	"	"	"	1 kΩ	
R 148	"	"	"	130 Ω	
R 149	"	"	"	100 Ω	
R 150	"	"	"	80 Ω	
R 151,152	"	"	"	1 kΩ	
R 170,171	"	1/2 W	5%	50 kΩ	
R 172	"	"	"	25 kΩ	
R 173	"	"	"	31,5 kΩ	
R 174,175	"	"	"	150 Ω	
R 180,181	"	"	10%	1,6 MΩ	
R 182	"	"	"	1 MΩ	
R 183	"	"	"	500 kΩ	
R 184,185	"	"	"	315 kΩ	
R 186	"	"	"	250 kΩ	
R 187	"	"	"	100 kΩ	
R 190-192	Wire	5,5 W	"	15 kΩ	RX 0304

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
POTENTIOMETERS:					
P 1	Trimmer	carbon	lin.	10 kΩ	PG 3102
P 2-4	"	wire	"	25 kΩ	PG 3251
P 5,6	"	carbon	"	100 kΩ	PG 4102
P 7	"	"	"	150 kΩ	PG 4151
P 8,9	Cross-over	"	1. log.	100 kΩ	PP 4111
P 10	Trimmer	wire	lin.	1 kΩ	PQ 2100
SWITCHES-RELAYS:					
O 1-20	Mini Relay				OC 0006
O 21	Displ. Range				OR 2502
O 22	Velocity Range				OS 2502
O 23,24	Accel. Range - Accel. Grad. Range				OT 2502
O 25	Meter Time Constant				OU 2502
O 26	Meter Indication Power on-off deck				OV 2502
O 27	Function Selector				OX 2502
O 28	Accel. Density Range				OY 2502
O 29	Mains Voltage Selector				JS 0005
RECTIFIERS:					
Q 1-13	Silicon		200 V/0,04 A		QV 0022
Q 14	"		1200 V/0,15 A		QV 0025
Q 15-23	"		50 V/0,75 A		QV 0501
Q 24-27	"		1200 V/0,15 A		QV 0025
Q 28,29	"		65 V/ 0,6 A		QV 1003
Q 30-34	Zener		6,8 V/0,05 A		QV 1106
Q 35,36	"		6,2 V/0,03 A		QV 1307
TRANSISTORS-TUBES:					
V 1,2	Twin triode		ECC82/12AU7		VA 0011
V 3-6	Pentode		EF86/6 CF 8		VA 0019
V 7	"		EL86/6 CW 5		VA 0024
V 8	Stabilizer		OB2		VA 0040
V 9,10	Twin triode		ECC88/6 DJ 8		VA 0073
V 11	Germ. transistor		2N555		VB 0023
V 12	"		2N1613		VB 0026
V 13	"		BC107		VB 0257
V 14	"		BC107		VB 0032
V 15	"		BC107		VB 0257
V 16	"		2N4289		VB 0049
V 17	"		2N3440		VB 0250
V 18	Fuse		1,6 A		VF 0007
V 19	"		2,5 A		VF 0011
V 20-26	Ind. lamp				VS 0008
V 27	Meter lamp		6,3 V/0,5 A		VS 1271
V 28,29	Cross-over ind.		6,3 V/0,15 A		VS 8008
PRINTED CIRCUITS:					
	DC - Amplifier				XC 0226
	Input-Output Amplifier				XC 0258
	Power Supply				XC 0259
	Input Attenuators				XC 0380
	XC 0226 with components				8032502
	XC 0258 "				8002502
	XC 0259 "				8022502
	XC 0380 "				8012502
MISCELLANEOUS:					
	Bakelite knob 25 mm				SN 0701
	Cabinet, wood				KA 0016
	" , metal				KQ 0047
	Power Cord, EUR				AN 0005
	" " , USA				AN 0006
	" transformer				TN 0012
	Socket Relay O 15, 16				JJ 0008
	" " O 1-14, 17-20				JJ 0012
	" Tube V 8				JV 7505
	" " V 1-7, 9, 10				JV 9012
	Monitor Output Jack				JJ 1006
	Glass Cover for Indication Lamp				SG 0328

Meter Circuit

valid from serial no. 201566

1.1. Mechanical Zero-point

METER TIME CONSTANT: "Off"

Adjust meter scale for 0.

1.2. Electrical Zero-point

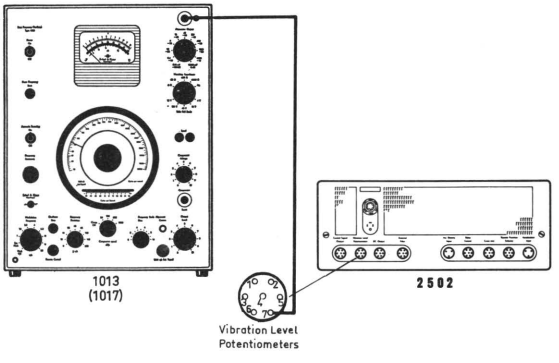
METER TIME CONSTANT: "1 sec."

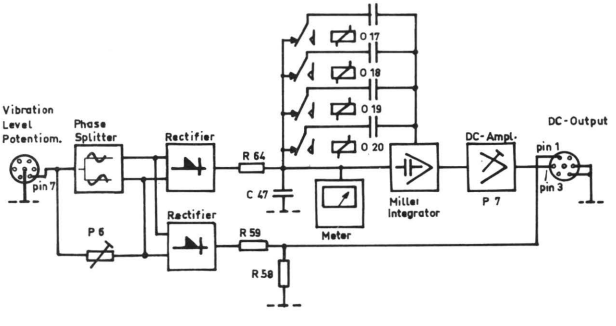
Connect pin 7 of "Vibration Level Potentiometer" socket to ground.

Check that the pointer is still at 0.

Tolerance: ½ pointer "width".

Possible reason for fault: Defective V 2





1.3. Sensitivity

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input signal for full scale deflection on type 2502.

Input voltage: Approx. 9 V.

1.4. Balance

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,

Measure the voltage across R 135 and R 136. Approx.: 9 V, max. difference: 0.3 dB. (located on printed circuit XC 0397)

continued

1.5. Frequency Response

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for a 9,8 V deflection on type 2502.

Check the frequency response from 5 Hz to 100 kHz.

Tolerance: ± 0,2 V. (+ tolerance of type 1013, 1017: 0,5 dB)

If necessary adjust P 6 at 100 kHz. (located on printed circuit XC 0397)

1.6. Overload

METER TIME CONSTANT: "10 sec."

V 1 removed.

Frequency: 1000 Hz. Input voltage: 12 dB above full deflection on type 2502.

Check with an oscilloscope across R 135 and R 136 that the signal is not distorted.

1.7. DC Amplifier

METER TIME CONSTANT: "1 sec."

V 1 removed.

Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,

Measure the DC voltage on "DC Output" socket, pin 3: -6.5 V.
Tolerance: ± 2%.

If necessary short-circuit C 47 to ground and adjust P 7 for 0 V on "DC Output" socket, pin 3.

(C 47 is located on printed circuit XC 0397 and P 7 on XC 0226)

1.8. Meter Time Constant

METER TIME CONSTANT: "30 sec."

V 1 removed.

Frequency: 1000 Hz . Adjust input voltage for a 10 V deflection on type 2502.

The meter time constant means the time it takes the meter pointer to fall from 10 V to 3,5 V when the input signal is disconnected.

In position "30 sec" the meter time constant should be 30 sec.

Check METER TIME CONSTANT in position 0,3 - 1 - 3 - 10 sec.

1.9. Ripple

a. METER TIME CONSTANT: "All positions except 0,3 sec."

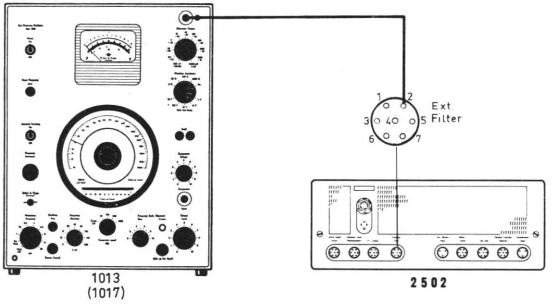
V 1 removed.
Frequency: 1000 Hz. Adjust input voltage for full scale deflection on type 2502,
Measure the ripple on pin 3 of "DC Output" socket by means of voltmeter type 2409.

