

Consisting of:

Output Amplifier	1019.1
Oscillator	1019.2
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Compressor	1019.4
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Removal of the Case.

After removing the eight HEX/HD screws on the front panel and the two screws in the bottom, it is possible to slide the chassis and the front panel out of the wooden case.

For rack mounting the metal case can be pulled out after the six HEX/HD screws on the side of the instrument are removed.

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 adopting 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.

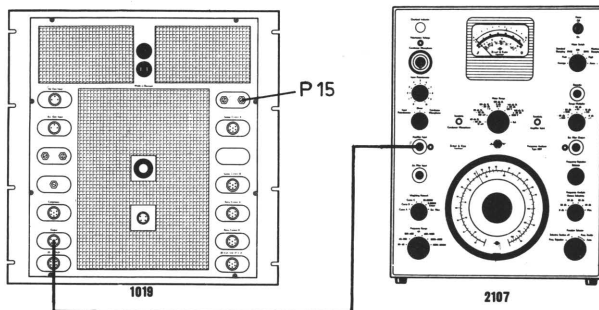
The instructions in this Manual are given purely as a guide to the service of equipment with minor faults. Some faults, as f.inst. small deviations in tolerances require for their correction special control equipment and extensive experience, and in these cases it is necessary to send the instrument 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
Oscilloscope
Frequency Counter
Multimeter (50 μ A)



1.1. Calibration of Indicating Meter.

METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"
FREQUENCY SCALE: "400 Hz"

Adjust the OUTPUT VOLTAGE for 10 V on OUTPUT socket.

Deflection on type 1019: 10 V

If necessary adjust P 15.

1.2. Output Voltage.

METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"
OUTPUT VOLTAGE: "10"

Check that full scale deflection on type 1019 can be obtained in the entire frequency range from 5-10000 Hz.

Possible reason for faults: The blocking range of the cam discs on the rear side of CV 0009 is within the frequency range.

Too low LF signal across R 92. The voltage should be approx. 320 mV. If not check item 2.2.

Too low DC voltage on V 10 cathode.

1.3. Frequency Response.

a. METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"
FREQUENCY SCALE: "400 Hz"

Adjust the OUTPUT VOLTAGE for an 18 dB deflection on type 1019.

Vary the frequency from 5-5000 Hz.

Deflection on type 1019: 18 dB.

Tolerance: ± 0.5 dB

Possible reason for fault: Defective tube V 8
Defective filter Z 3,4

b. FREQUENCY RANGE to "5005-10000 Hz"

Vary the frequency from 5005-10000 Hz.

Deflection on type 1019: 18 dB.

Tolerance: ± 1 dB.

c. FREQUENCY RANGE to "5-5000 Hz"
OUTPUT SWITCH to "High pass"
FREQUENCY SCALE to "400 Hz"

Adjust the OUTPUT VOLTAGE for a 20 dB deflection on type 1019.

Change frequency to 100 Hz.

Deflection on type 1019: 19.7 dB.

Tolerance: ± 0.2 dB.

Change frequency to 5 Hz.

Deflection on type 1019: 4 dB.

Tolerance: ± 2 dB.

1.4. Noise.

- a. METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"
FREQUENCY SCALE: "400 Hz"

- b. OPERATION SWITCH to "Stand by"

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

Adjust the OUTPUT VOLTAGE for a 10 V deflection on type 2107.

Measure Noise: min. 70 dB below 10 V.

If the noise level is too high remove tube V 7 and measure the noise from the output amplifier only: min. 75 dB below 10 V.

Possible reason for fault: Defective tube V 8

1.5. Distortion.

- METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"

Adjust the OUTPUT VOLTAGE for a 10 V deflection on type 1019.

Check distortion at different frequencies: max. 0.5%

Attention: Bear in mind that 2107 only allows measurements of distortion down to around 0.5% without a filter type 1607 connected between type 1019 and 2107 for rejection of the fundamental frequency.

Possible reason for fault: Defective tube V 7,8

Removal of Tuning Capacitor CV 0009.

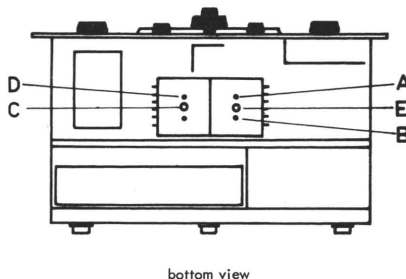
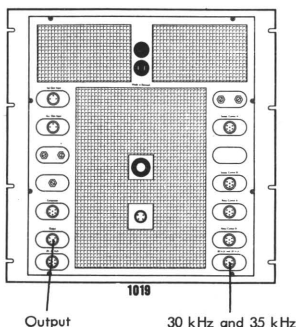
Remove the right hand side cover (when seen from the instrument front plate) of the capacitor unit CV 0009.

Set the condenser to fully "turned in" position. The position of the condenser is checked with a plate of insulating material, which strokes over the stator plates, so that none of the rotor plates is above the stator plates. The scale pointer should now point at 220° . If not, note carefully down the position of the pointer. Remove the multi-plugs and unsoldering the two leads to the oscillator coil assembly. Unscrew the two knobs on the tuning spindle and remove the scale rim, pointer and scale. The four screws, which secure Tuning Capacitor CV 0009 to the front plate, can then be unscrewed

Replacing Tuning Capacitor CV 0009.

After replacing scale, center it with reference to the spindle by means of a centering bush. Check the position of the condenser with a plate of insulating material for fully interleaved capacitor plates and fix the pointer to 220° or to the position noted above.

Attention: Item 2.1. and 2.2. The frequency can only be checked by means of a frequency counter or a frequency standard and an oscilloscope. The voltage should be measured by means of a high impedance (low capacity) tube voltmeter.



2.1. Fixed Oscillator.

- a. FREQUENCY RANGE: "5005-10000 Hz"

Check the signal on the socket "30 kHz and 35 kHz" (pin 4).

The frequency should be 35 kHz.

If necessary adjust the iron core "C" in Z 2.

The voltage should be approx. 2.7 V.

- b. FREQUENCY RANGE to "5-5000 Hz"

The frequency should change to 30 kHz.

If not, adjust the air trimmer "D" in Z 2 and check item a again.

2.2. Variable Oscillator.

- a. METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
OUTPUT SWITCH: "Linear"
FREQUENCY SCALE: "5 Hz"

Check that the frequency on the "Output" socket (pin 1) is 5 Hz.

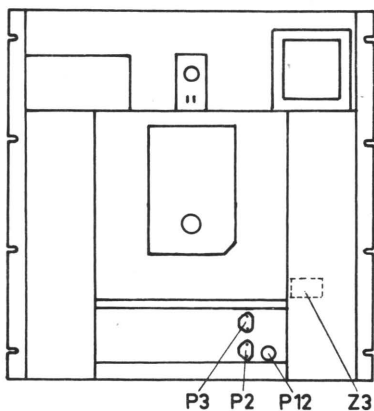
If not, adjust the FREQUENCY SCALE ADJUSTMENT. Fine adjustment by a knob and coarse adjustment by a screwdriver operated capacitor.

In case that the regulation range is too far away set both variable trimmers in mid position and adjust the air trimmer "B" in Z 2 for 5 Hz.

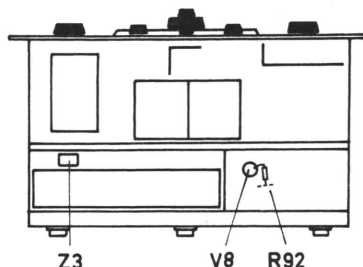
- b. FREQUENCY SCALE to "5000 Hz"

Check that the frequency is 5000 Hz.

If not, adjust the iron core "E" in Z 2 and check item a again.



rear view



bottom view

2.3. Oscillator Voltage.

- a. METER SWITCH: "Output Voltage"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5005-10000 Hz"
COMPRESSOR SPEED: "Standard"
OUTPUT SWITCH: "Linear"
- b. COMPRESSOR SPEED to "Off"
FREQUENCY RANGE to "5-5000 Hz"
FREQUENCY SCALE to "5000 Hz"
- c. FREQUENCY RANGE to "5005-10000 Hz"
FREQUENCY SCALE to "5005 Hz"

Adjust the OUTPUT VOLTAGE for an approx. half scale deflection on type 1019.

