USER'S GUIDE

MODEL: 100HVT

PART NO. : CS14-1486

DANGER HIGH VOLTAGE

WARNING: This publication describes a product engineered and designed to supply HIGH VOLTAGE. Accordingly, maximum safeguards have been built into the equipment and the best safety techniques possible are set forth in the unit's operating instructions. These instructions contain cautions, warning the user to exercise great care in the use of certain controls and at appropriate points in the operating procedures. Despite these written warnings the operator of this equipment is nevertheless strongly advised to maintain a safety consciousness at all times. The following rules are particularly relevant and must be followed at all times.

BEFORE CONNECTING INPUT POWER, GROUND CASE.

BEFORE UNGROUNDING CASE, DISCONNECT POWER.

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ILLUSTRATIONS

GENERAL DESCRIPTION

HIPOTRONICS' Model 100 HVT High Voltage Insulation Test Set is designed specifically for safe and accurate measurement of leakage current from insulated work platforms, specifically bucket trucks. Testing specifications are in accordance with ANSI specifications #A92.2-1969.

One-piece portable construction with low input power requirements make these units suitable for field tests on aerial platforms, bucket trucks, etc.

The full voltage capacitive load capability of the Model 100 HVT is 5 kVA. The built-in inductive reactance reduces the required input power approximately 2.5 kVA for a 5 kVA capacitive load test.

Hipotronics supplies both 220 V and 115 V input systems. Please check the input power requirements for the unit purchased before connecting the input power.

FEATURES

Features include:

- portable one-piece construction
- a triple-range current meter enabling low leakage current measurements
- a triple-range kilovoltmeter
- continuously adjustable output from zero to full voltage
- high voltage ON and OFF pushbuttons with zero start and external interlock provisions
- overload circuit breaker protection in the primary of the high voltage transformer
- secondary overload relay protection

CONTROLS AND INDICATORS

The function and uses of the various controls and indicators are described below.

AC POWER

The AC POWER circuit breakers supply the input power to the unit. The ON indicator should light when the unit is energized.

KILOVOLTMETER

The triple-range KILOVOLTMETER permits reading of the output voltage in high (0-100 kV), medium (0-50 kV) or low (0-25 kV) ranges. These scales must be used in relation to the setting of the RANGE SELECTOR switch.

CURRENT METER

The CURRENT METER enables an output current reading in three ranges (0-1/10/100 mA) depending on the position of the CURRENT RANGE switch.

RAISE VOLTAGE

The continuously adjustable RAISE VOLTAGE dial controls the output test voltage from zero to full voltage. The powerstat must be in the zero-start position before the high voltage can be activated.

HV ON/OFF

The high voltage section of the control panel consists of an ON and OFF pushbutton and an indicator which lights up when the high voltage is ON. The HV ON button must be momentarily depressed to supply power to the RAISE VOLTAGE powerstat when it is in the zero-start position.

OVERLOAD

The OVERLOAD circuit breaker will trip the unit when the power range is exceeded.

GROUND-GUARD-RETURN FRONT PANEL CONNECTIONS

There are three plug-in connection posts on the front panel labeled GUARD, GROUND, and RETURN. Either the GUARD or POS post is always connected to GROUND by a jumper link whenever testing. An explanation of these two connection combinations follows:

1 -Jumper link connected between GUARD and GROUND post

The sole function of this mode of operation is to separate the paths of two types of current flowing. These currents are: current flowing along the isolated insulator being tested which is to be monitored and corona leakage current flowing through the air to ground which is not to be monitored. With a grounded GUARD hookup, all leakage current flowing directly to ground will be bypassed around the current meter and therefore not observed. Only leakage current flowing along the insulator will be observed and accurately measured by the current meter. The low side of the test sample is connected to RETURN and the GUARD post is grounded.

2. Jumper link connected between GROUND and the RETURN post

This front panel hookup connection will only be used when sensitive current measurements are not necessary. The current paths are not separated in this configuration therefore all current is observed on the meter.

EXTERNAL INTERLOCK

The EXT INTLK terminal can be hooked up to the safety gates around the high voltage area. Otherwise the plug must be in its receptacle for the high voltage to be activated.

OUTPUT SELECTOR

The position of the OUTPUT SELECTOR should correspond to the connection of the voltmeter probe to the high voltage bonnet. The output will be 50 kV, 100 mA if the probe is connected to the midpoint connection on the high voltage ac bonnet while connection to the bonnet's toroid will produce 100 kV, 50 mA output.

INSTALLATION INSTRUCTIONS

1. Position the unit in the testing area at the spot where the high voltage module will be used.

2. Slide the HV module off the cart.

3. Leaving the control cabinet on the cart, place the cart approximately 20' to one side of the high voltage module and remove the top cover for access to the interconnecting cables.

4. Unwind the 3-conductor power cable from around the high voltage module and plug it into its respective socket on the control box.