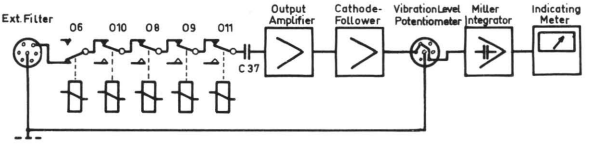
Tolerance: Max. 1 mV.

b. METER TIME CONSTANT: "0,3 sec."

As item a.

Tolerance: Max. 5 mV.

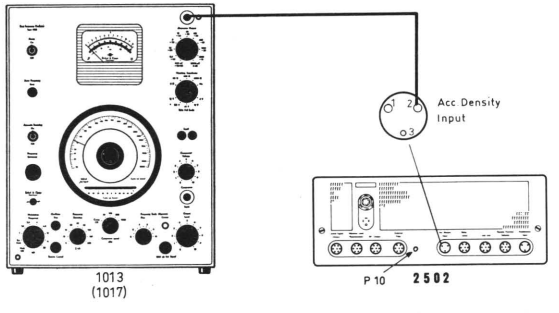




2.1. Sensitivity

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Ext. Filter"

Frequency: 500 Hz. Adjust input voltage for a 10 V deflection on type 2502.
The input voltage should be approx. 10 mV.



2.2. Acceleration Density

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Acc.Den."
ACCEL. DENSITY RANGE: "0,01"

Input signal: 100 mV, 500 Hz.
Deflection on type 2502: Full scale (20 dB)
If necessary adjust P 10

continued

2.3. Frequency Response

METER TIME CONSTANT: "1 sec."
FUNCTION SELECTOR: "Acc. Den."
ACCEL. DENSITY RANGE: "100"

Input signal: 10 V, 1000 Hz.

Deflection on type 2502: 100 g^2/cps

Check the frequency response from 10 - 100.000 Hz.
Tolerance: ± 2%

If necessary change value of C 79 (located on printed circuit XC 0397)

ACCEL. DENSITY RANGE to "0,01"

Input signal: 100 mV, 1000 Hz.

Deflection on type 2502: 1 g^2/cps

Check the frequency response again: ± 2%.

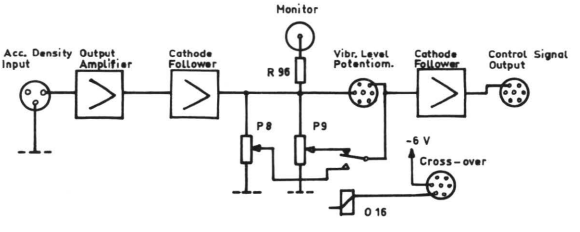
If necessary adjust P 5 at 100 kHz. (located on printed circuit XC 0397)

2.4. Overloading

FUNCTION SELECTOR: "Acc. Den."

Input frequency: 1000 Hz.

Connect an oscilloscope to "Vibration Level Potentiometer" socket pin 3, and check that the signal is not distorted until 12 dB above full scale deflection on type 2502.



2.5. AC Output

a. FUNCTION SELECTOR: "Acc. Den."
LEVEL BELOW CROSS-OVER: "0"
ACCEL. DENSITY RANGE: "100"

Frequency: 1000 Hz. Adjust the input voltage for 10 V on "Vibration Level Potentiometer" socket pin 3.

The voltage on "Monitor" socket should be 10 V.

The output on "Control Signal Output" socket pin 1 should be max. 1 dB below 10 V.

b. LEVEL BELOW CROSS-OVER to "10"

Output voltage on "Control Signal Output": 22-26 dB below 10 V

c. LEVEL ABOVE CROSS-OVER to "0"

Connect a shorting link on "Cross-over" socket between pin 3 and 6 in order to energize relay O 16.

Output on "Control Signal Output" socket pin 1 should be max. 1 dB below 10 V.

d. LEVEL ABOVE CROSS-OVER to "10"

Output voltage on "Control Signal Output": 22-26 dB below 10 V

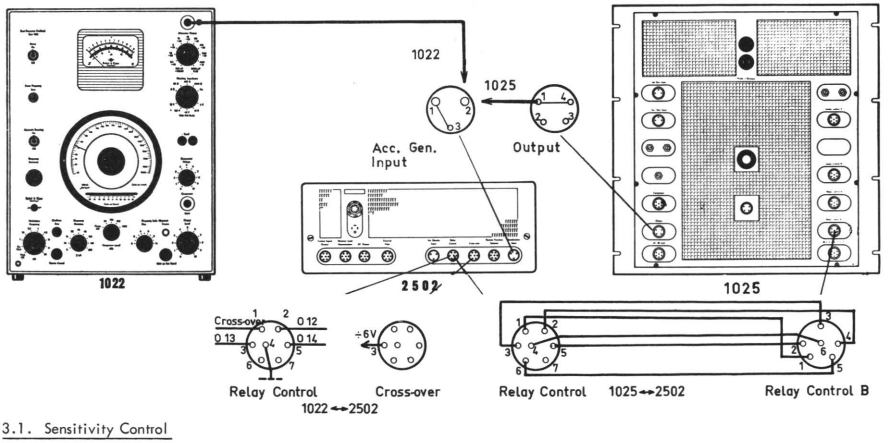
2.6. Noise and Hum

FUNCTION SELECTOR: "Acc. Den."
ACCEL. DENSITY RANGE: "100"

The instrument must be in its case or in another way effectively screened.

Disconnect signal input and check noise and hum on "Vibration Level Potentiometer" socket pin 3.

Max. 10 mV.



3.1. Sensitivity Control

METER TIME CONSTANT: "1 sec."
METER INDICATOR: "RMS"

The 2502's meter should read the values given in the table (within 4%) under the stated conditions.

It will be necessary to select suitable settings of the four RANGE selectors according to the meter readings.

Readings in the 3 programmed "AUTO" positions of FUNCTION SELECTOR depends on whether or not the cross-over relays are energized via pin 1 of "Relay Control".

If a type 1008, 1019, 1025 or 1040-1042 is used, the stabilizing relays will be energized automatically.

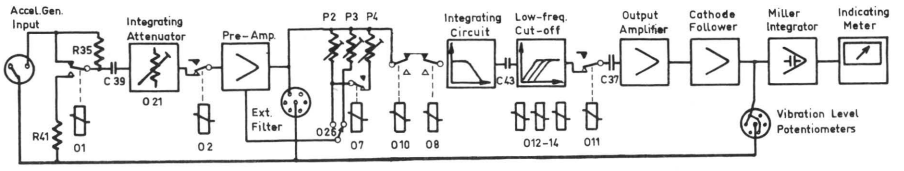
If a type 1022 (1013 and 1017) is used, the - 6 V can be taken from pin 3 on the "Cross-over" socket on type 2502.

Input to ACC.GEN.	10 Hz 100 mV	40 Hz 100 mV	125 Hz 1 V	500 Hz 1 V	2000 Hz 1 V	8000 Hz 1 V
Relay Control energized 1) on pins		2) 2	2) 3 2	5 2) 3 2	5 2) 3 2	5 2) 3 2
"Accel." g	10	10	100	100	100	100
"Grad" $g\sqrt{sec.}$	1,26	0,63	3,57	1,78	0,893	0,447
"Vel." in/sec.	61,6	15,4	49,2	12,3	3,1	
"Displ." inches	0,98	0,0613	0,0627	0,00392		
"Auto" D-A			0,0627 in 100 g			
"Auto" V-A			49,2 in/sec. 100 g			
"Auto" A-G			100 g 3,57 $g\sqrt{sec.}$			

Notes: 1) 6 V negative with respect to pin 4.
2) Energizing these pins should suppress low-frequency noise from the generator but should not affect the sensitivity at the signal frequency.

If the sensitivities are wrong, make the following adjustments. After each adjustment check the values given in the table.

continued



3.2. Displacement Sensitivity Adj.

a. DISPLACEMENT RANGE: "0,01"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "D peak-peak"
FUNCTION SELECTOR: "Displ."

It is recommended to use an electronic counter to monitor the test frequencies.

Input frequency: 500 Hz. Input voltage: Exactly 0,9 V.

