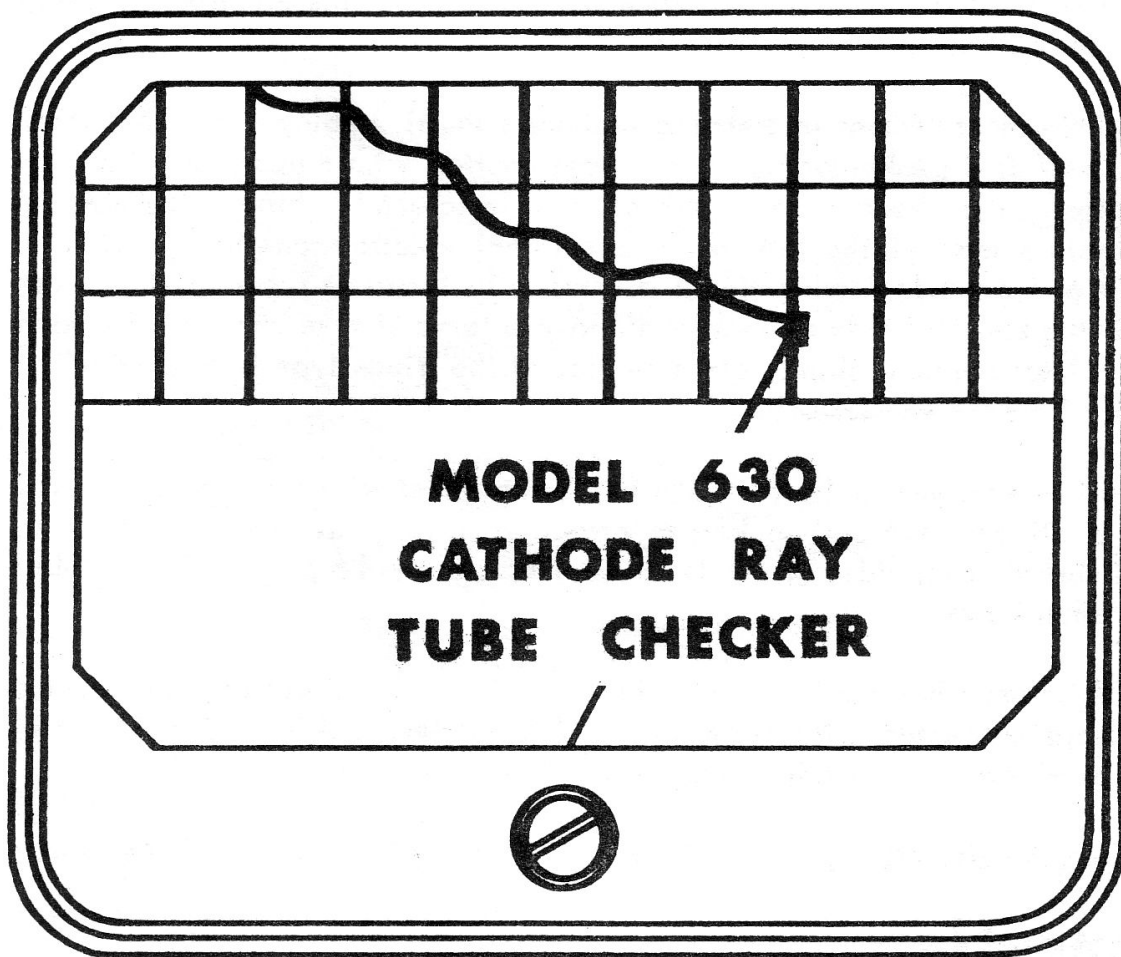


**INSTRUCTION
MANUAL
FOR**



**ELECTRONIC
INSTRUMENT CO., Inc.**

description

The EICO Model 630 Cathode-Ray Tube Checker is a self-contained, easily portable, electronic instrument that reliably detects TV picture tube troubles in the shop or field. It may be used to check all magnetic and electrostatic deflection cathode-ray tubes with either magnetic or electrostatic focussing including those types employed in oscilloscopes and other equipment. The Model 630 operates from the 105 - 125 volts AC, 50/60 cycles line and incorporates the following features:

- 1) Dependable indication of shorted or open elements in the electron gun using a sensitive neon lamp.
- 2) Bridge measurement of emitting cathode condition using the cathode-ray tube itself as a peak-reading vtvm in conjunction with a neon lamp balance indicator. Peak beam current (proportional to screen brightness) is measured in electron guns of the tetrode (conventional electromagnetically-focussed types) and pentode (conventional electrostatic-focussed types) designs, the balancing control being calibrated directly in terms of tube condition for each type. Cathode condition in electron guns of the triode type is determined by means of a peak emission check.
- 3) Test sockets and cables provided for picture tubes with either duodecal (12 pin) or diheptal (14 pin) sockets to cover practically all modern tubes. An octal socket is provided on the panel so adaptors can be plugged in for tubes with other bases.
- 4) TV picture tubes can be tested right in the TV set or carton using test sockets which are connected to the tester by 2 1/2 ft. cables. Cables and sockets may be tucked away in a handy compartment when they are not in use.
- 5) Compact size and light weight: 9 1/2" X 6 1/2" X 3"; 4 1/2 pounds.

operation

- 1) Connect the line cord of the Model 630 to the 105 - 125 volts AC, 50/60 cycles line.
- 2) Attach the appropriate adapter socket to the base of the tube under test.
- 3) Set the TEST SELECTOR switch at G-K (grid cathode) TEST and allow 20 to 30 seconds for the tube cathode to reach operating temperature. Observe the neon lamp and consult the table below for the test result.

NEON INDICATION	TEST RESULT
one half lit both halves lit entirely out	good tube (satisfactory for this test) shorted elements (grid-cathode short) open element (open heater, cathode, or grid -also "air"* tube)

* no longer having a vacuum.

An intermittent condition is detected by tapping the neck of the cathode-ray tube lightly while observing the neon lamp.

4) Set the TEST SELECTOR switch at H-K (heater-cathode) TEST. Observe the neon lamp and consult the table below for the test result. The test result given here are accurate only if the tube has already proven satisfactory in the G-K test. (If the tube has proven unsatisfactory in the G-K test, the tube is defective and further testing is unnecessary.)

NEON INDICATION	TEST RESULT
one half lit both halves lit	good tube (satisfactory for this test) shorted elements (heater-cathode short**)

** In some early sets, heater and cathode were connected together. In this case, tubes showing a heater-cathode short will operate satisfactory.

An intermittent condition is detected by tapping the neck of the cathode-ray tube lightly while observing the neon lamp.

5) If the tube under test has an electron gun of tetrode or pentode design, set the TEST SELECTOR switch at BEAM TEST. (Most tubes have guns with one of these two designs - see list on page 4.) Turn the BEAM CURRENT TEST control knob to its extreme clockwise position, extinguishing the neon lamp. Then gradually advance the setting counter-clockwise until the neon lamp just glows (one side only). When the knob is set at a point on the dial where a slight movement causes the neon lamp to light or go entirely out, it points to the condition of the cathode on the quality scale corresponding to the type of deflection used in the particular tube. The inner scale is used for magnetically deflected tubes and the outer scale for electrostatically deflected tubes. If both halves of the neon lamp glow, a short between the screen or first anode and the cathode is indicated and the tube is defective.

6) If the tube under test has an electron gun of triode design (see list on page 5), set the TEST SELECTOR switch at TRIODE TEST. Turn the BEAM CURRENT TEST control knob to its extreme clockwise position, extinguishing the neon lamp. Then gradually advance the setting counter-clockwise until the neon lamp just glows (one side only). When the knob is set at a point on the dial where a slight movement causes the neon lamp to light or go entirely out, it points to the condition of the cathode on the inner quality scale ("magnetic deflection" scale). To avoid any possible damage to the cathode by performing this test, do not continue this test beyond the time required to take a reading.

Note: Do NOT use the TRIODE TEST position when testing tubes with either tetrode or pentode design electron guns.

additional operating information

"Slow Heater" tubes: Tubes having the defect known as a "slow heater" will give a beam current or cathode emission reading in the LOW region when first tested. After normal filament voltage has been applied to the heater for several minutes (as occurs if the test is continued), the reading will rise to the QUESTIONABLE region and may even (although rarely) rise to the lower part of the GOOD REGION. Such tubes must be judged by the initial reading, for the condition of "slow heating" indicates that failure due to low cathode peak current or emission capability will occur in the near future.

Line Voltage: The Model 630 does not require adjustment to compensate for line voltage variation. It is designed so that 6.3 volts will be applied to the tube heater under load conditions when the line voltage is 117 volts. If the line voltage is lower than 117 volts, then the applied heater voltage will be proportionately less. Likewise, the heater voltage applied to the tube in the TV set is also proportionately less when the line voltage is lower than 117 volts. For this reason, it is desirable to test the tube on the same line the TV set is connected to, as tubes that do not operate satisfactorily at reduced line voltage in a set will more readily be found defective with the Model 630.