5. Pull the high voltage voltmeter probe from its vertical rack.

6. Hook the probe onto the brushed aluminum toroid on top of the HV module and let it hang to the ground.

   NOTE: If the 50 kV tap on the side of the HV module is going to be used, hook the probe onto it and not to the top toroid. The 50 kV tap will only be used when a bucket liner water test is to be performed.

7. Plug one end of the short coaxial cable into the base of the HV probe. The other end should be plugged into the position marked HV PROBE on the base of the HV power supply. Next to that connector is another, marked VM. This should be interconnected with coaxial cable to the position labeled VM on the control front panel.

8. Plug one end of the other cable provided into the RTN position on the front panel. The other end should be connected to the position marked RTN on the base of the HV module.

9. Connect a ground lead onto the GROUND post on the front panel.

10. Position the boom truck to be tested so that its boom is extended out from the rear of the truck and the bucket hovers directly above the HV module.

11. Use any insulated or bare wire conductor to interconnect the HV module to the metal portion connecting the boom to the bucket. Ideally, a 1" diameter conductor will minimize air corona.

12. Plug one end of each of the remaining two 20' insulated leads (black, red) into the front panel sockets marked RTN and either GROUND or GUARD. (See the Controls and Indicators for details).

CAUTION

THE EXTERNAL HV PROBE MUST BE HOOKED ONTO THE OUTPUT OF THE HV MODULE. SELECT EITHER THE 100 KV CONNECTION ON TOP OF THE HV MODULE OR THE 50 KV TAP ON THE SIDE OF THE MODULE.

OPERATION INSTRUCTIONS

This section provides step-by-step instructions for performing insulation testing of one side grounded and ungrounded specimens. The previous section should be completed before operation.

1. Connect input power cord to power source. On 220 V units, a 220 V, 15 amp service is required. On 115 V units, a 115 V, 25 amp service is required.

   NOTE: Hipotronics is obligated to put a 115 V, 20 amp twist lock male connector on the power cord to meet the input current requirements of this test system.

2. Select the desired front panel voltage and current meter ranges. Set the toggle switch between the meters to the appropriate position.

   NOTE: The 50 kV/100 mA position should only be used when testing bucket liners in water; otherwise use 100 kV/50 mA position.

3. Switch the AC POWER and the OVERLOAD breakers ON.

4. Turn the RAISE VOLTAGE dial to zero. This engages the zero start interlock.

5. Press the HV ON pushbutton. The high voltage pilot light should glow.

6. Raise the voltage to the desired level via the RAISE VOLTAGE powerstat. When the test is complete, return the powerstat to the zero start position and turn all power OFF.

7. If a flashover occurs during testing or if excessive leakage current flows, the secondary overload relay will shut the high voltage OFF.

SPECIAL OPERATIONS

This section provides step-by-step procedures required to perform special operations incidental to the three major functions described in the preceding section.