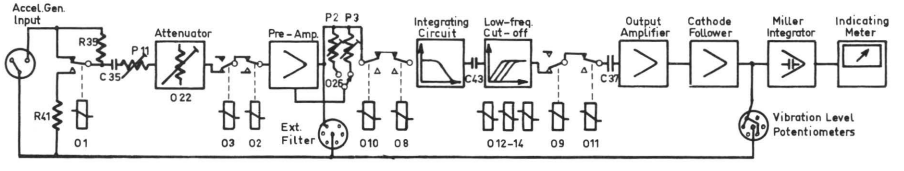
Connect "Relay Control" pin 4 to ground and pin 5 to -6 V on "Cross-over" pin 3 in order to energize O 14 for better low-frequency stability.

Adjust P 3 for 20 dB deflection on type 2502.

b. DISPLACEMENT RANGE to "1"

Input frequency: 5 Hz. Input voltage: Exactly 9 mV.

Adjust P 1 for 4% below full scale deflection.



3.3. Velocity Sensitivity Adj.

a. VELOCITY RANGE: "1"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "A.V.- peak"
FUNCTION SELECTOR: "Vel."

Input frequency: 500 Hz. Input voltage: Exactly 57.4 mV.

Adjust P 11 for 20 dB deflection on type 2502.

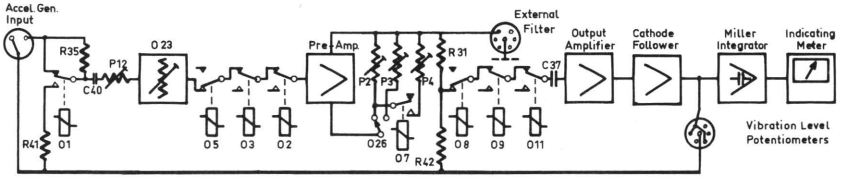
b. METER INDICATION to "RMS"

Adjust P 2 for a deflection of 17 dB.

c. DISPLACEMENT RANGE to "0,01"
FUNCTION SELECTOR to "Displ."

Input frequency: 500 Hz. Input voltage: Exactly 0,9 V.

Adjust P 4 for 11 dB deflection on type 2502.

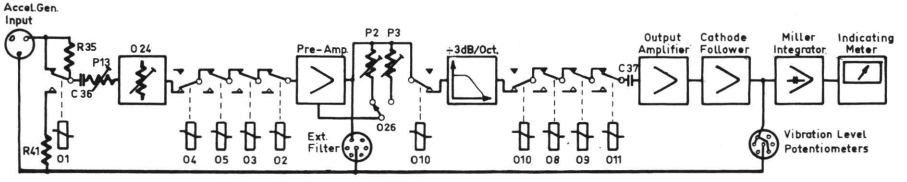


3.4. Acceleration Sensitivity Adj.

ACCELERATION RANGE: "1"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Accel."

Input frequency: 500 Hz. Input voltage: Exactly 10 mV.

Adjust P 12 for 20 dB deflection on type 2502.



3.5. Acceleration Gradient Sensitivity Adj.

ACC. RADIENT RANGE: "0.01"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Grad."

Input frequency: 500 Hz. Input voltage: Exactly 5.6 mV.

Adjust P 13 for 20 dB deflection.

3.6. Range x 10

a. ACCEL. RANGE: "100"
METER TIME CONSTANT: "1 sec."
METER INDICATION: "RMS"
FUNCTION SELECTOR: "Acceleration"

Input signal: 1 V, 500 Hz.

Deflection on type 2502: 20 dB.

b. FUNCTION SELECTOR to "Auto"
ACCEL. RANGE to "10"

Connect "Remote Function Selector" pin 4 to ground and pins 2 and 7 to -6 V on "Cross-over" pin 3 in order to energize O 1, O 5 and O 8.

Deflection on type 2502: 20 dB.

3.7. Noise and Hum

Type 2502 must be in its case or in other way effectively screened.

Measured on "Vibration Level Potentiometer" socket pin 3 in the frequency range 20-40000 Hz.

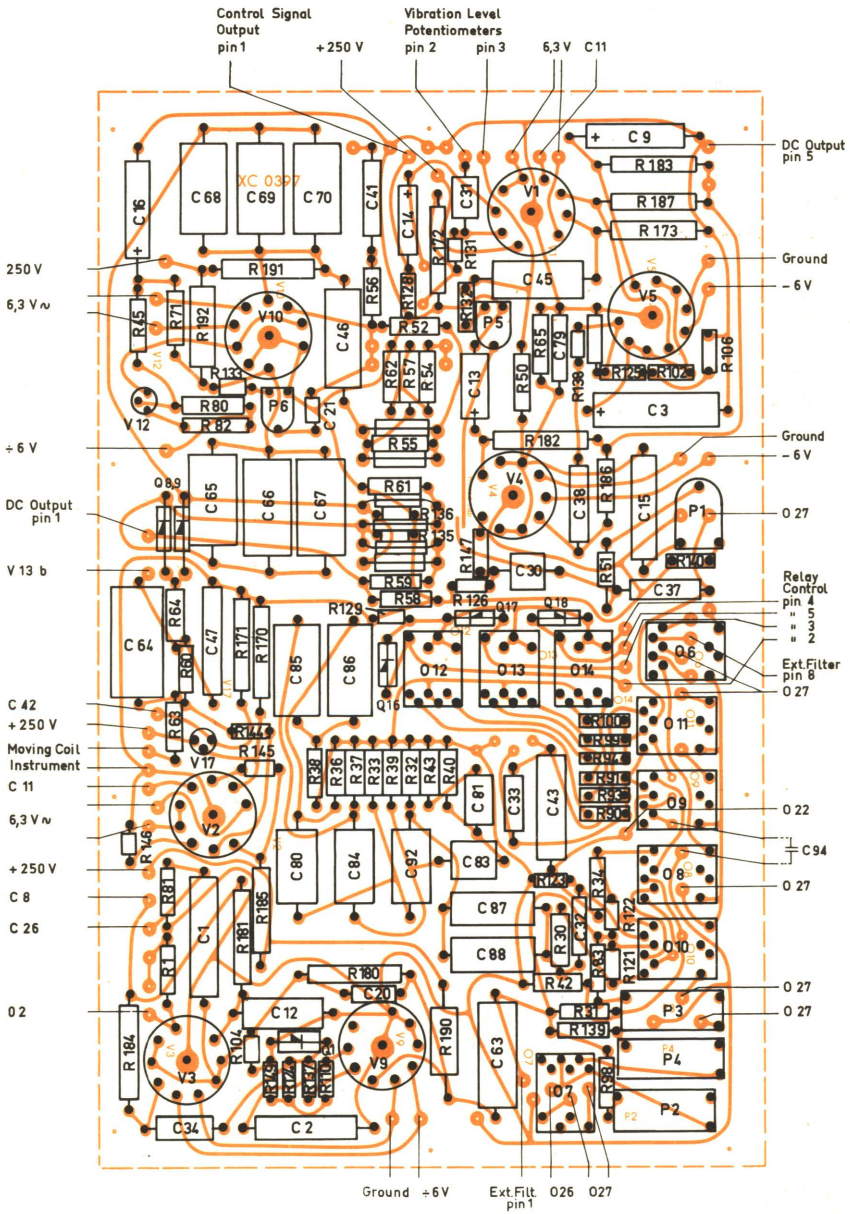
Switches in all positions.

Max. noise and hum: 75 mV.