Adjust the iron core in Z 3 to max. deflection.

When FREQUENCY RANGE is changed to "5-5000 Hz" the deflection must change max. 1 dB.

Turn "Phase" (P 12) on the front plate to min. deflection on type 1019.

Check the voltage across R 92: 320 mV.

If necessary adjust P 3.

Check again the voltage across R 92: 320 mV.

If necessary adjust P 2.

Possible reason for fault: Defective tube V 5
" filter Z 3
" capacitor C 60

2.4. Frequency Drift.

- METER SWITCH: "Power Freq. Beat"
OPERATION SWITCH: "Scanning off"
FREQUENCY RANGE: "5-5000 Hz"
OUTPUT SWITCH: "Linear"

Set the FREQUENCY SCALE to exactly the mains frequency

Adjust FREQUENCY SCALE ADJUSTMENT until a very slow beat shows up.

Check the frequency drift after a period of 20 min. and after 15 hours by adjustment of the FREQUENCY SCALE for a slow beat and read the frequency deviation on the scale.

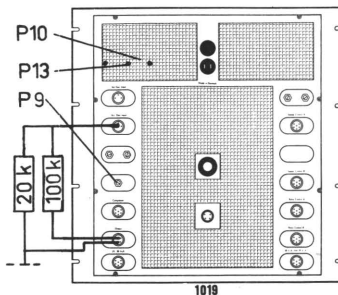
Tolerance: ± 5 Hz for each period.

If necessary adjust the trimmer "A"

After adjustment check item 2.2.

Attention: If an instrument has not been in use for a long period, frequency drift may occur due to humidity in the oscillator circuit. Therefore keep the instrument switched on 1-2 days before any adjustment.

Attention: The pick-up amplifier can only be checked and adjusted by means of a frequency counter or an oscilloscope and a frequency standard. The voltages should be measured by means of a high impedance (low capacity) tube voltmeter.



Check of Pick-up amplifier using "Accel. Gen. Input"

To check this section set the switches as follows:

METER SWITCH: "Vibration Level"
OPERATION SWITCH: "Scanning off"
COMPRESSOR SWITCH: "Off"
OUTPUT SWITCH: "Linear"

Switches not mentioned here are set in a position according to instructions.

3.1. Frequency Response.

- a. FUNCTION SELECTOR: "Accel."
ACCELERATION RANGE: "1" (Acc. Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"
- b. FREQUENCY RANGE to "5005-10000 Hz"

Adjust OUTPUT VOLTAGE for an 18 dB deflection on type 1019.

Change the frequency from 10-5000 Hz.
Deflection on type 1019: 18 dB.
Tolerance: ± 0.5 dB.

Check and tolerance as under item a.

3.2. Sensitivity of Displacement.

- a. FUNCTION SELECTOR: "Displ."
DISPL.-VEL. RANGE: "0.01" (Acc. Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust OUTPUT VOLTAGE for an input voltage of exactly 904 mV.

Deflection on type 1019: 20 dB.
Tolerance: ± 0.2 dB.

If necessary adjust P 10 "Displ./A.G."

AC voltage on V 1 pin 1: 7,8 V
 pin 2: 30 mV
 pin 6: 700 mV

- b. FREQUENCY SCALE to "1000 Hz"

Deflection on type 1019: 8 dB.
Tolerance: ± 0.2 dB.

- c. DISPL.-VEL. RANGE to "1" (Acc. Gen.)
FREQUENCY SCALE to "5Hz"

Adjust OUTPUT VOLTAGE for an input voltage of exactly 9.04 mV.
Deflection on type 1019: 19.7 dB.

If necessary adjust P 4 (located on printed circuit XC 0126)

Possible reason for fault: Defective capacitor C 29,30

The sensitivity adjustment of P 10 can be set 1.5% higher or lower if it facilitates the adjustment of P 4.

3.3. Sensitivity of Velocity.

- a. FUNCTION SELECTOR: "Vel."
DISPL.-VEL.RANGE: "0.1" (Accel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust OUTPUT VOLTAGE for an input voltage of exactly 57.6 mV.

Deflection on type 1019: 20 dB.

Tolerance: ± 0.2 dB.

If necessary adjust P 9 "Vel./A.G."

AC voltage on V1 pin 1: 7.8 V
 pin 2: 30 mV
 pin 6: 700 mV

- b. FREQUENCY SCALE to "1000 Hz"

Deflection on type 1019: 14 dB.

Tolerance: ± 0.2 dB.

3.4. Sensitivity of Acceleration.

- FUNCTION SELECTOR: "Accel."
ACCELERATION RANGE: "1" (Accel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust OUTPUT VOLTAGE for an input voltage of exactly 7.07 mV.

Deflection on type 1019: 20 dB.

Tolerance: ± 0.2 dB.

If necessary adjust P 13 "Accel./A.G."

AC voltage on V1 pin 1: 190 mV
 pin 2: 7 mV
 pin 6: 165 mV

3.5. Check of Acceleration Range.

- a. FUNCTION SELECTOR: "Accel."
ACCELERATION RANGE: "1" (Accel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

- b. ACCELERATION RANGE to "10" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

- c. ACCELERATION RANGE to "100" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

- d. ACCELERATION RANGE to "1000" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

Check also "Acceleration Range" at 10 kHz.

3.6. Check of Displ.-Vel. Range.

- a. FUNCTION SELECTOR: "Displ."
DISPL.-VEL.RANGE: "0.01" (Accel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "55 Hz"

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

- b. DISPL.-VEL.RANGE to "0.1" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

- c. DISPL.-VEL.RANGE to "1" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.

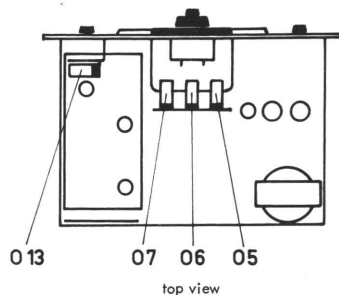
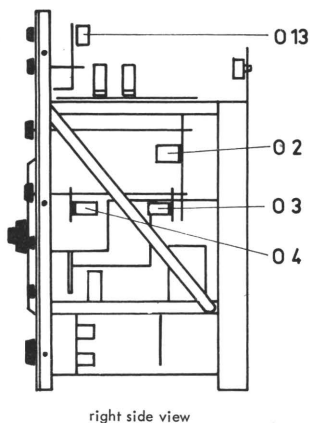
- d. DISPL.-VEL.RANGE to "10" (Accel.Gen.)

Deflection on type 1019: 0 dB.

Tolerance: ± 0.4 dB.

- e. FREQUENCY SCALE to "500 Hz"
FUNCTION SELECTOR to "Vel."

Check and tolerances as under item a - d.



3.7. Relay Functions.

a.

Check by moving the frequency pointer that the relays \bigcirc 5-6-7 are energized according to the following table.

Frequency scale:	30	100	300 Hz
Relay:	05	05-06	05-06-07

Tolerance: $\pm 10\%$

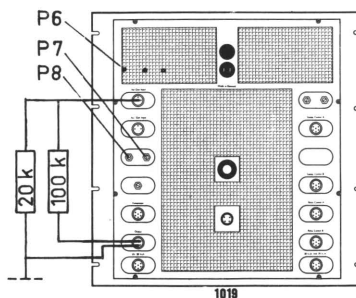
If necessary loosen rotating contact of switch \bigcirc 27 (located on the tuning spindle of CV 0009) and adjust the switching point according to table.

b. FUNCTION SELECTOR: "Acc."

Relays \bigcirc 2-3-4 should energize.

c. FUNCTION SELECTOR to "Auto D-A"

Relays \bigcirc 2-3 and \bigcirc 13 should energize according to position of frequency scale and cross over switch.



