

OPERATIONAL INSTRUCTIONS

HANSEN . VTVM

MODEL UV-47

HANSEN ELECTRIC LABORATORY & WORKS, LTD.

INSTRUCTION MANUAL FOR MODEL HANSEN UV-47 VTVM

General description, see catalog

1. Preparation and precautions.

- a) This UV-47 VTVM is used with 50-60 cps. power source. Do not attempt to use this instrument on DC or 25 cps AC power source.
- b) The rotary selector switch, lower, serves as a main switch. When this instrument is not in use, the switch should be in the "OFF" position.
- c) When using the UV-47, plug the line cord into an AC main. With the selector switch in DC volts or AC volts and the pilot should be on. Warm up time of the electron tube should be allowed before adjusting the meter indicator to the zero left position. Adjustment is made by "ZERO ADJ" zero adjuster knob.
- d) When in doubt of an AC or DC voltage, or a current, begin the test with highest range and work to a lower range until the correct range is found.
- e) Make certain that no voltage exists across any resistance or capacitance which is under going a test.
- f) The minus terminal of the UV-47 is grounded to the metal cabinet. Make certain that no hot voltage in the lead is connected to this minus terminal.
- g) When conducting tests, unless otherwise specified in the instruction manual, connect the red lead to the plus terminal and the black lead to the minus terminal of the UV-47. This procedure is the same as when using a VOM.
- h) Do not remove the plug located under the AC-ADJ, adjustment knob unless otherwise specified.
- i) To protect from induction or static coupling, and to give a high accuracy in AC voltage measurements, connect the red and black tip of the AC probe to the plus and minus terminals of the UV-47. Use the probe, with the alligator instead of black test leads. This probe can also be used in DC voltage, current or ohm measurements unless otherwise specified.
- j) For safety reason, do not handle the (UV-47) or the test probes when the instrument is connected to high voltage.
- k) When the selector switch is in the AC volts, DC volts plus, DC minus range, the terminal "G" is connected to the minus terminal.
- l) The alligator clip of the probe may be connected to ground (chassis) unless otherwise specified.

2. Measuring DC voltage. (1) -plus or minus-

0, 1.2, 2.4, 6, 12, 30, 60, 120, 300, 600 volts

(minimum graduation is 20m volts.)

Input resistance 20 Meg'

(Sensitivity 21.66 Meg' per volt on 1.2 V range)

- a) Set the selector switch to DC volt plus or DC volts minus position as required. Set the range switch to a range greater than the voltage to be measured. Measure by standard method.
- b) If RF voltage exists on the circuit to be measured, or the circuit is very sensitive to the shock of the test probe contact, the use of the IG probe will guard against this interference. When using the IG probe, connect the red lead to the jack marked "PROBE" and the black to the minus terminal of the UV-47 VTVM. The tip of the probe and the alligator clip are used instead of the red and black test leads. This probe connected to the UV-47 has no interference to any other current of the measurement.

TWO PROBES. If the AC probe or standard test leads are connected, instead of connecting the black tip of the IG probe to the minus terminal, connect the alligator clip of the IG probe to the terminal end of the AC probe or black test lead.

c) The DC voltage readings are taken from the black AC DC scale.

3. Measuring DC voltages. (2) -High Voltages-

0, 60, 120, 300, 600, 1500, 3000, 6000, 15000, 30000 volts.

Input resistance 135M ohms per volt

Using "EX-50" 30KV probe

- a) Connect the lead and black tip of the "EX-50" 30KV probe to the plus and minus terminals of the UV-47 VTVM. All DC voltage ranges are multiplied by 50 on the scale. If range selector switch is in the 300 volts DC position the UV-47 can measure up to 15,000 volts. This probe serves as well for an extra high impedance probe and the IG probe (non intercarance) probe. This probe is designed for television use, do not use on X-Ray or other great current circuits for maximum safety.

4. Measuring DC voltage. (3) -center zero measurement-

The UV-47 features a convenient zero center scale. The adjustment of the "ZERO ADJ" adjustment control on the panel will permit the meter indicator to swing to the zero center on the scale. This can be done when the selector switch is in the DC volt plus or DC volt minus position.