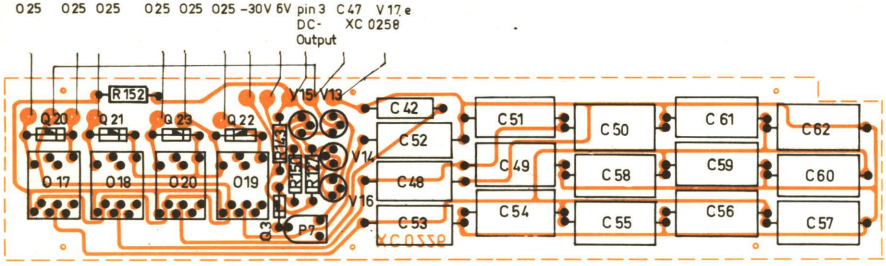
Position of Components

2502.4

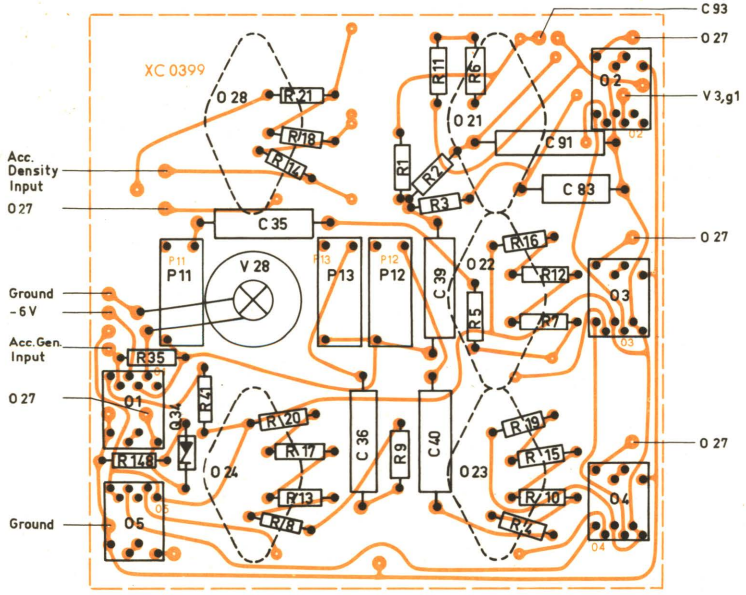
valid from serial no. 201566



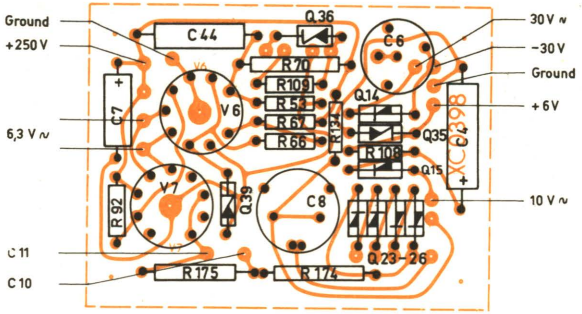
XC 0397



XC 0226



XC 0399



XC 0398

CAPACITORS:

CIRCUIT DIAGRAM REF.	COMPONENT TYPE		STOCK REF.
C 1-4	Electrolytic	640 µF/ 16 V	CE 0209
C 5	"	2 x 2000 µF/ 16 V	CE 0311
C 6	"	320 µF/ 64 V	CE 0511
C 7	"	1 µF/350 V	CE 0512
C 8	"	2 x 50 µF/250 V	CE 0706
C 9	"	8 µF/350 V	CE 0802
C 10,11	"	2 x 50 µF/450 V	CE 0909
C 12	"	4 µF/350 V	CE 0708
C 13,14	"	4 µF/250 V	CE 2034
C 15	"	250 µF/ 10 V	CE 8944
C 20	Ceramic	20 pF/400 V	CK 0093
C 21	"	12 pF/400 V	CK 0095
C 30	Polyester	33 nF/250 V	CS 0007
C 31	"	0,1 µF/250 V	CS 0013
C 32,33	"	0,15 µF/250 V	CS 0015
C 34	"	0,22 µF/250 V	CS 0017
C 35,36	"	0,33 µF/250 V	CS 0019
C 37,38	"	0,47 µF/250 V	CS 0021
C 39-42	"	0,68 µF/250 V	CS 0023
C 43-48	"	1 µF/250 V	CS 0025
C 49-72	"	2 µF/250 V	CS 0028
C 79	Polystyrene	400 pF/125 V	CT 1011
C 80	"	±1% 62,6 nF/125 V	CT 1100
C 81	"	" 6,26 nF/250 V	CT 1203
C 82,83	"	" 9,9 nF/250 V	CT 1204
C 84	"	" 19,8 nF/250 V	CT 1206
C 85	"	" 31,3 nF/250 V	CT 1207
C 86	"	" 43,8 nF/250 V	CT 1209
C 87,88	"	" 89 nF/ 63 V	CT 1500
C 89,90	"	" 110 nF/ 63 V	CT 1501
C 91	"	" 99 nF/ 63 V	CT 1503
C 92	"	" 139 nF/ 63 V	CT 1504
C 93	"	+0,-1% 1 µF/100 V	CT 5000
C 94	"	" 2 µF/100 V	CT 5041

RESISTORS:

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 1-3	Carbon	1/3 W	0.5%	1MΩ	
R 4	"	"	"	200 kΩ	
R 5	"	"	5%	100 kΩ	
R 6-8	"	"	0.5%	100 kΩ	
R 9	"	"	5%	31.6 kΩ	
R 10	"	"	0.5%	20 kΩ	
R 11	"	"	"	11.11 kΩ	
R 12-14	"	"	"	10 kΩ	
R 15	"	"	"	2 kΩ	
R 16	"	"	"	1.111 kΩ	
R 17-18	"	"	"	1 kΩ	
R 19	"	"	"	222.2 Ω	
R 20,21	"	"	"	111.1 Ω	
R 30	"	"	"	800 kΩ	
R 31	"	"	5%	200 kΩ	
R 32	"	"	0.5%	116 kΩ	
R 33	"	"	"	90.3 kΩ	
R 34	"	"	"	80 kΩ	
R 35	"	"	"	48.9 kΩ	
R 36	"	"	"	41 kΩ	
R 37	"	"	"	30.7 kΩ	
R 38	"	"	"	29 kΩ	
R 39	"	"	"	10.6 kΩ	
R 40	"	"	"	9.1 kΩ	
R 41	"	"	"	603 kΩ	
R 42	"	"	"	1.72 kΩ	
R 43	"	"	"	2 kΩ	
R 45	Metal	1/4 W	2%	20 kΩ	RF 0216
R 50	"	"	"	1MΩ	RF 0111

RESISTORS:

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
R 51	Carbon	1/3 W	1%	300 kΩ	
R 52	"	"	"	266 kΩ	
R 53	"	"	"	320 kΩ	
R 54	"	"	"	250 kΩ	
R 55	"	"	"	200 kΩ	
R 56	"	"	"	191 kΩ	
R 57	"	"	"	127 kΩ	
R 58	"	"	"	125 kΩ	
R 59	"	"	"	75 kΩ	
R 60,61	"	"	"	100 kΩ	
R 62	"	"	"	87 kΩ	
R 63	"	"	"	60 kΩ	
R 64	"	"	"	50 kΩ	
R 65	Metal	1/4 W	2%	910 Ω	RF 0220
R 66,67	Carbon	1/3 W	1%	20 kΩ	
R 70	"	"	"	460 kΩ	
R 71	Metal	1/4 W	2%	220 kΩ	RF 0217
R 80	"	"	"	5.6 kΩ	RF 0221
R 81	Carbon	1/3 W	"	500 Ω	
R 82	"	"	"	80 Ω	
R 83	"	"	"	63 kΩ	
R 90	"	1/10 W	5%	1MΩ	RB 6100
R 91	"	"	"	330 kΩ	RB 5330
R 92	"	1/3 W	"	315 kΩ	
R 93,94	"	1/10 W	"	100 kΩ	
R 96	"	1/3 W	"	18 kΩ	
R 98	"	"	"	40 kΩ	
R 99	"	1/10 W	"	33 kΩ	RB 4330
R 100	"	"	"	10 kΩ	RB 4100
R 101	"	1/3 W	"	20 kΩ	
R 102	"	1/10 W	"	2.7 kΩ	RB 3270
R 103	"	1/3 W	"	2.2 kΩ	
R 104	"	1/10 W	"	2.7 kΩ	RB 3270
R 105	"	"	"	1.5 kΩ	RB 3150
R 106	"	"	"	820 Ω	RB 2820
R 108	"	1/3 W	"	315 Ω	
R 109	"	"	"	40 Ω	
R 110	"	1/10 W	"	330 Ω	RB 2330
R 120-123	"	"	"	6.8MΩ	RA 0023
R 124,125	"	"	"	3.3MΩ	RA 0022
R 126	"	"	"	1.8MΩ	RA 0021
R 127	"	1/3 W	10%	2MΩ	
R 128,129	"	1/10 W	5%	1MΩ	RB 6100
R 130	"	"	"	560 kΩ	RB 5560
R 131	"	"	"	470 kΩ	RB 5470
R 132,133	"	"	"	100 kΩ	RB 5100
R 134	"	1/3 W	10%	125 kΩ	
R 135,136	"	1/10 W	5%	39 kΩ	RB 4390
R 137,138	"	"	"	10 kΩ	RB 4100
R 139	"	1/3 W	"	40 kΩ	
R 140	"	1/10 W	"	18 kΩ	RB 4180
R 141,142	"	1/3 W	10%	6.3 kΩ	
R 143	"	"	"	5 kΩ	
R 144,145	"	1/10 W	5%	33 kΩ	RB 4330
R 146	"	"	"	1.2 kΩ	RB 3120
R 147	"	"	"	1 kΩ	RB 3100
R 149	"	"	"	100 Ω	RB 2100
R 150	"	1/3 W	"	80 kΩ	
R 151,152	"	"	"	1 kΩ	
R 170,171	"	1/2 W	"	50 kΩ	
R 172	"	"	"	283 Ω	
R 173	"	"	"	31.5 kΩ	
R 174,175	"	"	"	150 Ω	
R 180,181	"	"	10%	1.6MΩ	
R 182	"	"	"	1MΩ	
R 183	"	"	"	500 kΩ	
R 184,185	"	"	"	315 kΩ	
R 186	Metal	1/4 W	2%	220 kΩ	RF 0217
R 187	Carbon	1/2 W	10%	100 kΩ	
R 190-192	Wire	5,5 W	"	15 kΩ	RX 0304