Check of Pick-up amplifier using "Vel. Gen. Input"

3.8. Frequency Response.

- a. FUNCTION SELECTOR: "Vel."
DISPL.-VEL-RANGE: "0.01" (Vel. Gen.)
VEL. GEN. RESPONSE: "Flat"
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust the OUTPUT VOLTAGE for a 15 dB deflection on type 1019.

Change the frequency from 5-2000 Hz.

Deflection on type 1019: 15 dB.

Tolerance: ± 0.2 dB.

- b. VEL.GEN.RESPONSE to "Shaped"
FREQUENCY SCALE to "10 Hz"

Adjust the OUTPUT VOLTAGE for a 10 dB deflection on type 1019.
Change the frequency from 10-2000 Hz and check the deflection on type 1019.

Frequency scale	Hz	10	100	200	300	400	500	600
Deflection on type 1019	dB	10	10.26	10.83	11.24	11.63	11.94	12.30
Frequency scale	Hz	700	800	900	1000	1250	1500	2000
Deflection on type 1019	dB	12.58	12.92	13.15	13.52	14.16	14.80	16.19

Tolerance, for frequencies 10-1000 Hz: $\pm 0,3$ dB
1250-2000 Hz: $\pm 0,5$ dB

3.9. Sensitivity of Velocity.

FUNCTION SELECTOR: "Vel."
DISPL.-VEL.RANGE: "0.01" (Vel.Gen.)
VEL.GEN.RESPONSE: "Flat"
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust OUTPUT VOLTAGE for an input voltage of exactly 6.8 mV.

Deflection on type 1019: 20 dB.
Tolerance: ± 0.2 dB.

If necessary adjust P 6 "Vel./V.G."

AC voltage on V 1 pin 1: 450 mV
 pin 2: 1,8 mV
 pin 6: 45 mV

3.10. Sensitivity of Displacement.

- a. FUNCTION SELECTOR: "Displ."
DISPL.-VEL.RANGE: "0.01" (Vel.Gen.)
VEL.GEN.RESPONSE: "Flat"
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust the OUTPUT VOLTAGE for an input voltage of exactly 1.07 V.

Deflection on type 1019: 20 dB.
Tolerance: ± 0.2 dB

If necessary adjust P 8 "Displ./V.G."
After adjustment of P 8 check item 3.11

AC voltage on V 1 pin 1: 7,6 V
 pin 2: 28 mV
 pin 6: 680 mV

- b. FREQUENCY SCALE to "1000 Hz"

Deflection on type 1019: 14 dB.
Tolerance: ± 0.2 dB.

3.11. Sensitivity of Acceleration.

- a. FUNCTION SELECTOR: "Accel."
VEL.GEN.RESPONSE: "Flat"
ACCELERATION RANGE: "1" (Vel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

Adjust the OUTPUT VOLTAGE for an input voltage of exactly 8.36 mV.

Deflection on type 1019: 20 dB.
Tolerance: ± 0.2 dB.

If necessary adjust P 7 "Accel./V.G."
After adjustment of P 7 check item 3.10

AC voltage on V 1 pin 1: 340 mV
 pin 2: 3,5 mV
 pin 6: 29 mV

- b. FREQUENCY SCALE to "250 Hz"

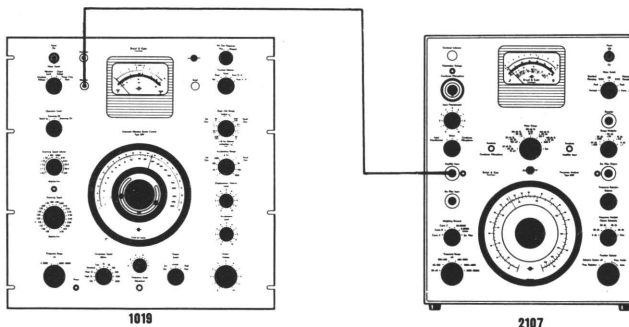
Deflection on type 1019: 14 dB.
Tolerance: ± 0.2 dB.

3.12. Check of Acceleration Range.

- a. FUNCTION SELECTOR: "Accel."
VEL.GEN.RESPONSE: "Flat"
ACCELERATION RANGE: "1" (Vel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- b. ACCELERATION RANGE to "10" (Vel.Gen.) Deflection on type 1019: 0 dB.
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- c. ACCELERATION RANGE to "100" (Vel.Gen.) Deflection on type 1019: 0 dB.
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- d. ACCELERATION RANGE to "1000" (Vel.Gen.) Deflection on type 1019: 0 dB.

3.13. Check of Displ.-Vel. Range.

- a. FUNCTION SELECTOR: "Displ."
VEL.GEN.RESPONSE: "Flat"
DISPL.-VEL.RANGE: "0.01" (Vel.Gen.)
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "5 Hz"
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- b. DISPL.-VEL.RANGE to "0.1" (Vel.Gen.) Deflection on type 1019: 0 dB.
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- c. DISPL.-VEL.RANGE to "1" (Vel.Gen.) Deflection on type 1019: 0 dB.
Adjust OUTPUT VOLTAGE to 20 dB deflection on type 1019.
- d. DISPL.-VEL.RANGE to "10" (Vel.Gen.) Deflection on type 1019: 0 dB.
- e. FUNCTION SELECTOR to "Vel."
Check Displ.-Vel. Range again at 500 and 2000 Hz.
Check and tolerances as under item a-d.



3.14. Noise-Microphony.

- a. FUNCTION SELECTOR: "Vel."
DISPL.-VEL.RANGE: "0.01" (Vel.Gen.)

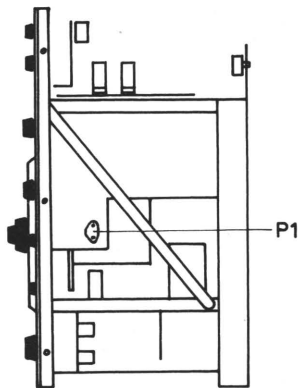
The instrument must be in its case or in other way effectively screened.
Disconnect input signal to both input amplifier "Vel." and "Acc."
Check the microphony by gently tapping on the front plate of the apparatus.
All deflections are read in dB below 10 V.
Velocity with velocity generator.

Noise: 45 dB
Microphony: 30 "

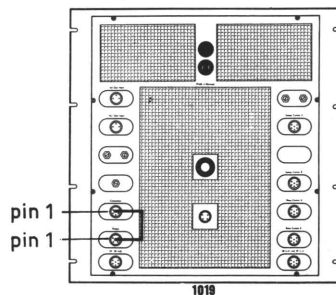
b. FUNCTION SELECTOR to "Displ."	Displacement with velocity generator.	Noise: 45 dB Microphony: 40 "
c. FUNCTION SELECTOR to "Accel."	Acceleration with velocity generator.	Noise: 32 " Microphony: 25 "
d. FUNCTION SELECTOR to "Vel." DISPL.-VEL.RANGE: "0.01" (Acc.Gen.)	Velocity with acceleration generator.	Noise: 32 " Microphony: 25 "
e. DISPL.-VEL.RANGE to "0.1" (Acc.Gen.)		Noise: 45 " Microphony: 40 "
f. FUNCTION SELECTOR to "Displ." DISPL.-VEL.RANGE to "0.01" (Acc.Gen.)	Displacement with acceleration generator.	Noise: 45 " Microphony: 35 "
g. FUNCTION SELECTOR to "Accel." ACCELERATION RANGE to "1" (Acc.Gen.)	Acceleration with acceleration generator.	Noise: 50 " Microphony: 30 "
Possible reason for Noise:		Defective tube V 2 Defective capacitor C 15, 16 Defective relay O 2
Possible reason for Microphony:		Defective tube V 1

To check this section set the switches as follows: OPERATION SWITCH: "Scanning off"
OUTPUT SWITCH: "Linear"
VEL.GEN. RESPONSE: "Flat"

Switches not mentioned here are set in a position according to instructions.



right side view



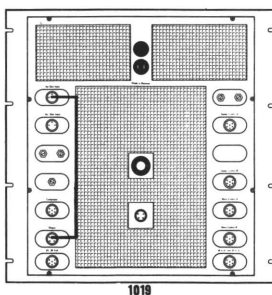
4.1. Compressor Balance.