Note: This center scale zero will be useful as a NULL indicator in FM discriminator, bias measurements or in any application where polarity reversal may occur.

5. Measuring AC voltage. (1) -Mainly for Audio Circuits.-

0, 1.2, 2.4, 6, 12, 30, 60, 120, 300, 600 volt. RMS point.

707 of positive peak

0, 3.6, 7.2, 18, 36, 90, 180, 360, 900, 1800 volt p-p

Frequency response 20 cps to 3M cps.

- a) Set the selector switch to an AC volt position that will be a higher range than the voltage to be measured.
- b) Sometimes, even though the meter indicator was adjusted by the "ZERO ADJ" adjustment knob on DC volt position, the meter indicator will shift from zero position in AC low volt ranges. At this time adjust the meter to the zero position by the AC ADJ control (AC-DC balancer knob).
- c) The meter scale of the UV-47 is calibrated in both RMS and P-P voltages. The RMS range scale 12 volts or more (full scale value) is taken from the red 6 volts AC scale. (above the black AC-DC scale). The 1.2 AC volt range is taken from the red 1.2 volt scale between the ohm top scale and the 6 volt AC scale. The RMS scale indicates 0.707 of positive peak voltages. P-P scale (lowest on the scale plate). The 3.6 V (1.2 V RMS), is taken from the 3.6 V scale above the P-P scale.

6. Measuring AC voltage. (2) -Mainly for RF-

0, 1.2, 2.4, 6, 12, 30 V RMS

0, 3.6, 7.2, 18, 36, 90 V P-P

Frequency response 5K cps. - 30M cps.

Input capacitance 2 micromicro farads (by using "Germanium RF probe").

- DC
- a) Set the selector switch to the AC plus position. Connect the red and black tips of the germanium "RF" probe to the "PROBE", and minus terminal of the UV-47. If the range switch is set in the 1.2V - 30V DC, the UV-47 works as a P-P detector RF volt meter.
 - b) The ranges of the RMS value are the same as the DC volt range P-P ranges and are three times (3x) the DC range reading. (noted on panel).
 - c) The RF meter scale in the same as the AC voltage ranges. Allow an inaccuracy of 50M cps, when using this probe. The probe has a very small input capacity, it matches for a high impedance and pulse circuit e.g. horizontal drive circuit for television.
 - d) The alligator clip must be to ground (chassis). If the circuit has 300 or more volts DC do not use this probe.

7. Measuring AC voltage. (3) -Decible scale minus 19 DB to plus 58 DB-

- a) The decible is a power ratio or voltage ratio and may be used as such without specifying the reference level. We can compare any values of DB that are taken from different ranges. The UV-47 has a calibrated DB scale to a standard of 1 milliwatt to 600 ohms line as zero DB.
- b) Set the selector to the "AC volt" position and the range switch to the appropriate range. The DB reading is computed by adding the meter reading to the range setting. If the meter reading indicates plus 16 and the range is plus 14 the total DB is plus 30. For greater accuracy in the minus 14 DB (1.2 V RMS) the reading is taken from the 6 V DB scale.

8. Measuring Resistance.

R x 1, R x 10, R x 100, R x 1K, R x 10K, R x 100K, R x 1Meg

Maximum graduation 400, 4K, 40K, 400K, 4Meg, 40Meg, 400Meg

Minimum graduation 0.2, 2, 20, 200, 2K, 20K, 200K

Ordinary resistance DC.

- a) Set the selector switch to the ohm position and the range switch to the required position. The meter indicator moves from the zero position, use the "OHM ADJ" ohms adjuster control so the meter indicates exactly full scale. Resistance is measured by the standard method. Make certain no voltage exists across the resistance to be measured.

9. Measuring Resistance. (2) -High Meg range DC-

1000 meg ohms to 100000 Meg ohms (1Meg to 100K Meg.)

- a) Set the selector switch to the ohms position and adjust to full scale by using the "OHM ADJ" control at the R x 1Meg range. To measure, set the range selector switch to the high Meg position. Connect the AC probe to the plus and minus terminals in the standard method. But do not ground or connect the alligator clip. Connect the black test lead to the "G" terminal.
- b) If the indicator has shifted from the full scale position correct the position with the "ZERO ADJ" control, NOT BY THE "OHMS ADJ" CONTROL. The tip of the AC probe and the black test lead is used for measuring. Use the high Meg scale.