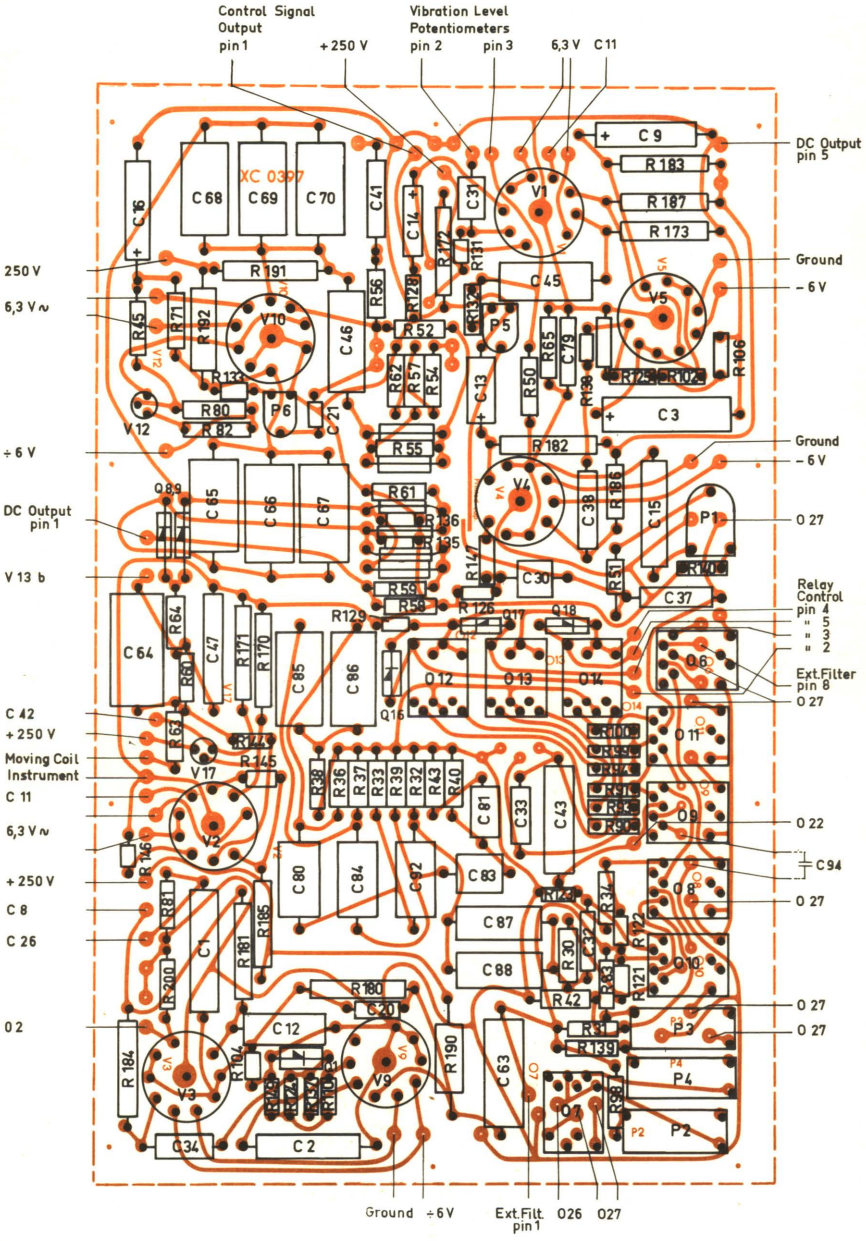
CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
POTENTIOMETERS:					
P 1	Trimmer	carbon	lin.	10 kΩ	PG 3102
P 2-4	"	wire	"	25 kΩ	PG 3251
P 5,6	"	carbon	"	80 kΩ	PG 3800
P 7	"	"	"	150 kΩ	PG 4151
P 8,9	Cross-over	"	1. log.	100 kΩ	PP 4111
P 10	Trimmer	wire	lin.	1 kΩ	PQ 2100
P 11-13	"	"	lin.	25 kΩ	PG 3251
SWITCHES-RELAYS:					
O 1-20	Mini Relay				OC 0006
O 21	Displ. Range				OR 2502
O 22	Velocity Range				OS 2502
O 23,24	Accel. Range - Accel. Grad. Range				OT 2502
O 25	Meter Time Constant				OU 2502
O 26	Meter Indication Power on-off deck				OV 2502
O 27	Function Selector				OX 2502
O 28	Accel. Density Range				OY 2502
O 29	Mains Voltage Selector				JS 0005
RECTIFIERS:					
Q 1-13	Silicon			200 V/0,04 A	QV 0022
Q 14	"			1200 V/0,15 A	QV 0025
Q 15-23	"			50 V/0,75 A	QV 0501
Q 24-27	"			1200 V/0,15 A	QV 0025
Q 28,29	"			65 V/ 0,6 A	QV 1003
Q 30-34	Zener			6,8 V/0,05 A	QV 1106
Q 35,36	"			6,2 V/0,03 A	QV 1307
Q 39	"			104 V/ 2 mA	QV 1323
TRANSISTORS-TUBES:					
V 1,2	Twin triode			ECC82/12AU7	VA 0011
V 3-6	Pentode			EF86/6 CF 8	VA 0019
V 7	"			EL86/6 CW 5	VA 0024
V 9,10	Twin triode			ECC88/6 DJ 8	VA 0073
V 11	Germ. transistor			2N555	VB 0023
V 12	"			2N1613	VB 0026
V 13	"			BC107	VB 0257
V 14	"			BC107	VB 0032
V 15	"			BC107	VB 0257
V 16	"			2N4289	VB 0049
V 17	"			2N3440	VB 0250
V 18	Fuse			1,6 A	VF 0007
V 19	"			2,5 A	VF 0011
V 20-26	Ind. lamp				VS 0008
V 27	Meter lamp			6,3 V/0,5 A	VS 1271
V 28	Cross-over ind.			6,3 V/0,15 A	VS 8008
V 29	Danger Lamp			6.3 V/ 0.15 A	VS 8008
PRINTED CIRCUITS:					
	DC - Amplifier				XC 0226
	Input-Output Amplifier				XC 0397
	Power Supply				XC 0398
	Input Attenuators				XC 0399
	XC 0226 with components				8032502
	XC 0397	"			8002502
	XC 0398	"			8022502
	XC 0399	"			8012502

CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REF.
MISCELLANEOUS:		
	Bakelite knob 25 mm	SN 0701
	Cabinet, wood	KA 0016
	" , metal	KQ 0047
	Power Cord, EUR	AN 0005
	" " , USA	AN 0006
	" transformer	TN 0012
	Socket Relay O 15, 16	JJ 0008
	" " O 1-14, 17-20	JJ 0012
	" Tube V 8	JV 7505
	" " V 1-7, 9, 10	JV 9012
	Monitor Output Jack	JJ 1006
	Glass Cover for Indication Lamp	SG 0328
	" " " Danger Lamp	SG 0327