METER SWITCH: "Output Voltage"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Off"
FREQUENCY SCALE: "400 Hz"

Adjust OUTPUT VOLTAGE for a 0.7 V deflection on type 1019.

Adjust P 1 until signals on the anodes of V 3 are equal.
Tolerance: $\pm 2\%$

Possible reason for fault: Defective diode Q 13
Defective capacitor C 87, 88



4.2. Compression.

a. METER SWITCH: "Vibration Level"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "100"
FUNCTION SELECTOR: "Vel."
DISPL.-VEL. RANGE: "0.1" (Vel.Gen.)
OUTPUT VOLTAGE: "10"
FREQUENCY SCALE: "200 Hz"

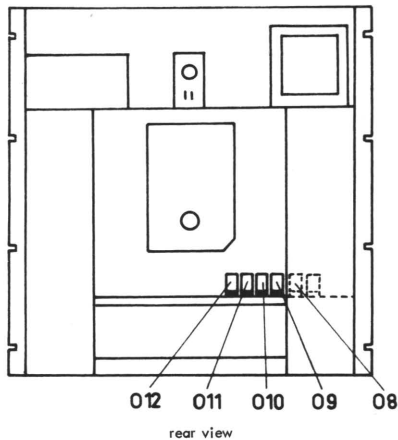
Adjust DISPLACEMENT VELOCITY LEVEL for an 18 dB deflection on type 1019.

b. DISPL.VEL.RANGE to "1" (Vel.Gen.)

Deflection on type 1019: 18 dB.
Tolerance: ± 0.5 dB.

c. DISPL.VEL.RANGE to "10" (Vel.Gen.)

Deflection on type 1019: 18 dB.
Tolerance: ± 1.3 dB.



4.3. Compressor Speed.

- a. METER SWITCH: "Vibration Level"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Standard"
FUNCTION SELECTOR: "Vel."
DISPL.-VEL.RANGE: "1" (Vel.Gen.)
OUTPUT VOLTAGE: "10"
FREQUENCY SCALE: "500 Hz"

Adjust DISPLACEMENT-VELOCITY LEVEL for a 20 dB deflection on type 1019.
Check the min. deflection for all positions of COMPRESSOR SPEED, when
DISPL.-VEL.RANGE is changed from "1" to "10".

COMPRESSOR SPEED:	High Q	Min. deflection: approx.	10 dB
	Med. Q	"	14 "
	Standard	"	17 "
	Fast	"	18,2 "
	10	"	6 "
	30	"	10 "
	100	"	14 "
	300	"	17 "
	1000	"	18,2 "
	3000	"	18,8 "

b. OUTPUT VOLTAGE to "0"

Check that the compressor relays are energized according to the following
table.

COMPRESSOR SPEED	FREQUENCY SCALE			
	30-100	100-300	300-1000	1000-5000
High, Q		08	08	08-09
Med. Q		08-09	08-09	08-09-010
Standard	08	08-09	08-09-010	08-09-010-011
Fast	08-09	08-09-010	08-09-010-011	80-09-010-011-012
	Independent of position of FREQUENCY SCALE			
10	08			
30	08-09			
100	08-09-010			
300	08-09-010-011			
1000	08-09-010-011-012			
3000				

4.4. Frequency Response with Velocity Generator.

METER SWITCH: "Vibration Level"
COMPRESSOR SPEED: "Standard"
FUNCTION SELECTOR: "Vel."
DISPL.-VEL.RANGE: "1" (Vel.Gen.)
OUTPUT VOLTAGE: "10"
FREQUENCY RANGE: "5-5000 Hz"
FREQUENCY SCALE: "500 Hz"

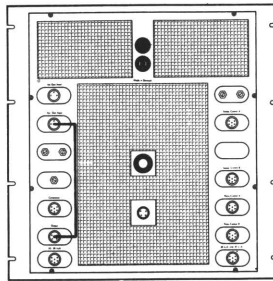
Adjust DISPLACEMENT VELOCITY LEVEL for a 19 dB deflection on type 1019.

Vary the frequency from 5-2000 Hz.

Deflection on type 1019: 19 dB.

Tolerance: ± 0.5 dB.

By turning DISPLACEMENT-VELOCITY LEVEL it should be possible to obtain deflections from -2 dB to 21 dB.



1019

4.5. Frequency Response with Acceleration Generator.

METER SWITCH: "Vibration Level"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Standard"
FUNCTION SELECTOR: "Accel."
ACCELERATION RANGE: "1000" (Accel.Gen.)
OUTPUT VOLTAGE: "10"
FREQUENCY SCALE: "1000 Hz"

Adjust ACCELERATION LEVEL for a 19 dB deflection on type 1019.

Vary the frequency from 10-10000 Hz.

Deflection on type 1019: 19 dB.

Tolerance: ± 0.5 dB.

By turning ACCELERATION LEVEL it should be possible to obtain deflections from -2 to 21 dB.

4.6. Gain Reserve.

- a. METER SWITCH: "Output Voltage"
FREQUENCY RANGE: "5-5000 Hz"
COMPRESSOR SPEED: "Standard"
FREQUENCY SCALE: "1000 Hz"

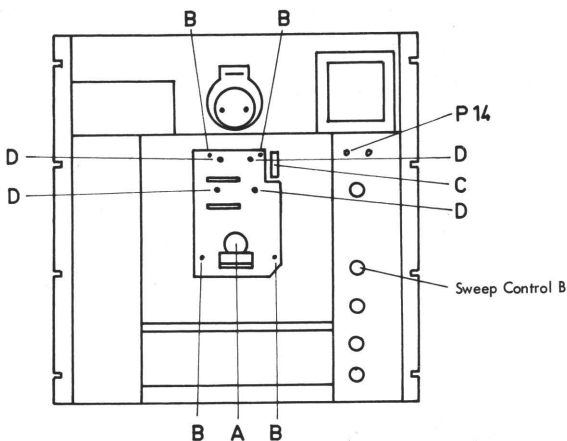
COMPRESSOR input disconnected

Adjust the OUTPUT VOLTAGE for a 20 dB deflection on type 1019.

- b. COMPRESSOR SPEED to "Off"

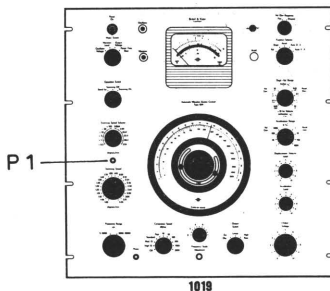
Deflection on type 1019: Max. 12 dB.

Possible reason for fault: Defective tube V 5.



Removal of the Motor Unit.

Remove the meter and the lamp for frequency dial. By removing the cam "A" and the four screws "B" it is possible to pull the back plate away. After removing the multiplug "C" and the four screws "D" holding the motor unit, it is possible to lift the motor up through the hole in the upper Chassis.



5.1. Adjustment of Motor Speed.

- a. OPERATION SWITCH: "Scanning on"
SCANNING SPEED SELECTOR: "X 1"
SCANNING SPEED: "1.80"

The speed should be 1.80° per min.

Tolerance: $\pm 3\%$

If necessary adjust P 14 (Motor).

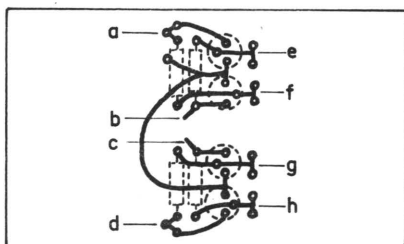
The periodic time of the pulses should be 24 m.sec. measured on "Sweep Control "B" pin 6.

- b. SCANNING SPEED SELECTOR to "2.59"

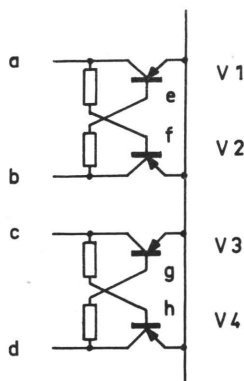
The speed should be 2.59° per min.

If necessary adjust potentiometer P 1

The periodic time of the pulses should be 18.69 m.sec.