10. Measuring Resistance. (3) -Low ohm range (AC)-

Minimum graduation 0.04 ohms.

- a) Set the selector switch to the "COND" position and the range switch to the low resistance position. Connect the red and black tips of the AC probe to the plus and "G" terminals. Adjust to the zero reading with the "AC ADJ" control. Connect the alligator clip of the AC probe to the head of the AC probe and adjust the "OHM ADJ" control until the meter indicator shows full scale. (zero ohms position on the low resistance scale) An built-in AC power source is used in this range, for measurement, use tip of AC probe and alligator clip.

11. Measuring Capacitance. (1)

C x 10, C x 100, C x 1000

Maximum graduation 0.1 microfarad, 1 microfarad, 10 microfarad,

Minimum graduation 0.0002 microfarad, 0.002 microfarad, 0.02 microfarad.

- a) Set the selector switch to the "COND" position. The range switch is set to the required range. Use the standard test leads to the plus and minus terminal. Short the test leads together and adjust the "AC ADJ" control until the indicator shows a zero reading. Next, open the leads and adjust the "OHMS ADJ" control until the meter indicator shows full scale. Measurement is in standard method.

12. Measuring Capacitance. (2) -For smaller than 500 micro microfarad-

Minimum graduation 20 micro microfarads.

C x 1 for small capacitance, for those capacitance smaller than 500 micro microfarads. Set the selector switch to the "COND" position and the range switch to the C x 1 position. Use the "G" and minus terminals. The same method of adjustment is used as the one in the C x 10, C x 100 range. The capacitance to be measured is very small and this range is very sensitive to the human body and other inductance sources. If at all possible measurement to the "G" terminal should be direct.

13. Measuring AC current

0, 3, 120 microamps.

0, 1.2, 12, 120 milliamps.

0, 1.2, amperes at 120 Millivolts.

- a) Set the selector switch to the ACA position and the range switch to the required position. Adjust to zero by the "AC ADJ" control. Use the red 1.2 V AC scale. ~~This can measure audio frequency current~~ (3 micro amps range is for 50-60 cycles). To avoid the body effect and other stray current, minus terminals will be grounded. If possible use the AC probe.

14. Measuring DC current.

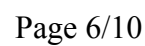
0, 0.12, 1.2, 12, 120 microamps

0, 1.2, 12, 120 millivolts

0, 1.2 ampere at 1200 millivolts

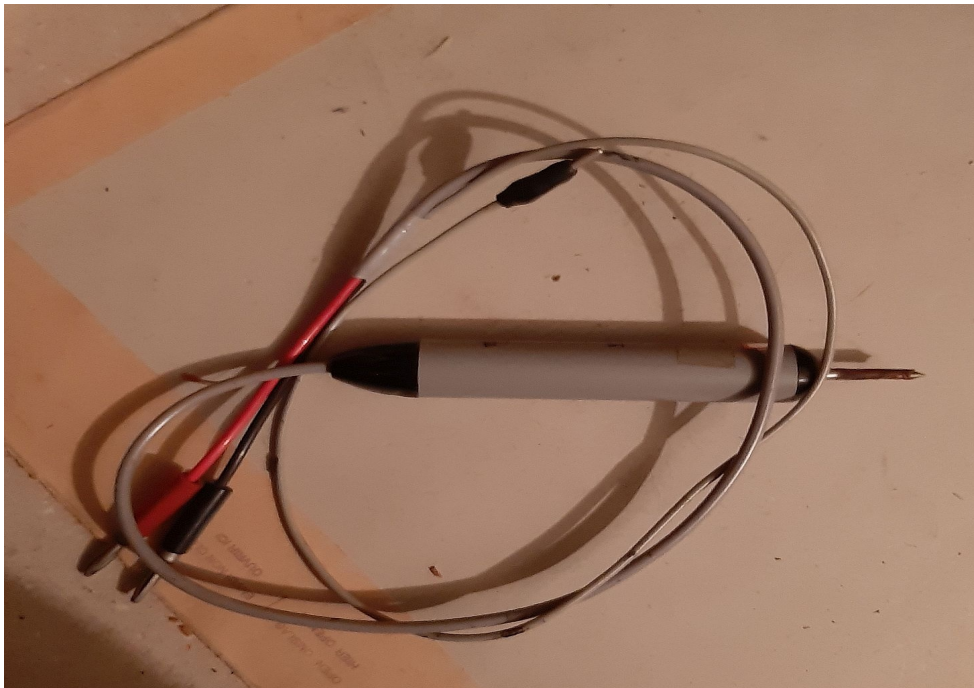
- a) Set selector switch to DC amps position. (DCA). The DC volt black scale is used. To avoid the effect of stray voltages, use the AC probe. This DC ampere meter has no reversal switch. If necessary the UV-47 could be used with the zero center or backward indicator, by adjusting the zero adj. control.