KILOVOLTMETER RECALIBRATION

1. Connect a Hipotronics KVM-100 between the high voltage output toroid and ground potential.

2. Connect the test set to the appropriate input power source.

3. Turn on the AC POWER and the HV ON.

4. With the VOLTAGE RANGE switch on the 25 kV position, raise the output voltage until the standard meter reads 20 kV.

5. Adjust the VM CAL potentiometer located on the front panel until the kilovoltmeter also reads 20 kV.

6. Shut the high voltage OFF and remove the standard meter. All ranges should be calibrated.

CURRENT METER RECALIBRATION

1. Connect a standard 1 mA current meter between the high voltage output toroid and ground potential.

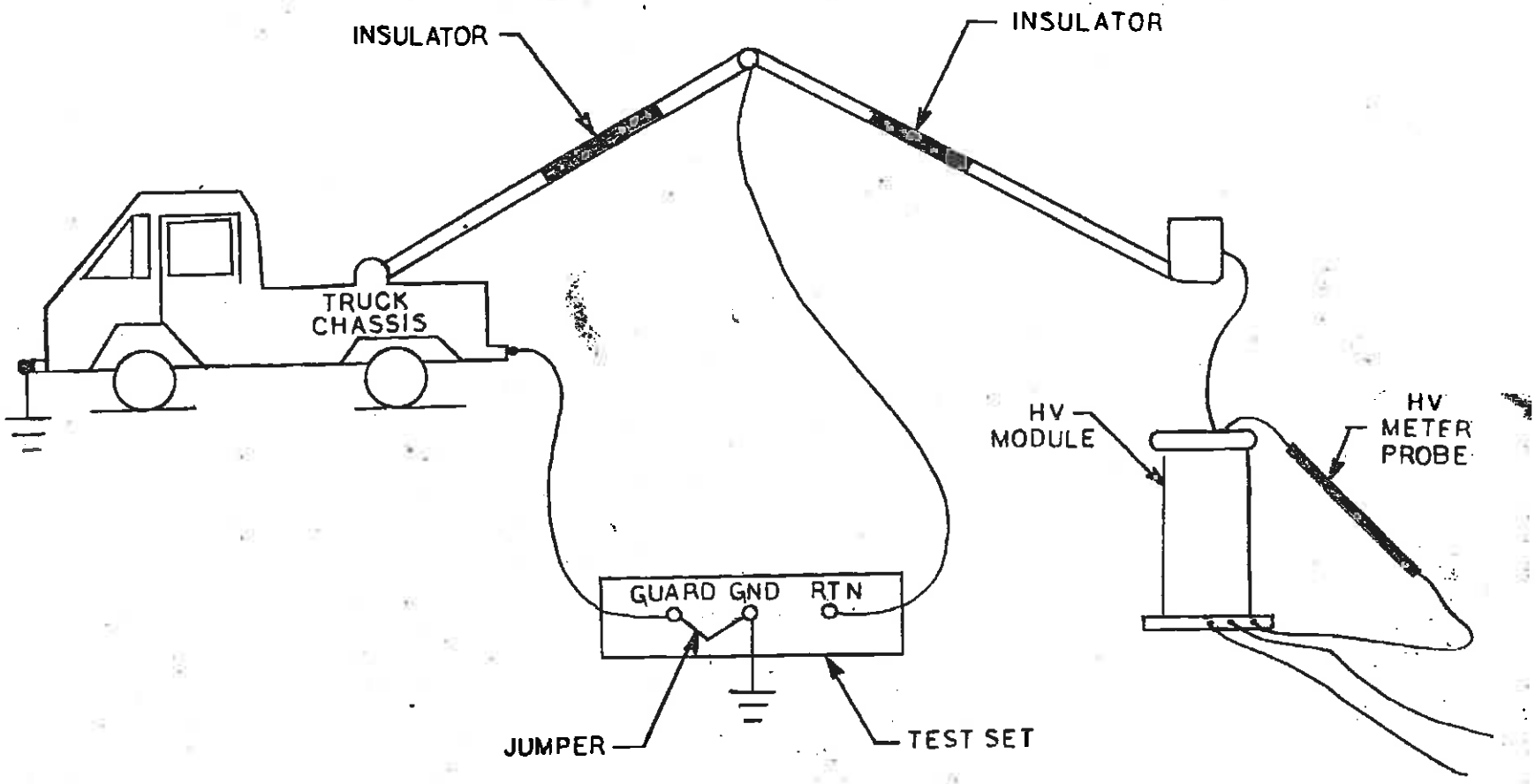
2. Connect the test set to the appropriate input power source.

3. Turn on the AC POWER and the HV ON.

4. With the front panel current meter selector switch on the 1 mA range, raise the output current very slowly until the standard meter reads .8 mA.

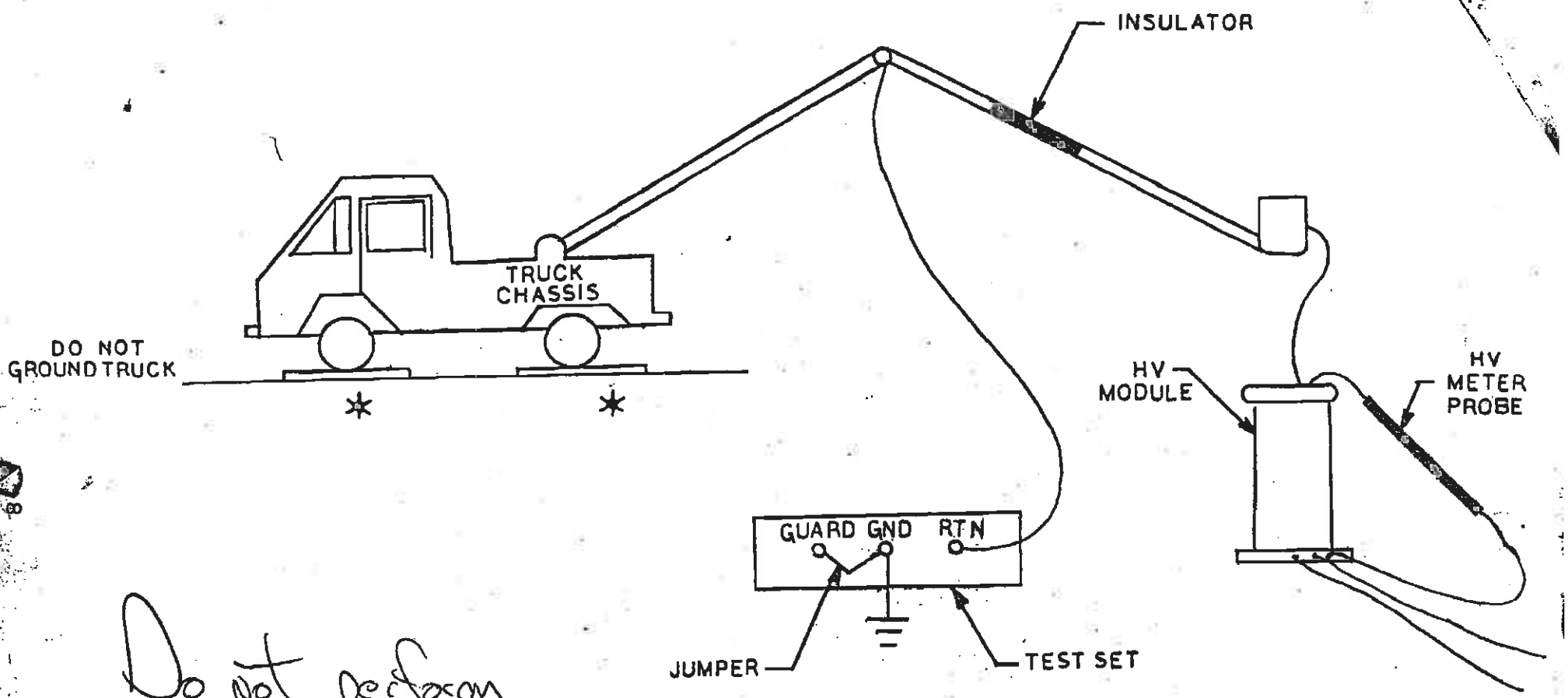
5. Adjust the CM CAL potentiometer on the front panel until the current meter reads .8 mA.