Printed circuit XC 0130



5.2. Fault Tracing for Motor Unit.

- a. OPERATION SWITCH: "Scanning off"
SCANNING SPEED SELECTOR: "1"
SCANNING SPEED: "1.80"

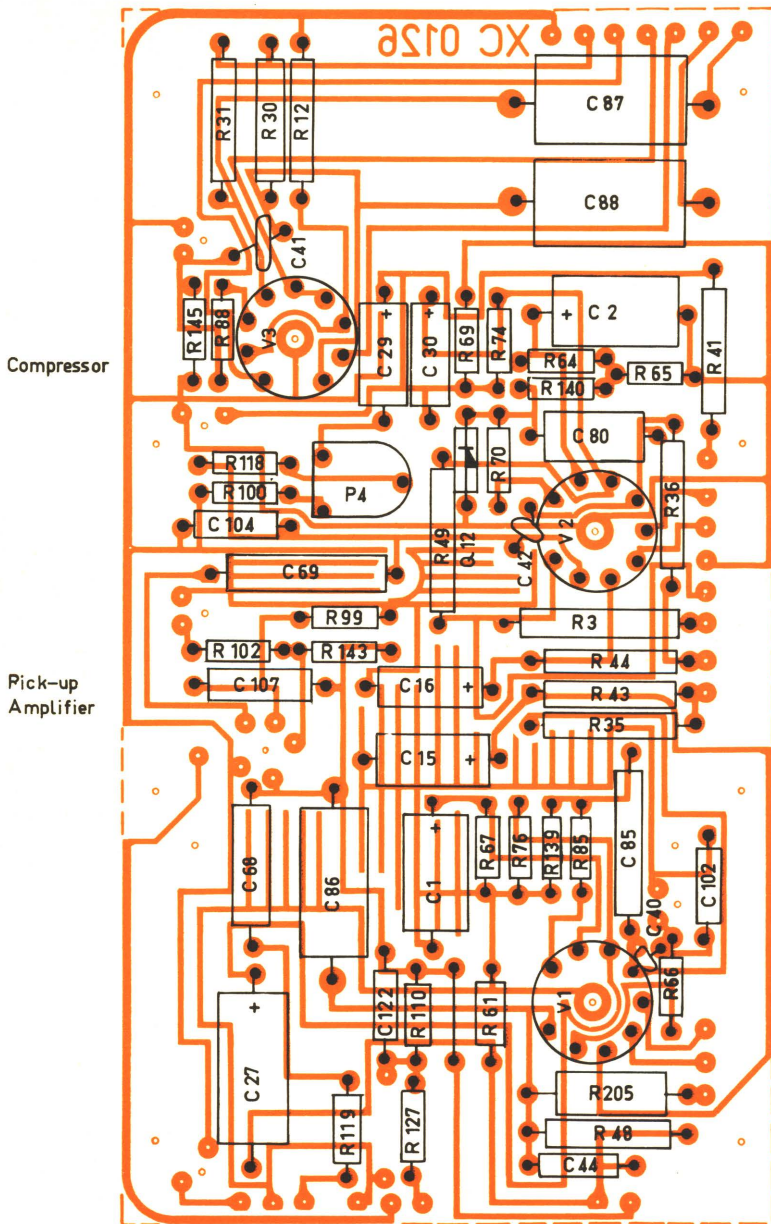
If the motor does not work, check the 24 m.sec. pulses on SWEEP CONTROL B socket (pin 6) in order to localize the defect to be in the pulse generator or in motor unit.

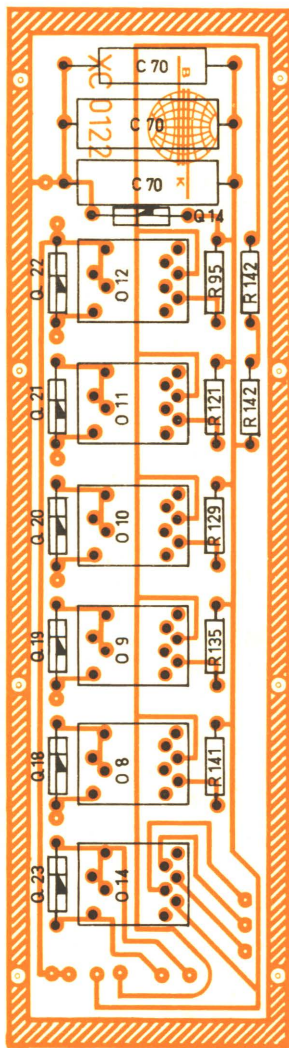
If the pulses are present on SWEEP CONTROL B socket check the dc voltages on the transistors in the multivibrator.

Measuring Point	a	b	c	d	e	f	g	h	
DC Voltage	- 10 V	- 10 V	- 10 V	- 10 V					The two multivibrations are working.
	0 V	- 20 V	- 20 V	0 V	- 0,5 V	+ 2 V	+ 2 V	- 0,5 V	Transistor V 1 should change over.
	- 20 V	0 V	0 V	- 20 V	+ 2 V	- 0,5 V	- 0,5 V	+ 2 V	Transistor V 2 should change over.
	0 V	- 20 V	0 V	- 20 V	- 0,5 V	+ 2 V	- 0,5 V	+ 2 V	Transistor V 3 should change over.
	- 20 V	0 V	- 20 V	0 V	+ 2 V	- 0,5 V	+ 2 V	- 0,5 V	Transistor V 4 should change over.

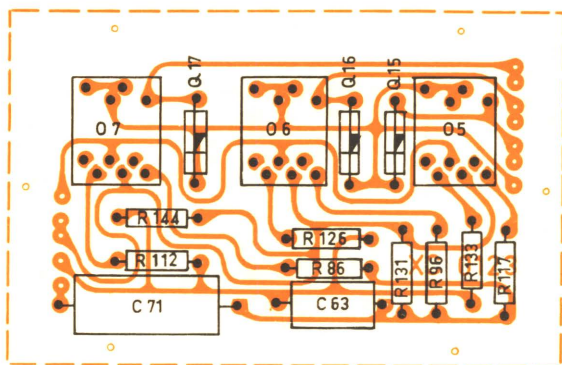
Connect an oscilloscope to the collector of the transistor which should change over according to the table.

- The pulses can not be obtained on the collector but the pulses are on the base. This transistor or accompanying components may be defective.
- The pulses can be obtained on the collector. The transistor with which it is matched is defective.