(CIRCUIT DIAGRAM)
結 線 圖

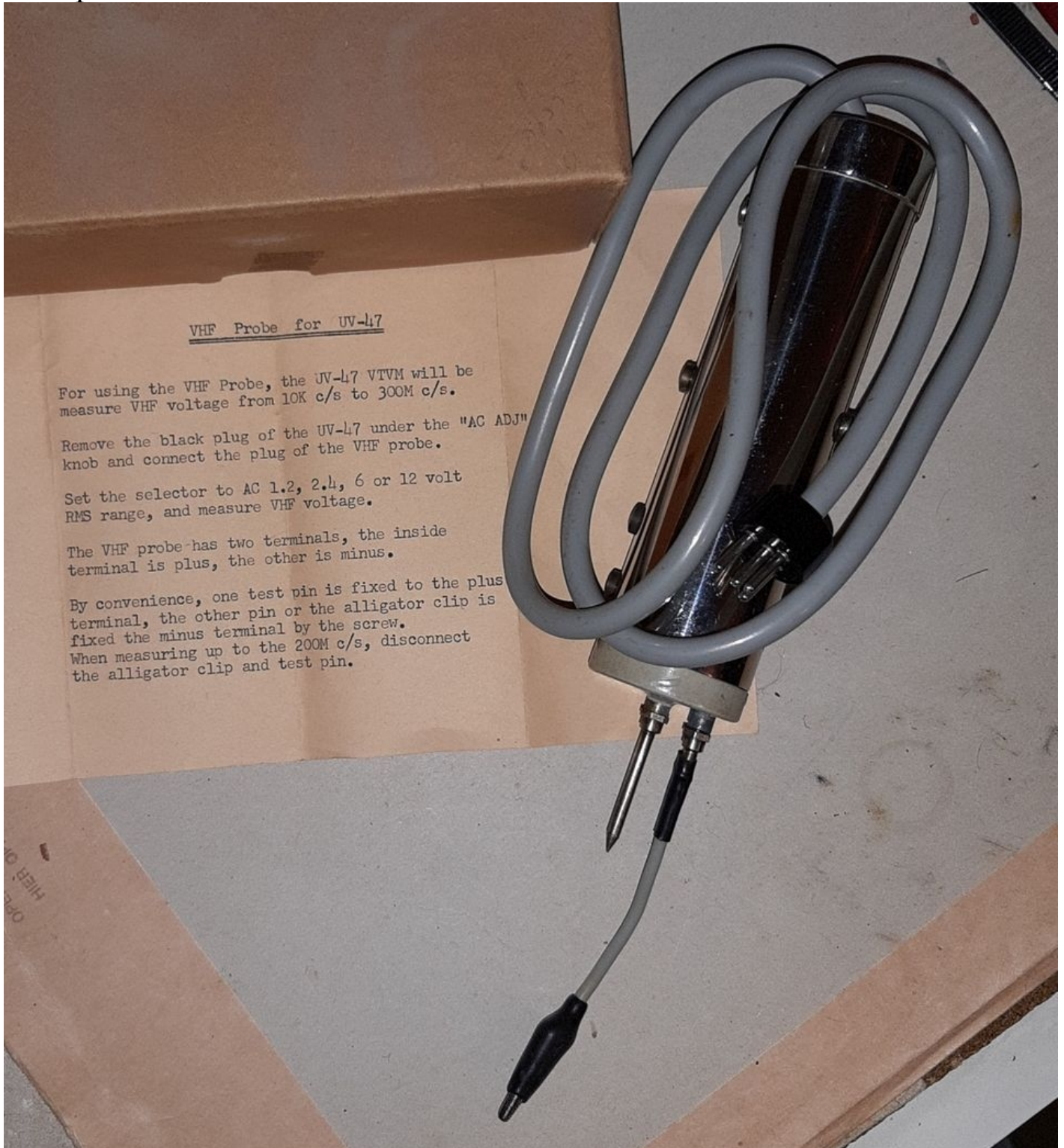




HF probe



VHF probe



Exemple de calibration:

Celle du HANSEN UV47 Numéro Z32003



試験成績表

CERTIFICATE

型名 TYPE UV-47

計器番号 No. Z32003

定格 RATING

精度 ACCURACY $\pm 3\%$ on P.C. $\pm 4\%$ on A.C.

定格値に対する率 \pm % of full scale value

絶縁抵抗 INSULATION RESISTANCE (D.C. 500V)

以上 Over 100 megohms

耐電圧 PUNCTURE TEST VOLTAGE A.C. 2000 volts 1 minute

試験条件 温度 CALIBRATED AT TEMPERATURE 20°C

相对湿度 RELATIVE HUMIDITY 50%

備考 REMARKS A.C. 220V or 110V.

更正表

CALIBRATION

測定範囲 Range	計器指示 Indication	標準器指示 Standard	測定範囲 Range	計器指示 Indication	標準器指示 Standard
D.C. \pm 600V	600	600	D.C. A 12A	120	123
300V	300	300	120mA	120	121
120V	120	120	12mA	12.0	12.1
60V	60.0	60.3	1.2mA	1.20	1.20
30V	30.0	30.0	120mA	120	118
12V	12.0	12.0	12mA	12.0	11.9
6V	6.00	5.97			
2.4V	2.40	2.42			
1.2V	1.20	1.20			
A.C. 600V	600	605	A.C. A 12A	120	123
300V	300	300	120mA	120	120
120V	120	120	12mA	12.0	12.0
60V	60.0	60.3	1.2mA	1.20	1.20
30V	30.0	30.0	120mA	120	118