High - voltage tests: As tests for shorts or intermittents in the second (high - voltage) anode or the focussing electrode are not significant with only several hundred volts applied, connections to these elements are not provided for any tube. Only testing at the operating potential provided in the TV set or electronic instrument is significant, and providing such high potentials is impractical in a portable instrument. Screen defects will be observable when the tube is operated in the TV set with a raster.

Maintenance Note: If the tube checker fails to operate, check for a loose neon lamp.

TUBES WITH TETRODE OR PENTODE TYPE ELECTRON GUNS

The following tube types have tetrode or pentode guns. Except where noted otherwise, all these tubes have 6.3 volt heaters, are tested using the duodecal socket, and are electromagnetically deflected. No suffix letters are given as they have no bearing on the test. Where special basing is noted to the right of the tube number, see section titled ADAPTORS FOR SPECIAL TYPES and the accompanying basing diagram.

	TYPE	BASING	TYPE	BASING	TYPE	TYPE
**	3BP1		10DP4		16AP4	17LP4
**	3BP4		10EP4		16CP4	17QP4
**	3JP1		10FP4		16DP4	17RP4
**	3JP4		** 10GP4		16EP4	17SP4
**	3JP7		** 10HP4		16FP4	17TP4
*	3KP4	(11M)	10KP4		16GP4	19AP4
*	5AP1	(11N)	10KP7		16HP4	19DP4
*	5BP4	(11N)	12AP4	(6AL)	16JP4	19EP4
**	5CP1A		12CP4		16KP4	19FP4
**	5CP4A		12JP4		16LP4	19GP4
**	5CP7A		12KP4		16MP4	19JP4
	5FP4	(5AN)	12LP4		16QP4	20BP4
	5FP7	(5AN)	12QP4		16RP4	20CP4
	5TP4		12RP4		16SP4	20DP4
	7CP4	(6AZ)	12SP7		16TP4	20FP4
	7DP4		12TP4		16UP4	20GP4
*	7EP4	(11N)	12UP4		16VP4	20HP4
**	7GP4		12VP4		16WP4	20JP4
	7HP4		12YP4		16XP4	21AP4
**	7JP4		14BP4		16YP4	21CP4
	7MP4		14CP4		16ZP4	21DP4
	7MP7		14DP4		17AP4	21EP4
	7MP14		14EP4		17BP4	21FP4
	7QP4		14GP4		17CP4	21KP4
	7RP4		14HP4		17FP4	22AP4
**	8BP4		15AP4		17GP4	24AP4
	9AP4	(6AL)	15CP4		17HP4	24BP4
	10BP4		15DP4		17JP4	27QP4
	10CP4		16ACP4		17KP4	30BP4

* Electrostatically deflected

** Electrostatically deflected - diheptal base

TUBES WITH TRIODE TYPE ELECTRON GUNS

The following tubes have triode electron guns. Except where noted otherwise, all of these tubes have 6.3 volt heaters, are tested using the duodecal socket, and are electromagnetically deflected. No suffix letters are given as they have no bearing on the test. Where special basing is noted to the right of the tube number, see section titled ADAPTERS FOR SPECIAL TUBE TYPES and the accompanying basing diagrams.

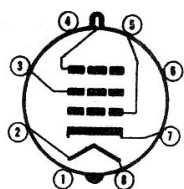
TYPE	BASING	TYPE	BASING
3NP4	(5BV)	12CP4	
7AP4		12VP4	
8AP4		12WP4	(X9)
10MP4		TP400A	(X8)

ADAPTERS FOR SPECIAL TYPES

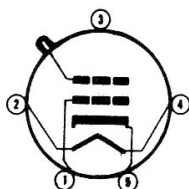
To test tubes not having duodecal or diheptal bases, or not having 6.3 volt heaters, a special adapter is required. This adapter is constructed by wiring a socket of the same type as the tube base to an octal plug by means of a 5 - wire cable. The right-hand column in the table below gives the pins in the octal plug to which the wire-ends at one end of the cable are connected (only 5 pins are connected: 1, 2, 5, 3 and either 6 or 4 depending on the type of deflection). The left-hand column gives the corresponding element in the special tube type to which the opposite end of each wire should be connected. In order to determine which pin or pins correspond to a particular element in the special tube type, the basing diagrams below should be consulted. For those special tube types having a 2.5 volt heater rated at 2.1 amperes, insert a 1.8 ohm resistor in series with one heater lead. To connect the completed adaptor to the Model 630, insert the octal plug into the octal socket on the panel.