6. Shut the HV OFF and remove the standard meter.



SKETCH 1

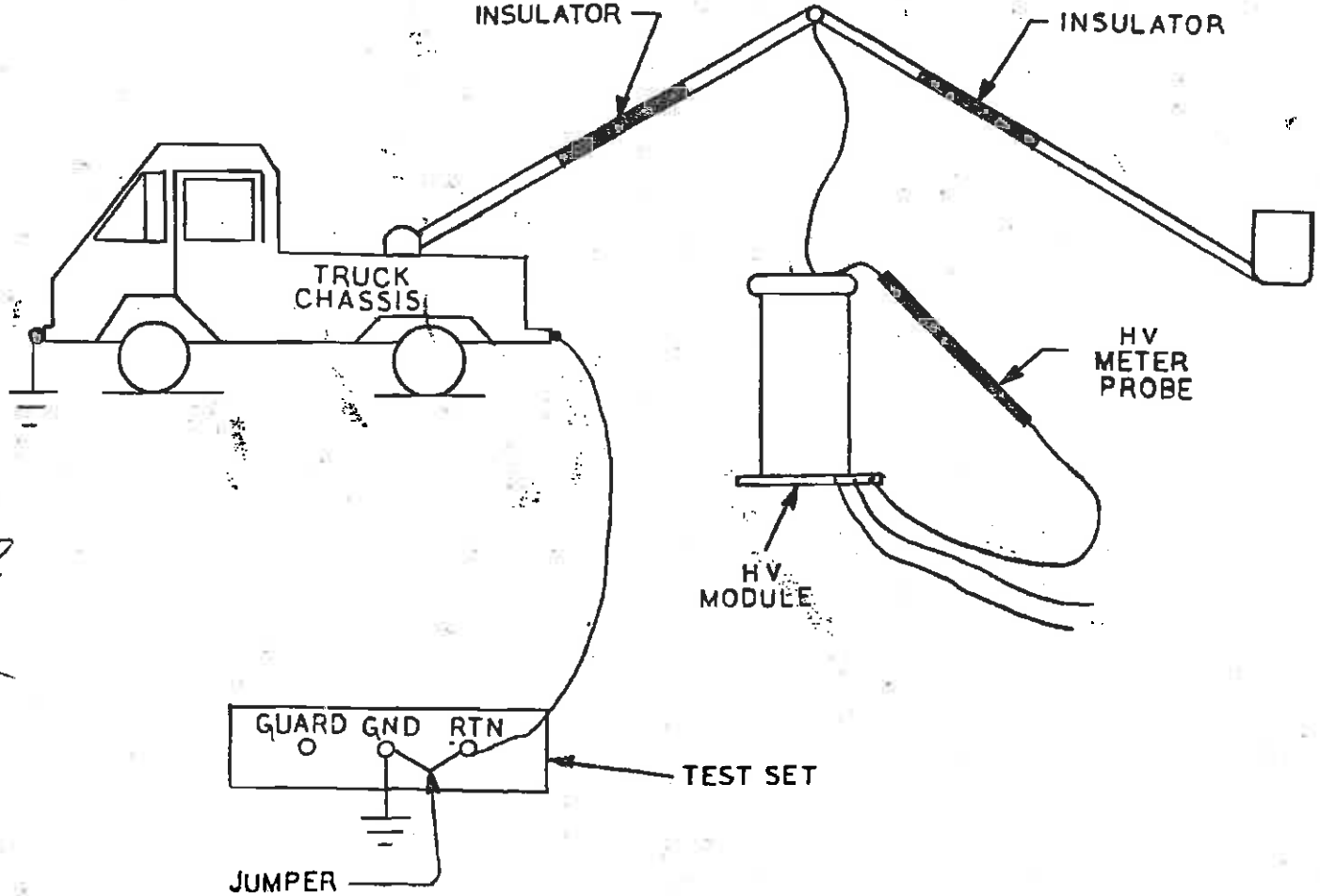
ANSI Test on the upper insulated arm of a double insulated boom truck