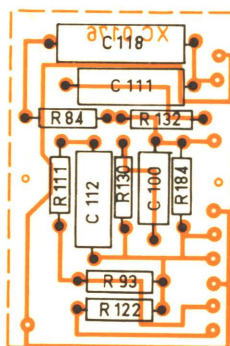




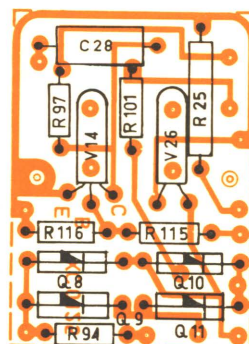
Compressor Relays



Differentiating and Integration Circuits



Vel. Gen. Input



Meter Circuit

CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE	CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE
<u>CAPACITORS:</u>			<u>RESISTORS:</u>		
C 1,2	Electrolytic	640 µF/ 16 V	CE 0201	R 30-32	Carbon 1/2 W 5% 100 kΩ
C 3	"	5000 µF/ 15 V	CE 0301	R 33,34	" " 10% 200 kΩ
C 4,5	"	1000 µF/ 75 V	CE 0501	R 35-37	" " " 315 kΩ
C 6-12	"	2 x 100 µF/250 V	CE 0704	R 38,39	" " 5% 350 kΩ
C 13	"	2 x 100 µF/450 V	CE 0902	R 40	" " 10% 500 kΩ
C 14	"	50 µF/500 V	CE 0903	R 41	" " 2% 500 kΩ
C 15	"	4 µF/250 V	CE 0703	R 42	" " 5% 630 kΩ
C 16	"	4 µF/250 V	CE 2034	R 43,44	" " " 800 kΩ
C 17,18	"	40 µF/150 V	CE 2038	R 45	" " " 1 MΩ
C 19	Polyester	10 µF/160 V	CS 0722	R 46	" " " 1.25 MΩ
C 20	Electrolytic	1000 µF/350 V	CE 2948	R 47	" " 10% 1.6 MΩ
C 21,22	"	2 x 100 µF/450 V	CE 0902	R 48,49	" " " 2 MΩ
C 23,24	"	100 µF/ 12 V	CE 8946	R 60	" " 1/3 W " 10 Ω
C 25,26	"	2 x 24 µF/350 V	CE 6896	R 61	" " 2% 100 Ω
C 27	"	1000 µF/ 16 V	CE 0309	R 62	" " 10% 150 Ω
C 28	"	50 µF/ 25 V	CE 8965	R 63	" " " 80 Ω
C 29,30	"	100 µF/ 3 V	CE 8943	R 64,65	" " " 315 Ω
C 31	Ceramic	1.8 pF/500 V	CK 0180	R 66-68	" " " 500 Ω
C 41	"	3.3 pF/500 V	CK 0330	R 69	" " 2% 600 Ω
C 42	"	10 pF/500 V	CK 1100	R 70	" " 10% 1 kΩ
C 43	"	18 pF/500 V	CK 1180	R 71	" " 2% 1.5 kΩ
C 44,46	"	27 pF/500 V	CK 1270	R 72-75	" " 10% 2 kΩ
C 50	Paper	3.5 µF/200 V	CP 0342	R 76	" " " 2.5 kΩ
C 51,52	"	8 µF/150 V	CP 0888	R 77,78	" " " 3.15 kΩ
C 60	Polyester	10 nF/125 V	CS 0001	R 79,80	" " " 4 kΩ
C 61,62	"	0.1 µF/125 V	CS 0013	R 81	" " " 5 kΩ
C 63	"	0.15 µF/125 V	CS 0015	R 82,83	" " " 6.3 kΩ
C 64	"	0.33 µF/125 V	CS 0019	R 84	" " 2% 10 kΩ
C 65	"	0.47 µF/125 V	CS 0021	R 85-91	" " 10% 10 kΩ
C 66,67	"	0.68 µF/125 V	CS 0023	R 92	" " 2% 20 kΩ
C 68-70	"	0.47 µF/125 V	CS 0021	R 93,94	" " " 31.5 kΩ
C 70,71	"	1 µF/125 V	CS 0025	R 95	" " 5% 31.5 kΩ
C 72	"	10 nF/125 V	CS 0001	R 96,97	" " 10% 31.5 kΩ
C 80	"	47 nF/400 V	CS 0109	R 98-100	" " 2% 40 kΩ
C 81-84	"	0.1 µF/400 V	CS 0113	R 101	" " 10% 40 kΩ
C 85	"	0.22 µF/400 V	CS 0117	R 102-104	" " 2% 63 kΩ
C 86-89	"	1 µF/350 V	CS 0500	R 105	" " 10% 63 kΩ
C 100	Polystyrene	75 pF/500 V	CT 0102	R 106	" " 5% 70 kΩ
C 102,103	"	200 pF/500 V	CT 0107	R 107-109	" " 2% 100 kΩ
C 104	"	300 pF/500 V	CT 0109	R 110	" " 5% 100 kΩ
C 105	"	400 pF/500 V	CT 0111	R 111-116	" " 10% 100 kΩ
C 106	"	450 pF/500 V	CT 0112	R 117,118	" " " 150 kΩ
C 107,110	"	500 pF/500 V	CT 0113	R 119	" " 5% 160 kΩ
C 111	"	1 nF/400 V	CT 0218	R 120	" " 2% 175 kΩ
C 112	"	400 pF/500 V	CT 0111	R 121	" " 5% 180 kΩ
C 113	"	1 nF/400 V	CT 0218	R 122	" " 2% 200 kΩ
C 114	"	6.3 nF/200 V	CT 3234	R 123,124	" " 10% 200 kΩ
C 115	"	10 nF/200 V	CT 3331	R 125	" " 5% 315 kΩ
C 116	"	100 nF/100 V	CT 3359	R 126	" " 10% 315 kΩ
C 117	"	1 µF/100 V	CT 3345	R 127,128	" " 5% 500 kΩ
C 118,119	"	1.25 nF/400 V	CT 3358	R 129	" " " 600 kΩ
C 120	"	200 nF/100 V	CT 3362	R 130	" " 2% 1 MΩ
C 121	"	2 µF/100 V	CT 5041	R 131	" " 5% 630 kΩ
C 122	"	175 pF/500 V	CT 0106	R 132	" " 2% 1 MΩ
C 123	"	400 pF/500 V	CT 0111	R 133,134	" " 10% 1 MΩ
C 130	Variable Tuning Capacitor		CV 0009	R 135	" " 5% 1.8 MΩ
C 131	Trimmer	60 pF/	CV 3007	R 137,138	" " 10% 2 MΩ
C 132	"	15 pF/	CV 3013	R 139,140	" " " 3.15 MΩ
<u>RESISTORS:</u>			<u>RESISTORS:</u>		
R 1,2	Carbon	1 W 10% 10 kΩ	R 141,142	" " 5% 6 MΩ	
R 3-5	"	" " 20 kΩ	R 143,144	" " 10% 6.3 MΩ	
R 6	"	" " 31.5 kΩ	R 145	" " " 1 MΩ	
R 10	"	1/2 W " 160 Ω	R 160-162	" " 0.5% 111.1 Ω	
R 11	"	" " 500 Ω	R 163	" " " 222.2 Ω	
R 12,13	"	" " 1 kΩ	R 164-166	" " " 1 kΩ	
R 14	"	2% 1.6 kΩ	R 167	" " " 2 kΩ	
R 15	"	10% 2 kΩ	R 168	" " " 222.2 kΩ	
R 16,17	"	5% 3.15 kΩ	R 169-171	" " " 10 kΩ	
R 18	"	" " 6.3 kΩ	R 172,173	" " " 20 kΩ	
R 19	"	" " 20 kΩ	R 174-176	" " " 100 kΩ	
R 20-23	"	10% 31.5 kΩ	R 177,178	" " " 200 kΩ	
R 24,25	"	5% 50 kΩ	R 179	" " " 11.1 kΩ	
R 26	"	10% 63 kΩ	R 180	" " " 100 kΩ	
R 27,28	"	" " 80 kΩ	R 181	" " " 980 kΩ	
R 29	"	" " 100 kΩ	R 182,183	" " " 1 MΩ	
			R 184	" " " 143 kΩ	
			R 185	" " 1% 160 kΩ	
			R 186	" " " 315 kΩ	

CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE
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RESISTORS:

R 187	Carbon 1/2 W 1%	700 kΩ
R 200	Wire 10 W "	10 kΩ RQ 0210
R 201, 202	" " "	4.7 kΩ RX 0102
R 203	" " "	82 Ω RX 0107
R 204	" " "	100 Ω RX 0108
R 205	" 5.5 W "	13 kΩ RX 0308
R 206	" 8 W "	390 Ω RX 0406

POTENTIOMETERS:

P 1-3	Trimmer carbon lin.	10 kΩ PG 3100
P 4	" " "	10 kΩ PG 3102
P 5	Accel. Level carbon log.	50 kΩ PP 3507
P 6	Vel. /V.G. carbon lin.	50 kΩ PP 3508
P 7	Acc. /V.G. " "	100 kΩ PP 4108
P 8	Displ. /V.G. " "	100 kΩ PP 4108
P 9	Vel. /A.G. " "	100 kΩ PP 4108
P 10	Displ. /A.G. " "	100 kΩ PP 4108
P 11	Displ.-Vel. Level " log.	500 kΩ PP 4507
P 12	Phase " "	10 kΩ PP 3106
P 13	Accel./A.G. wire lin.	10 kΩ PQ 3109
P 14	Motor " "	20 kΩ PQ 3209
P 15	Meter " "	20 kΩ PQ 3209
P 16	Output Voltage carbon " "	100 kΩ PP 4104

SWITCHES - RELAYS:

N 1	Power On-Off	NN 0563
O 1	Power voltage selector	OA 0017
O 2-14	Relay	OC 0006
O 16	Frequency Range	OP 1029
O 17	Compressor Speed	OQ 1028
O 18	Function Selector	OS 1028
O 19	Operation Switch	OT 1040
O 20	Displ.-Vel. Range	ON 1028
O 21	Acceleration Range	ON 1028
O 22	Vel. Gen. Response	OX 1016
O 23	Meter Switch	OX 1028
O 24	Output Switch	OZ 1029

RECTIFIERS:

Q 1-3	Silicon	200 V/o.04 A	QV 0022
Q 4-7	"	1200 V/o.15 A	QV 0025
Q 8-11	Germanium	115 V/ 150 mA	QV 0085
Q 12-23	Silicon	1000 V/o.15 A	QV 0023
Q 24-27	"	200 V/ o.6 A	QV 0502
Q 28-31	"	65 V/ o.6 A	QV 1003
Q 32	Zener	6.5 V/ 140 mA	QV 1308
Q 34	Silicon	1000 V/o.15 A	QV 0023
Q 35, 36	"	50 V/o.75 A	QV 0501

TRANSISTORS - TUBES:

V 1	Triode, pentode	ECF80/68L8	VA 0061
V 2	"	ECF82/6U8	VA 0062
V 3	Twin triode	ECC83/12AX7	VA 0012
V 4	"	ECC81/12AT7	VA 0009
V 5	Pentode	EF94/6AU6	VA 0035
V 6-8	Twin triode	ECC81/12AT7	VA 0009
V 9	Pentode	12BY7	VA 0063
V 10	"	EL86/6CW5	VA 0024
V 11	"	EF94/6AU6	VA 0035
V 12	Stabilizer	OA2	VA 0039
V 13	Germ. transistor	ASZ16	VB 0029
V 14	"	OC44	VB 3044
V 20	Fuse	1.6 A	VF 0007
V 21	Fuse	2.5 A	VF 0011
V 22	Meter lamp	6.3 V/ o.5 A	VS 1271
V 23, 24	Accel.ind.lamp	6.3 V/o.15 A	VS 8008
V 25	Dial lamp	6.3 V/ o.3 A	VS 8024
V 26	Cold Cathodetube	90 V	VA 0072

CIRCUIT DIAGRAM REF.	COMPONENT TYPE	STOCK REFERENCE
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PRINTED CIRCUIT:

Compressor Relays	XC 0122
Diff. and Integr. Circuits	XC 0123
Meter Circuit	XC 0125
Compressor, Pick-up Amplifier	XC 0126
Vel. Gen. Input	XC 0176
XC 0122 with components	8061019
XC 0123 "	8051019
XC 0125 "	8011019
XC 0126 "	8041019
XC 0176 "	8091019

MISCELLANEOUS:

Bakelite knob 25 mm	SN 0701
" 30 mm x 17	SN 0814
" 30 mm x 11	SN 0807
" 35 mm	SN 0989
" 55 mm	SN 1014
L 1 Choke	LJ 0003
Z 2 Coils for Oscillator	ZS 0081
Z 3 Coil for compressor	ZS 0100
Coil for magnet clutch	LB 1011
Cabinet, wood	KA 1018
Cabinet, metal	KQ 0052
Frequency dial	SA 1030
Housing for freq. dial	SC 0189
Low-pass filter	ZS 0110
Magnet clutch	UM 1008
Moving coil meter	IM 1028
Magnet clutch	UM 1009
Plug 3 pin	JP 0304
Plug 4 pin	JP 1004
Plug 6 pin	JP 1005
Plug 20 pin	JP 2000
Plug, Vibration/Oscillator	JP 0009
Painter for freq. dial	SV 0018
Power cord. EUR	AN 0005
Power cord. USA	AN 0006
Power transformer	TN 0015
Socket 3 pin	JJ 0304
Socket 4 pin	JJ 1004
Socket 6 pin	JJ 1005
Socket 20 pin	JJ 2000
Socket Vibration/Oscillator	JJ 1006
Socket Fuse V 20, 21	JS 0006
Socket Tube V 5, 11, 12	JV 7503
Socket Tube V 4, 6-10	JV 9011
Socket Tube V 1-3	JV 9012
Socket Relay O 2, 5-14	JJ 0C12
Socket Relay O 3, 4, 30	JJ 0008

CIRCUIT COMPONENT TYPE
DIAGRAM REF.

STOCK
REFERENCE

CIRCUIT COMPONENT TYPE
DIAGRAM REF.

STOCK
REFERENCE

COMPONENTS FOR MOTOR DRIVE

Pulsegenerator Z1 0001

CAPACITORS:

C 1	Polystyrene	+0,-2%	1 µF/100 V	CT 3345
C 2	"	"	50 nF/100 V	CT 3355
C 3	"	"	150 nF/100 V	CT 3356
C 4	"	"	300 nF/100 V	CT 3357

RESISTORS:

R 1	Metal	1/2 W	10%	510 kΩ	RF 0100
R 11	Carbon	1/3 W	2.5%	30,2 Ω	
R 12	"	"	"	39,8 Ω	
R 13	"	"	"	60,3 Ω	
R 14	"	"	"	800 Ω	
R 16	"	"	0.5%	64,6 kΩ	
R 17	"	"	"	501 kΩ	
R 20	Wire	5,5 W	10%	6,8 kΩ	RX 0305
R 21	Carbon	1/3 W	0.5%	94,4 kΩ	
R 22	"	"	"	85,1 kΩ	
R 23	"	"	"	75,9 kΩ	
R 24	"	"	"	79,4 kΩ	
R 25	"	"	"	70,8 kΩ	
R 26	"	"	"	73,3 kΩ	
R 27	"	"	"	79,4 kΩ	
R 28	"	"	"	69,2 kΩ	
R 29	"	"	"	61,7 kΩ	
R 30	"	"	"	55 kΩ	
R 31	"	"	"	49 kΩ	
R 32	"	"	"	43,2 kΩ	
R 33	"	"	"	47,3 kΩ	
R 34	"	"	"	42,2 kΩ	
R 35	"	"	"	38 kΩ	
R 36	"	"	"	39,4 kΩ	
R 37	"	"	"	38 kΩ	
R 38	"	"	"	33,9 kΩ	
R 39	"	"	"	39,8 kΩ	
R 40	"	"	"	26,6 kΩ	
R 41	"	"	"	31,6 kΩ	

POTENTIOMETER:

P 1	Carbon, lin	100 kΩ	PP 4108
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SWITCHES:

O 1	Scanning Speed Selector	OV 1040
O 2	Scanning Speed	OY 1040

RECTIFIERS:

Q 1	Zener	7 V/140 mA	QV 1309
Q 2	Zener	19,5 V/ 70 mA	QV 1310

TRANSISTORS:

V 1	Germanium	2N167B	VB 0016
V 2	Germanium	ASZ16	VB 0029

PRINTED CIRCUIT:

Scanning Speed	XC 0129
XC 0129 with components	8000056

Motor Circuit CV 0009

CAPACITORS:

C 1	Polyester	10 nF/125 V	CS 0001
C 2-5	Polyester	33 nF/125 V	CS 0007

RESISTORS:

R 1-4	Wire	5,5 W	5%	120 Ω	RX 0307
R 5-8	Carbon	1/3 W	"	56 Ω	
R 9-12	"	"	"	3 kΩ	
R 13-22	"	"	"	16 kΩ	

SWITCHES:

O 1	Relay	OD 0006
O 2	Stabilizing Network	OY 1029
O 3	Reversing Arm	NT 0007

RECTIFIERS:

Q 1-4	Germanium	115 V/150 mA	QV 0085
Q 5-11	Silicon	50 V/750 mA	QV 0501
Q 12	Zener	21 V/ 70 mA	QV 1314

TRANSISTORS:

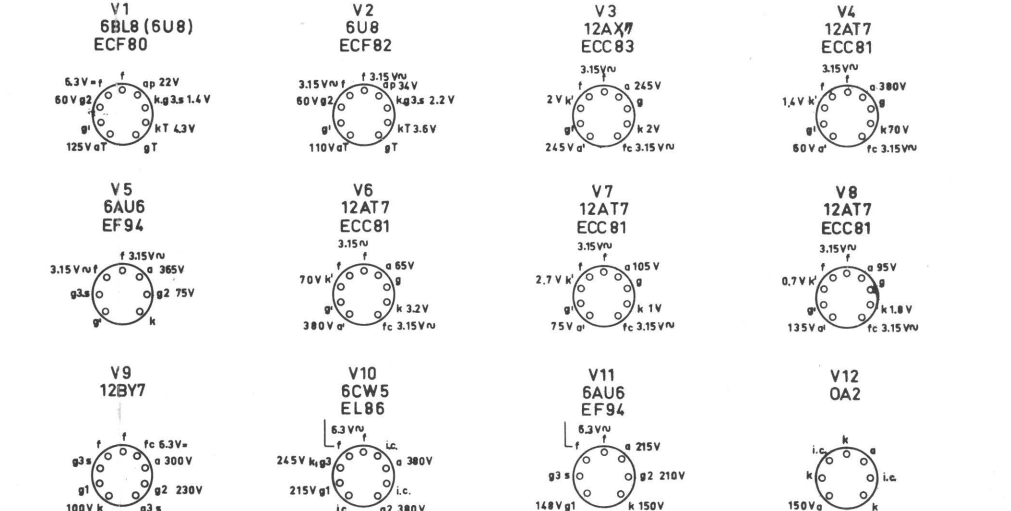
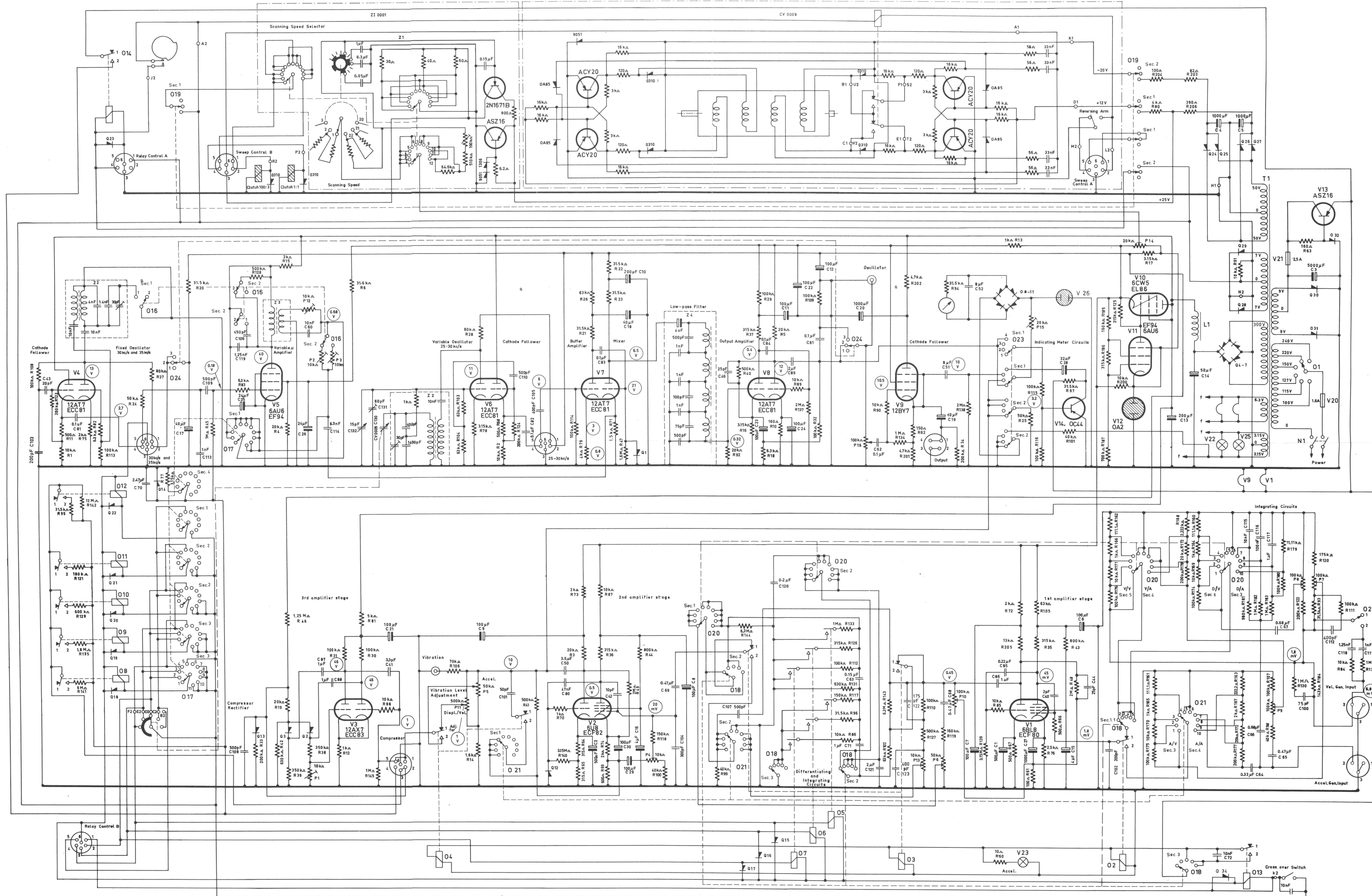
V 1-4	Germanium	ACY20	VB 0017
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PRINTED CIRCUIT:

Motor Circuit	XC 0130
XC 0130 with components	8000054

MOTOR:

M 1	Motor	AU 5050/22	UM 0008
	Gearbox	AU 5300/83 AA	UG 0032



Voltage checks:
Switches Position X
Adjust "Output Voltage" for 10V

- 01: Mains Voltage Selector
- 02-03-04: Function Selector Relays
 - 1: Displ.-Velocity Operation
 - 2: Acceleration Operation
- 05-06-07: LF cut-off Relays
- 08-09-010:
 - 011: Automatic Compressor Control Relays
 - 1: Resistor connected in passive circuit
 - 2: in active
 - 013: Cross-over Relay
 - 1: Operation
 - 2: Stand by
 - 014: Stand by Relay
 - 1: Operation
 - 2: Stand by
- 016: Frequency Range
 - X 1: 5-5000 c/s
 - 2: 5000-10000 c/s
- 017: Compressor Speed
 - 1: Off
 - 2: High Q
 - 3: Standard
 - 4: 5 dB/sec
 - 5: Fast
 - 6: 10 dB/sec
 - 7: 30 "
 - 8: 100 "
 - 9: 300 "
 - 10: 1000 "
- 018: Function Selector
 - X 1: Vel.
 - 2: Displ.
 - 3: Accel.
 - 4: Auto D-A
 - 5: Auto V-A
- 019: Operation Switch
 - 1: Stand by
 - 2: Scanning Off
 - X 3: Scanning On
- 020: Displacement-Velocity Range
 - X 1: 0.01 inches
 - 01 inches/sec Vel. Gen.
- 021: Acceleration Range
 - 1: 1 g Vel. Gen.
 - 2: 10 "
 - 3: 100 "
 - 4: 1000 "
 - 5: 1- Accel. Gen.
 - 6: 10 "
 - 7: 100 "
 - 8: 1000 "
 - 9: 10000 "
 - 10: 10000 "
- 022: Vel. Gen. Response
 - X 1: Flat
 - 2: Shaped
- 023: Meter Switch
 - 1: Oscillator Voltage
 - 2: Vibration Level
 - X 3: Output Voltage
 - 4: Power Freq. Beat
- 024: Output Switch
 - 1: Ext. Osc.
 - X 2: Linear
 - 3: High pass
- Sensitivity Adjustment:
 - P 6: Velocity
 - P 7: Acceleration
 - P 8: Displacement
 - P 9: Velocity
 - P 10: Displacement
 - P 11: Acceleration

BRUEL & KJÆR
Naerum - Denmark

Circuit Diagram
Valid from serial no. 97374

1019.8