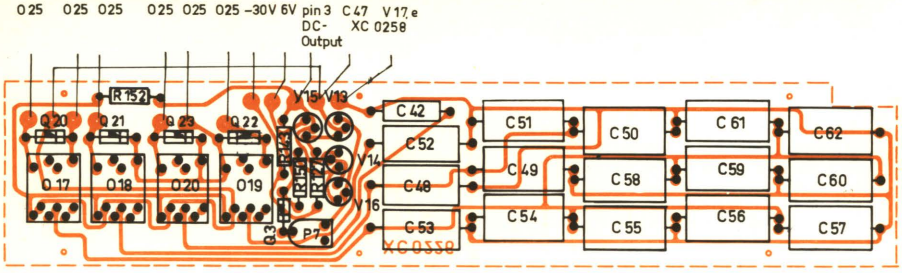
Position of Components

2502.4

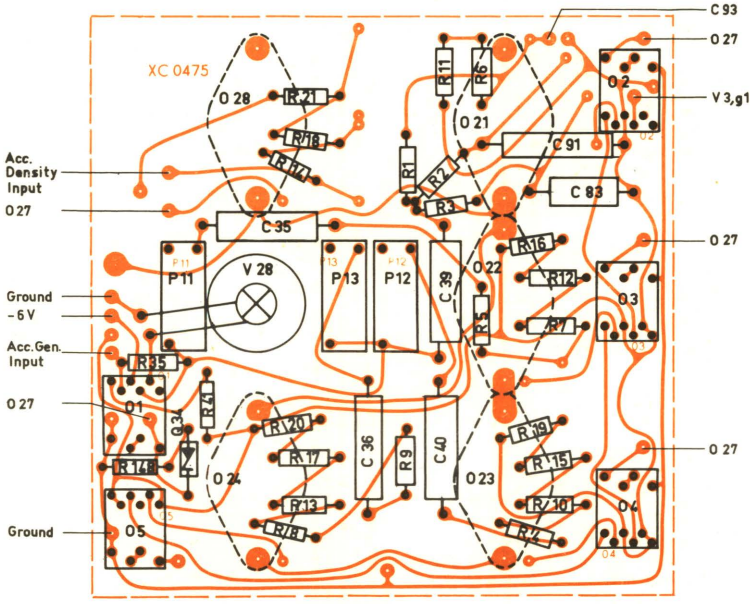
valid from serial no. 247082



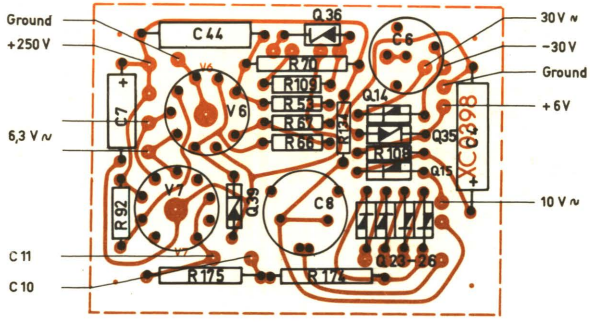
XC 0397



XC 0226



XC 0475



XC 0398

CIRCUIT DIAGRAM REF.	COMPONENT TYPE			STOCK REF.
CAPACITORS:				
C 1-4	Electrolytic	640 µF/ 16 V	CE	0209
C 5	"	2 x 2000 µF/ 16 V	CE	0311
C 6	"	320 µF/ 64 V	CE	0511
C 7	"	1 µF/350 V	CE	0512
C 8	"	2 x 50 µF/250 V	CE	0706
C 9	"	8 µF/350 V	CE	0802
C 10,11	"	2 x 50 µF/450 V	CE	0909
C 12	"	4 µF/350 V	CE	0708
C 13,14	"	4 µF/250 V	CE	2034
C 15	"	250 µF/ 10 V	CE	8944
C 20	Ceramic	20 pF/400 V	CK	0093
C 21	"	12 pF/400 V	CK	0095
C 30	Polyester	33 nF/250 V	CS	0007
C 31	"	0,1 µF/250 V	CS	0013
C 32,33	"	0,15 µF/250 V	CS	0015
C 34	"	0,22 µF/250 V	CS	0017
C 35,36	"	0,33 µF/250 V	CS	0019
C 37,38	"	0,47 µF/250 V	CS	0021
C 39-42	"	0,68 µF/250 V	CS	0023
C 43-48	"	1 µF/250 V	CS	0025
C 49-72	"	2 µF/250 V	CS	0028
C 79	Polystyrene	400 pF/125 V	CT	1011
C 80	"	±1% 62,6 nF/125 V	CT	1100
C 81	"	" 6,26 nF/250 V	CT	1203
C 82,83	"	" 9,9 nF/250 V	CT	1204
C 84	"	" 19,8 nF/250 V	CT	1206
C 85	"	" 31,3 nF/250 V	CT	1207
C 86	"	" 43,8 nF/250 V	CT	1209
C 87,88	"	" 89 nF/ 63 V	CT	1500
C 89,90	"	" 110 nF/ 63 V	CT	1501
C 91	"	" 99 nF/ 63 V	CT	1503
C 92	"	" 139 nF/ 63 V	CT	1504
C 93	"	+0,-1% 1 µF/100 V	CT	5000
C 94	"	" 2 µF/100 V	CT	5041

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
RESISTORS:					
R 1-3	Carbon	1/3 W	0.5%	1MΩ	
R 4	"	"	"	200 kΩ	
R 5	"	"	5%	100 kΩ	
R 6-8	"	"	0.5%	100 kΩ	
R 9	"	"	5%	31.6 kΩ	
R 10	"	"	0.5%	20 kΩ	
R 11	"	"	"	11.11 kΩ	
R 12-14	"	"	"	10 kΩ	
R 15	"	"	"	2 kΩ	
R 16	"	"	"	1.111 kΩ	
R 17-18	"	"	"	1 kΩ	
R 19	"	"	"	222.2 Ω	
R 20,21	"	"	"	111.1 Ω	
R 30	"	"	"	800 kΩ	
R 31	"	"	5%	200 kΩ	
R 32	"	"	0.5%	116 kΩ	
R 33	"	"	"	90.3 kΩ	
R 34	"	"	"	80 kΩ	
R 35	"	"	"	48.9 kΩ	
R 36	"	"	"	41 kΩ	
R 37	"	"	"	30.7 kΩ	
R 38	"	"	"	29 kΩ	
R 39	"	"	"	10.6 kΩ	
R 40	"	"	"	9.1 kΩ	
R 41	"	"	"	603 kΩ	
R 42	"	"	"	1.72 kΩ	
R 43	"	"	"	2 kΩ	
R 45	Metal	1/4 W	2%	20 kΩ	RF 0216
R 50	"	"	"	1MΩ	RF 0111