Do not perform On Aerial Lift Units

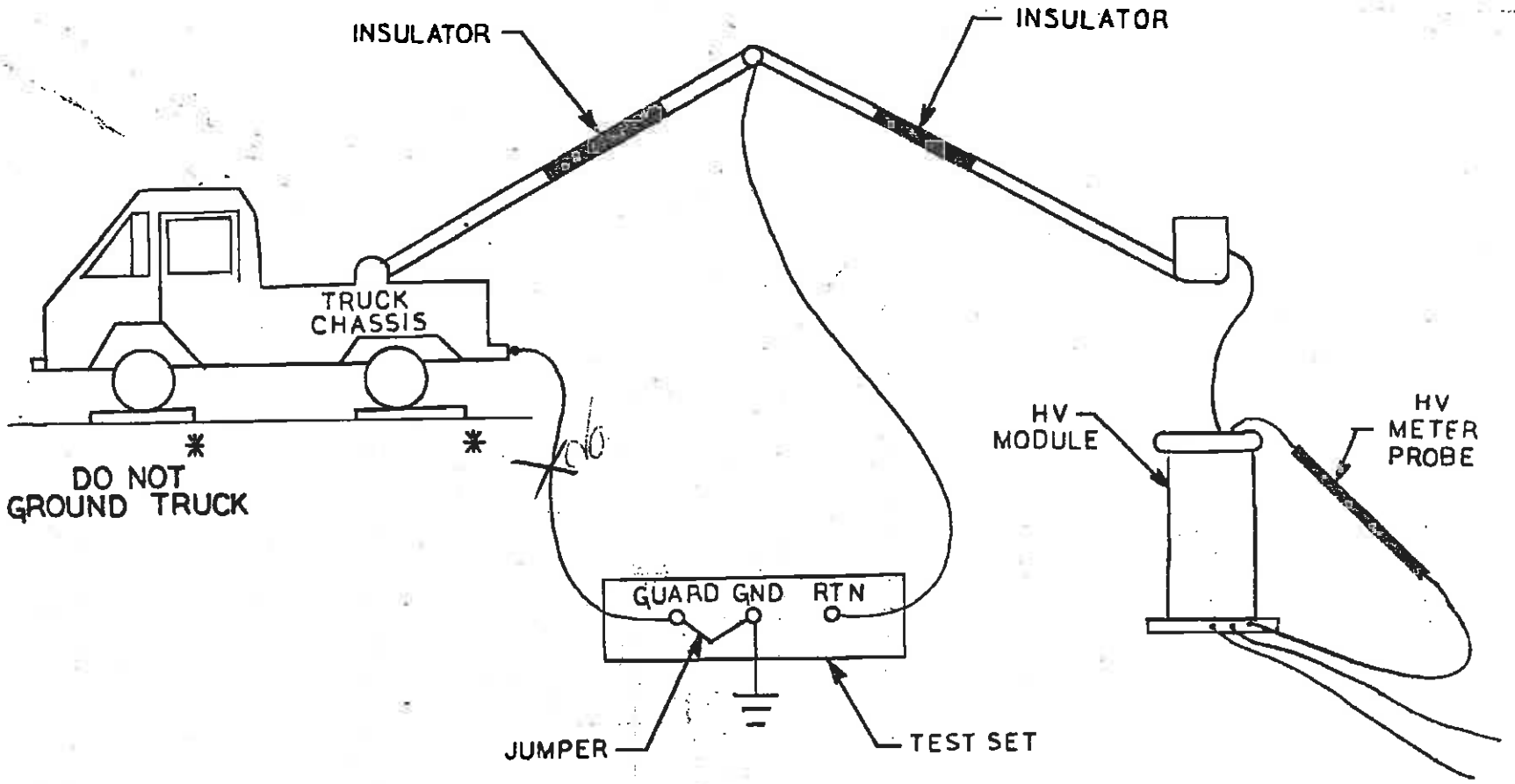
SKETCH 2

ANSI Test on the upper arm of a single insulated boom truck
* Rubber insulated pads may be needed. Conductivity of modern tires will cause current to flow through them to ground possibly causing damage to the vehicle. If the tire insulation quality is unknown, rubber pads should be used.