12V	12.0	12.0			
6V	6.00	6.00			
2.4V	2.40	2.38			
1.2V	1.20	1.20			

ハンセン電機工業株式会社

HANSEN ELECTRIC LABORATORY
& WORKS, LTD.

昭和 年 月 日
March 5, 1963

試験者
Inspector, Y. Sugiyama



試験成績表

CERTIFICATE

型名 UV-47
TYPE

計器番号
No. 232003

定格
RATING

精度 OHMS; $\pm 3\%$ COND; $\pm 5\%$
ACCURACY of full scale value.

定格値に対する率
 \pm % of full scale value

絶縁抵抗
INSULATION RESISTANCE (D.C. 500V)

以上
Over 100 megohms

耐電圧
PUNCTURE TEST VOLTAGE A.C. 2000

V 1分間
volts 1 minutes

試験条件 温度
CALIBRATED AT TEMPERATURE 20°C

相対湿度
RELATIVE HUMIDITY 50%

備考 A.C. 220V OR 110V.
REMARKS

更正表

CALIBRATION

測定範囲 Range (R)	計器指示 Indication	標準器指示 Standard	測定範囲 Range	計器指示 Indication	標準器指示 Standard
Rx1	20.0	20.0 Ω	Cx1	120	100PF
Rx10	200	200 Ω	Cx10	10000	10000PF
Rx100	2.00	2.00 K Ω	Cx100	0.095	0.10 MF
Rx1K	20.0	20.0 K Ω	Cx1000	1.00	1.00 MF
Rx10K	203	200 K Ω			
Rx100K	2.05	2.00 M Ω			
Rx1M	20.5	20.0 M Ω			
HIGH MEG	2.10	2.00 K M Ω			
LOW RES	2.00	2.00 Ω			

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