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
RESISTORS:					
R 51	Carbon	1/3 W	1%	300 kΩ	
R 52	"	"	"	266 kΩ	
R 53	"	"	"	320 kΩ	
R 54	"	"	"	250 kΩ	
R 55	"	"	"	200 kΩ	
R 56	"	"	"	191 kΩ	
R 57	"	"	"	127 kΩ	
R 58	"	"	"	125 kΩ	
R 59	"	"	"	75 kΩ	
R 60,61	"	"	"	100 kΩ	
R 62	"	"	"	87 kΩ	
R 63	"	"	"	60 kΩ	
R 64	"	"	"	50 kΩ	
R 65	Metal	1/4 W	2%	910 Ω	RF 0220
R 66,67	Carbon	1/3 W	1%	20 kΩ	
R 70	"	"	"	460 kΩ	
R 71	Metal	1/4 W	2%	220 kΩ	RF 0217
R 80	"	"	"	5.6 kΩ	RF 0221
R 81	Carbon	1/3 W	"	500 Ω	
R 82	"	"	"	80 Ω	
R 83	"	"	"	63 kΩ	
R 90	"	1/10 W	5%	1MΩ	RB 6100
R 91	"	"	"	330 kΩ	RB 5330
R 92	"	1/3 W	"	315 kΩ	
R 93,94	"	1/10 W	"	100 kΩ	
R 96	"	1/3 W	"	18 kΩ	
R 98	"	"	"	40 kΩ	
R 99	"	1/10 W	"	33 kΩ	RB 4330
R 100	"	"	"	10 kΩ	RB 4100
R 101	"	1/3 W	"	20 kΩ	
R 102	"	1/10 W	"	2.7 kΩ	RB 3270
R 103	"	1/3 W	"	2.2 kΩ	
R 104	"	1/10 W	"	2.7 kΩ	RB 3270
R 105	"	"	"	1.5 kΩ	RB 3150
R 106	"	"	"	820 Ω	RB 2820
R 108	"	1/3 W	"	315 Ω	
R 109	"	"	"	40 Ω	
R 110	"	1/10 W	"	330 Ω	RB 2330
R 120-123	"	"	"	6.8MΩ	RA 0023
R 124,125	"	"	"	3.3MΩ	RA 0022
R 126	"	"	"	1.8MΩ	RA 0021
R 127	"	1/3 W	10%	2MΩ	
R 128,129	"	1/10 W	5%	1MΩ	RB 6100
R 130	"	"	"	560 kΩ	RB 5560
R 131	"	"	"	470 kΩ	RB 5470
R 132,133	"	"	"	100 kΩ	RB 5100
R 134	"	1/3 W	10%	125 kΩ	
R 135,136	"	1/10 W	5%	39 kΩ	RB 4390
R 137,138	"	"	"	10 kΩ	RB 4100
R 139	"	1/3 W	"	40 kΩ	
R 140	"	1/10 W	"	18 kΩ	RB 4180
R 141,142	"	1/3 W	10%	6.3 kΩ	
R 143	"	"	"	5 kΩ	
R 144,145	"	1/10 W	5%	33 kΩ	RB 4330
R 146	"	"	"	1.2 kΩ	RB 3120
R 147	"	"	"	1 kΩ	RB 3100
R 149	"	"	"	100 Ω	RB 2100
R 150	"	1/3 W	"	80 kΩ	
R 151,152	"	"	"	1 kΩ	
R 170,171	"	1/2 W	"	50 kΩ	
R 172	"	"	"	285 kΩ	
R 173	"	"	"	31.5 kΩ	
R 174,175	"	"	"	150 Ω	
R 180,181	"	"	10%	1.6MΩ	
R 182	"	"	"	1MΩ	
R 183	"	"	"	500 kΩ	
R 184,185	"	"	"	315 kΩ	
R 186	Metal	1/4 W	2%	220 kΩ	RF 0217
R 187	Carbon	1/2 W	10%	100 kΩ	
R 190-192	Wire	5,5 W	"	15 kΩ	RX 0304

CIRCUIT DIAGRAM REF.	COMPONENT TYPE				STOCK REF.
POTENTIOMETERS:					
P 1	Trimmer	carbon	lin.	10 kΩ	PG 3102
P 2-4	"	wire	"	25 kΩ	PG 3251
P 5,6	"	carbon	"	80 kΩ	PG 3800
P 7	"	"	"	150 kΩ	PG 4151
P 8,9	Cross-over	"	1. log.	100 kΩ	PP 4111
P 10	Trimmer	wire	lin.	1 kΩ	PQ 2100
P 11-13	"	"	lin.	25 kΩ	PG 3251
SWITCHES-RELAYS:					
O 1-20	Mini Relay				OC 0006
O 21	Displ. Range				OR 0015
O 22	Velocity Range				OS 0002
O 23	Accel. Range - Accel. Grad. Range				OT 0002
O 25	Meter Time Constant				OU 0001
O 25	Power on-off wafer				NN 0020
O 26	Meter Indication				OV 0001
O 27	Function Selector				OX 0001
O 28	Accel. Density Range				OY 2502
O 29	Mains Voltage Selector				JS 0005
RECTIFIERS:					
Q 1-13	Silicon		200 V/0,04 A		QV 0022
Q 14	"		1200 V/0,15 A		QV 0025
Q 15-23	"		50 V/0,75 A		QV 0501
Q 24-27	"		1200 V/0,15 A		QV 0025
Q 28,29	"		65 V/ 0,6 A		QV 1003
Q 30-34	Zener		6,8 V/0,25 W		QV 1106
Q 35,36	"		6.0 - 6.4 V/ 30 mA		QV 1307
Q 39	"		101 - 107 V/ 1 W		QV 1323
TRANSISTORS-TUBES:					
V 1,2	Twin triode		ECC82/12AU7		VA 0011
V 3-6	Pentode		EF86/6 CF 8		VA 0019
V 7	"		EL86/6 CW 5		VA 0024
V 9,10	Twin triode		ECC88/6 DJ 8		VA 0073
V 11	Germ. transistor	PNP	2N555		VB 0023
V 12	Silicon "	NPN	2N1613		VB 0026
V 13	" "	"	BC107		VB 0257
V 14	" "	"	BC107		VB 0032
V 15	" "	"	BC107		VB 0257
V 16	" "	PNP	2N4289		VB 0049
V 17	" "	NPN	2N3440		VB 0250
V 18	Fuse		1,6 A		VF 0007
V 19	"		2,5 A		VF 0011
V 20-26	Ind. lamp		6 V/40 mA		VS 0008
V 27	Meter lamp		6,3 V/0,5 A		VS 1271
V 28	Cross-over ind.		6,3 V/0,15 A		VS 8008
V 29	Danger Lamp		6.3 V/ 0.15 A		VS 8008
PRINTED CIRCUITS:					
	DC - Amplifier				XC 0226
	Input-Output Amplifier				XC 0397
	Power Supply				XC 0398
	Input Attenuators				XC 0475
	XC 0226 with components				8032502
	XC 0397 "				8002502
	XC 0398 "				8022502
	XC 0475 "				8012502

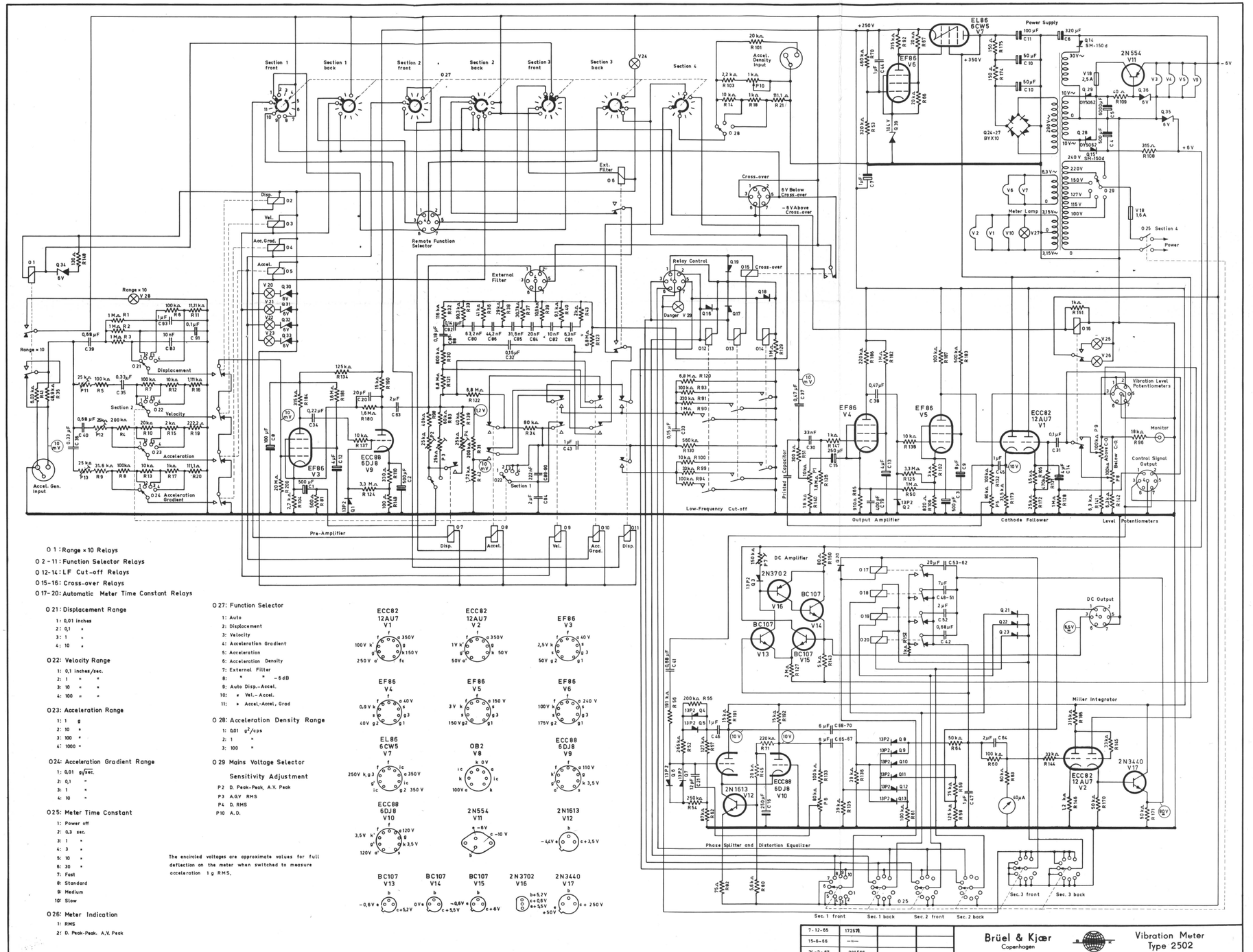
CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REF.
MISCELLANEOUS:		
	Bakelite knob 25 mm	SN 2522
	Mounting Ring for SN 2522	DB 0674
	Screw for SN 2522	YQ 2083
	Cabinet, wood	KA 0016
	" , metal	KQ 0047
	Power Cord, EUR	AN 0005
	" " , USA	AN 0006
	" transformer	TN 0012
	Socket Relay O 15,16	JJ 0008
	" " O 1-14, 17-20	JJ 0012
	" Tube V 8	JV 7505
	" " V 1-7, 9, 10	JV 9012
	Monitor Output Jack	JJ 1006
	Glass Cover for Indication Lamp	SG 0328
	" " " Danger Lamp	SG 0327
	Moving Coil Instrument (40 µA)	IM 2502