Tube Element	Pin No. - Octal Plug
--------------	----------------------

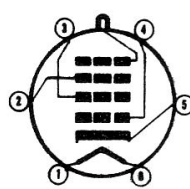
Heater	1
Heater	2
Cathode	5
Grid #1	3
Grid #2 (of magnetically deflected only)	6
Grid #2, (of electrostatically	4
Anode #2 deflected only)	



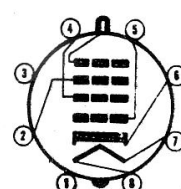
5 AN



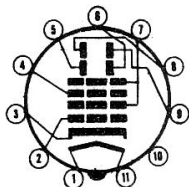
Radial Contact Base
5 BV



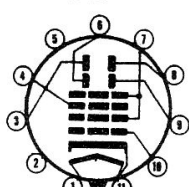
6-Pin Medium Base
6 AL



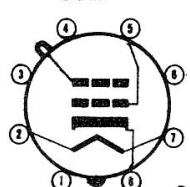
Octal Base
6 AZ



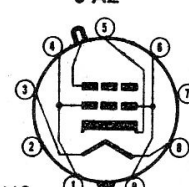
Magnal Base
11 M



Magnal Base
11 N



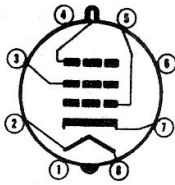
X 8



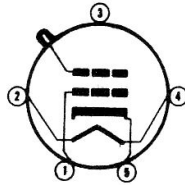
X 9

BASING DIAGRAMS
(BOTTOM VIEW)

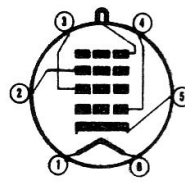
BASING DIAGRAMS (BOTTOM VIEW)



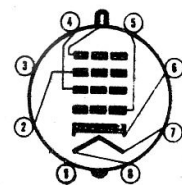
5 AN



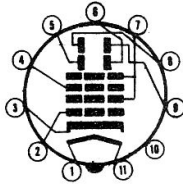
Radial Contact Base
5 BV



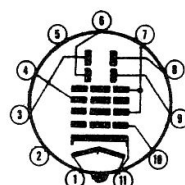
6-Pin Medium Base
6 AL



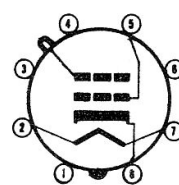
Octal Base
6 AZ



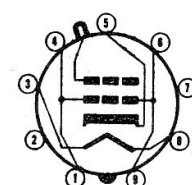
Magnal Base
11 M



Magnal Base
11 N



X 8

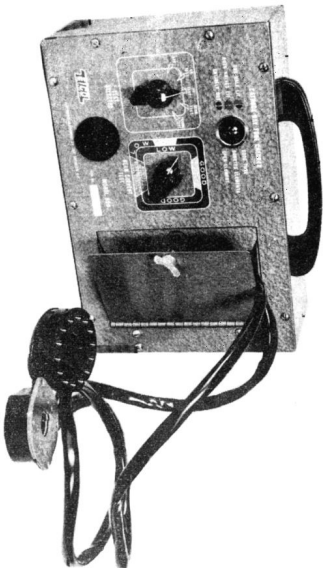


X 9

parts list

STOCK#	DESCRIPTION	Am't.
88016	cabinet	1
81045	panel	1
30011	power transformer	1
53000	bar knobs	2
87000	handle	1
20013	cap., .005 mfd-400V	1
10850	res., 33K Ω , 1W, 10%	1
10400	res., 10K Ω , 1/2W, 10%	1
57000	line cord	1
97706	lamp assembly	1
92004	neon lamp, NE-45	1
60021	selector switch	1
97017	duodecal socket, (12 pins) w/leads	1
97018	diheptal socket, (14 pins) w/leads	1
97013	socket, octal	1
16011	pot., 2M Ω	1
46000	3/8" rubber grommet	3
40001	3/8" hex nut	2
42000	3/8" lock washer	2
42001	3/8" flat washer	2
41000	6-32 X 1/4 screw	3
40000	#6 hex nut	3
42002	#6 lock washer	3
41002	#6 P.K. screw	10
58301	tubing, heavy	2 pcs.
58000	hook-up wire	pc.
81048	cable clamp	1
	instruction book	1

NOTE: When ordering replacement parts, please include all of the following information: 1) part number and description given in parts list; 2) quantity; 3) model number of instrument; 4) serial number of instrument (on panel). This information will expedite the processing of your order and insure your receiving the correct replacement parts.



I.E. 1172 Electronic Inst. Co., Inc.

14 Pin Socket