SKETCH 3

Flash over test on lower insulated arm of double insulated boom truck

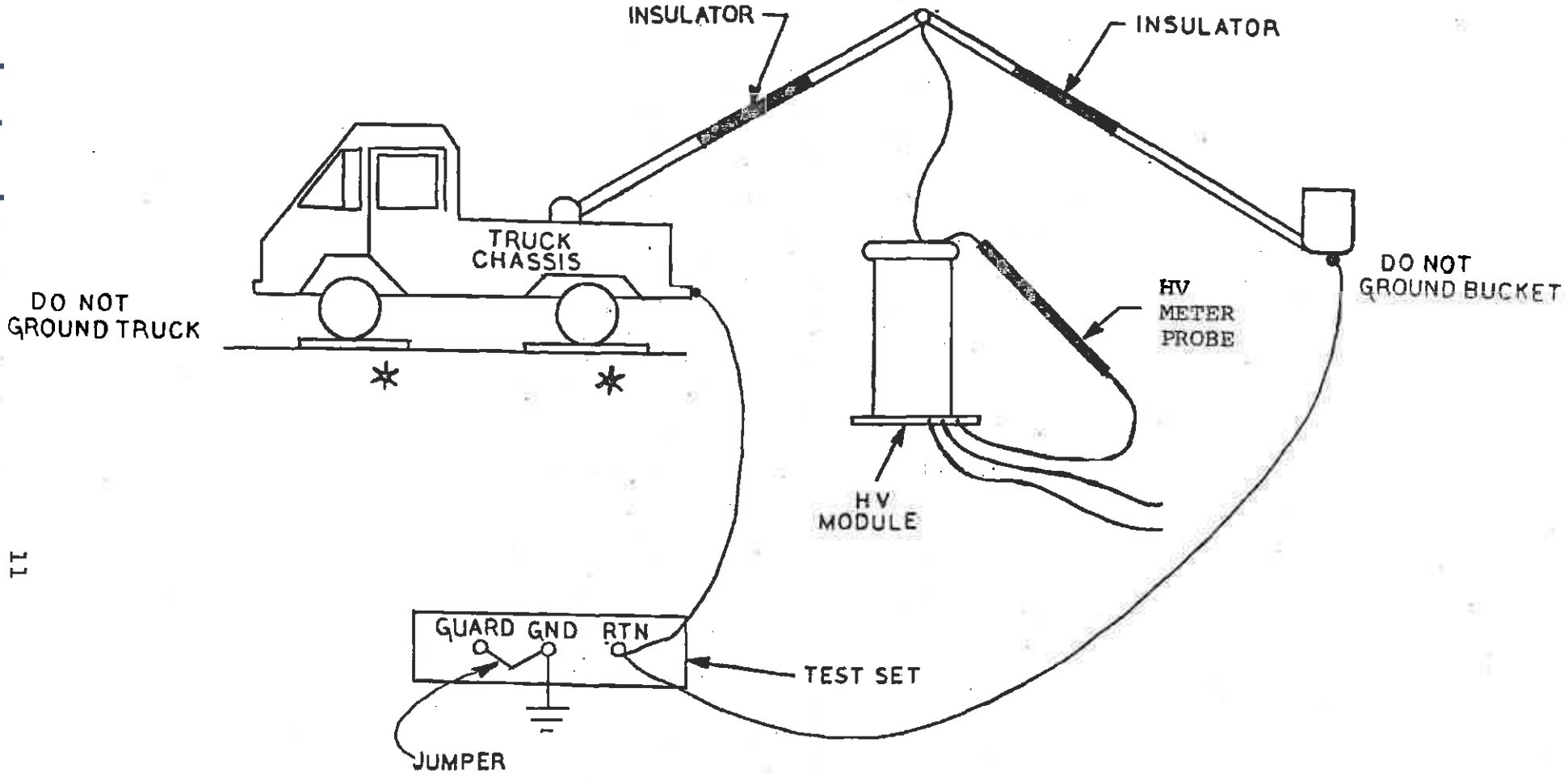


SKETCH 4

do 1st

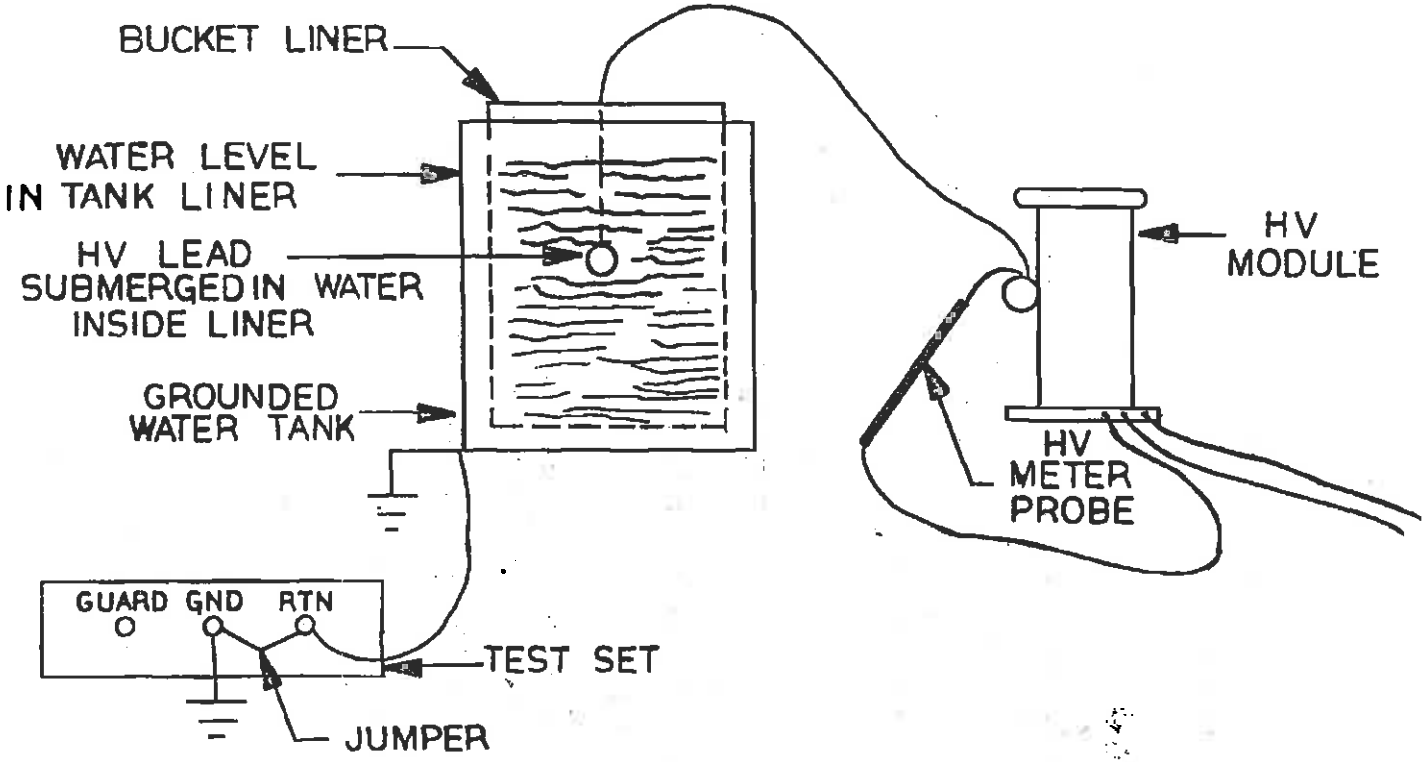
Overall test on double insulated boom truck

* Rubber insulated pads may be needed. Conductivity of modern tires will cause current to flow through them to ground possibly causing damage to the vehicle. If the tire quality is unknown, rubber pads should be used.