BRÜEL & KJÆR
Nærum - Denmark

Circuit Diagram

valid from serial no. 201566

2502.6



O 1 : Range × 10 Relays
O 2 - 11 : Function Selector Relays
O 12-14 : LF Cut-off Relays
O 15-16 : Cross-over Relays
O 17-20 : Automatic Meter Time Constant Relays

O 21 : Displacement Range
1: 0,01 inches
2: 0,1 "
3: 1 "
4: 10 "

O 22 : Velocity Range
1: 0,1 inches/sec.
2: 1 " "
3: 10 " "
4: 100 " "

O 23 : Acceleration Range
1: 1 g
2: 10 "
3: 100 "
4: 1000 "

O 24 : Acceleration Gradient Range
1: 0,01 g/sec.
2: 0,1 "
3: 1 "
4: 10 "

O 25 : Meter Time Constant
1: Power off
2: 0,3 sec.
3: 1 "
4: 3 "
5: 10 "
6: 30 "
7: Fast
8: Standard
9: Medium
10: Slow

O 26 : Meter Indication
1: RMS
2: D. Peak-Peak. A.V. Peak

O 27 : Function Selector
1: Auto
2: Displacement
3: Velocity
4: Acceleration Gradient
5: Acceleration
6: Acceleration Density
7: External Filter
8: " " - 6 dB
9: Auto Disp.-Accel.
10: " Vel.-Accel.
11: " Accel.-Accel. Grad

O 28 : Acceleration Density Range
1: 0,01 g²/cps
2: 1 "
3: 100 "

O 29 Mains Voltage Selector
Sensitivity Adjustment
P 2 D. Peak-Peak, A.V. Peak
P 3 A.G.V. RMS
P 4 D. RMS
P 10 A.D.

The encircled voltages are approximate values for full deflection on the meter when switched to measure acceleration 1 g RMS.

7-12-65	172578			
15-8-66	—"—			
24-2-67	201566			

Brüel & Kjær
Copenhagen

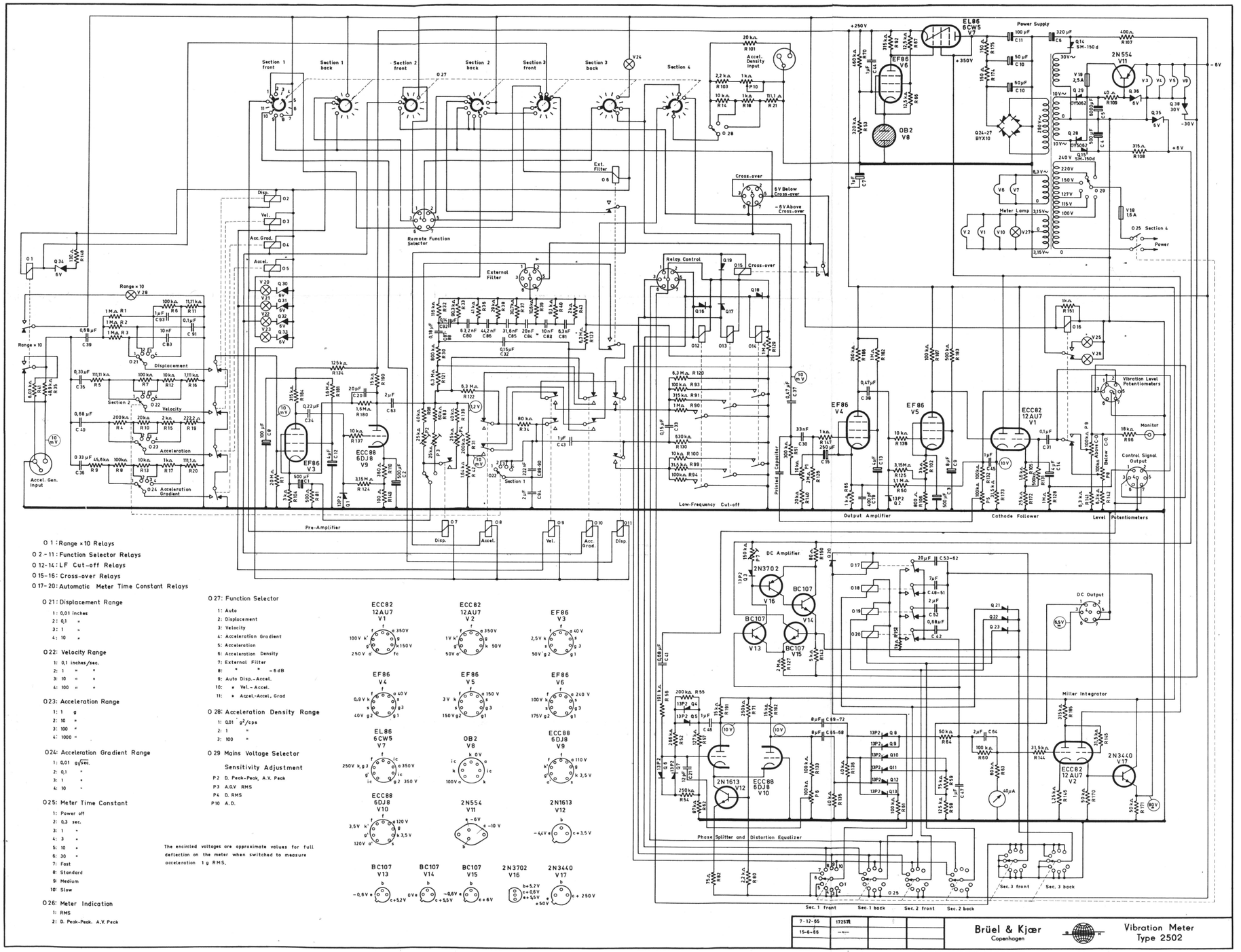
Vibration Meter
Type 2502

BRÜEL & KJÆR
Nærum - Denmark

Circuit Diagram

· valid from serial no. 172571

2502.6



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5 : Acceleration
6 : Acceleration Density
7 : External Filter
8 : " – 6 dB
9 : Auto Disp.-Accel.
10 : " Vel.-Accel.
11 : " Accel.-Accel. Grad

O 28 : Acceleration Density Range
1 : 0,01 g^2/cps
2 : 1 "
3 : 100 "

O 29 Mains Voltage Selector

Sensitivity Adjustment
P 2 D. Peak-Peak, A.V. Peak
P 3 A.G.V. RMS
P 4 D. RMS
P 10 A.D.

The encircled voltages are approximate values for full deflection on the meter when switched to measure acceleration 1 g RMS.

ECC82 12AU7 V1 — EF86 V3 — ECC82 12AU7 V2 — EF86 V4 — EF86 V5 — EF86 V6 — EL86 6CW5 V7 — OB2 V8 — ECC88 6DJ8 V9 — ECC88 6DJ8 V10 — 2N554 V11 — 2N1613 V12 — BC107 V13 — BC107 V14 — BC107 V15 — 2N3702 V16 — 2N3440 V17

7-12-65	172571		
15-6-65	—		

Brüel & Kjær
Copenhagen

Vibration Meter
Type 2502