SKETCH 5

Phase to phase test on double insulated boom truck
* Rubber insulated pads may be needed. Conductivity of modern tires will cause current to flow through them to ground possibly causing damage to the vehicle. If the tire insulation quality is unknown, rubber pads should be used.



SKETCH 6

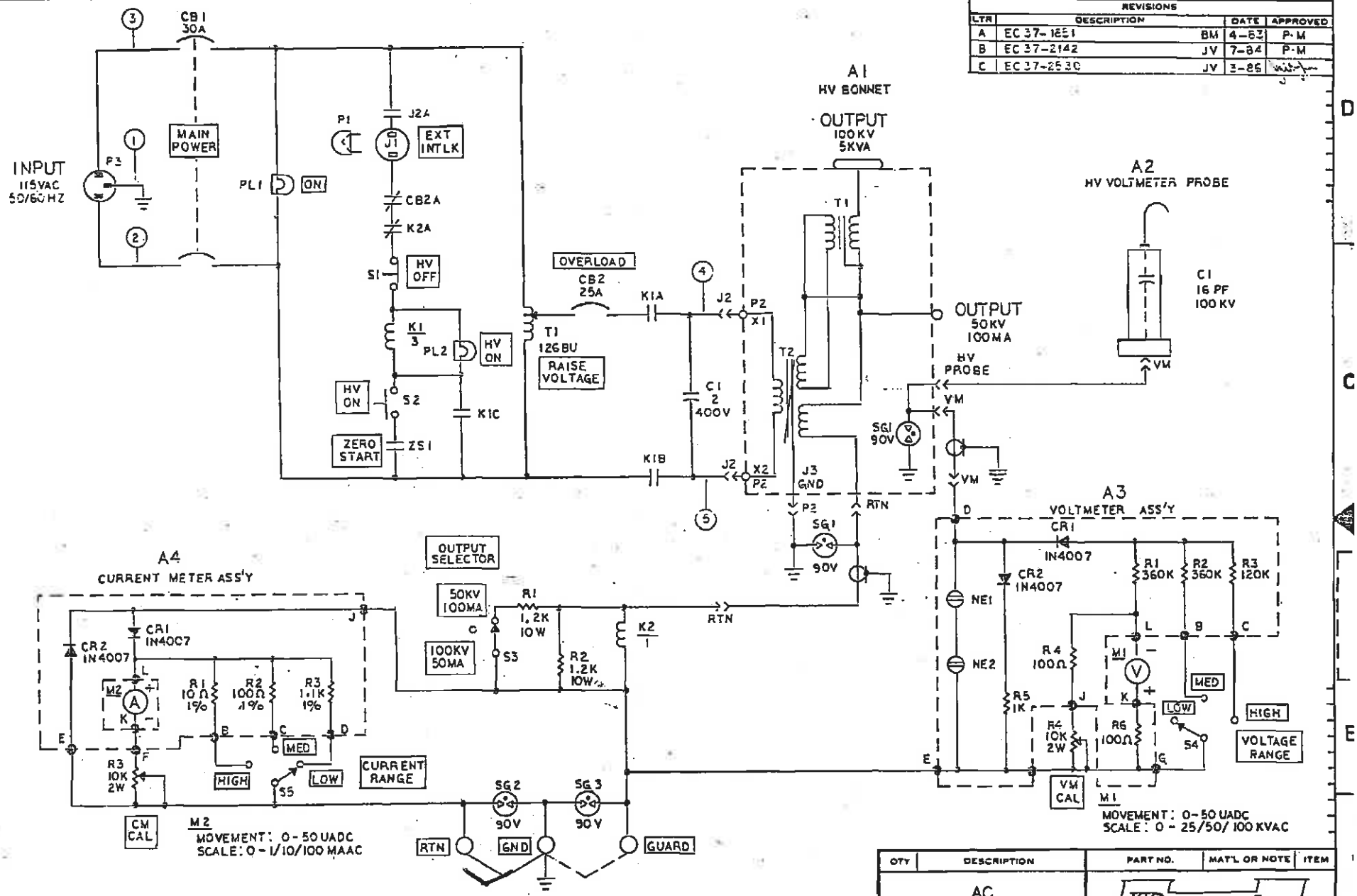
Flash over test on bucket liner in water

PARTS LIST

MODEL NO: 100 HVT
PART NO: CS14-1486

REF.	DESCRIPTION	P/N
A2	SUBASSEMBLY, HV VOLTMETER PROBE	
A2C1	Capacitor, 16 pF @ 100 kV, Hipo	BSR-981-A310
	Connector, BNC, Kings	UG1094/U
	Hook, Brass	AD14-1681
	Adaptor, Brass	AD14-1682
	End Cap, Epoxy	
A3	SUBASSEMBLY, VOLTMETER, P.C.B.	
PCB	FAB, Hipo	30-352
CR1,2	Diode	1N4007
NE1,2	Neon	NE2
R1,2	Resistor, 360 k ohms, 1/2 Watt, 1%	
R3	Resistor, 120 k ohms, 1/2 Watt, 1%	
R4,6	Resistor, 100 ohms, 1/2 Watt, 1%	
R5	Resistor, 1 k ohm, 1/2 Watt, 10%	
A4	SUBASSEMBLY, CURRENT METER, PRINTED CIRCUIT BOARD	
PCB	FAB, Hipo	30-352
CR1,2	Diode	1N4007
R1	Resistor, 10 ohms, 1/2 Watt, 1%	
R2	Resistor, 100 ohms, 1/2 Watt, 1%	
R3	Resistor, 1.1 k ohms, 1/2 Watt, 1%	
	Binding Post, Black, Superior	DF31BC
	Binding Post, White, Superior	DF31WTC
	Binding Post, Gold, Smith	
SG2	Spark Gap, 90 V	
SG3	Spark Gap, 90 V	

REVISIONS				
LTR	DESCRIPTION		DATE	APPROVED
A	EC 37-1651	BM	4-83	P-M
B	EC 37-2142	JV	7-84	P-M
C	EC 37-2530	JV	3-85	



NOTES:
1. INPUT AND FUNCTION SWITCHES SHOWN WITH POWER "OFF".
2. INTERLOCKS AND OVERLOAD CONTACTS SHOWN CLOSED FOR EASE IN TROUBLE SHOOTING.
3. "A" AND "B" LINES SUPPLY CONTROL POWER AND UNLESS OTHERWISE SPECIFIED, CARRY 115VAC.
4. ▭ BOXED ITEMS INDICATE FRONT PANEL MARKINGS.
5. ○ DENOTES TERMINAL BOARD CONNECTIONS.
6. ● DENOTES P/C BOARD CONNECTIONS.
7. ▼ DENOTES WIRE NUMBERS.
8. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/2 W ± 10%.
9. UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN "UF".

QTY	DESCRIPTION	PART NO.	MAT'L OR NOTE	ITEM
	AC DIELECTRIC TEST SET			

Hipotronics
BREWSTER, N.Y.

MAT'L		MODEL NO. 100 HVT	
FINISH	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DWG TOLERANCES	DRAWN J.VARVARA 3/5/85	DWG NO. CS 14-1486 REV. C
	FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ±30'	CHECKED	SCALE SHT 1 OF 1