INSTRUCTIONS

FOR USING THE

"AVO"

VALVE TESTER

BRITISH MADE BY

THE AUTOMATIC COIL WINDER &
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THE "AVO" VALVE TESTER

INSTRUCTIONS FOR USE.

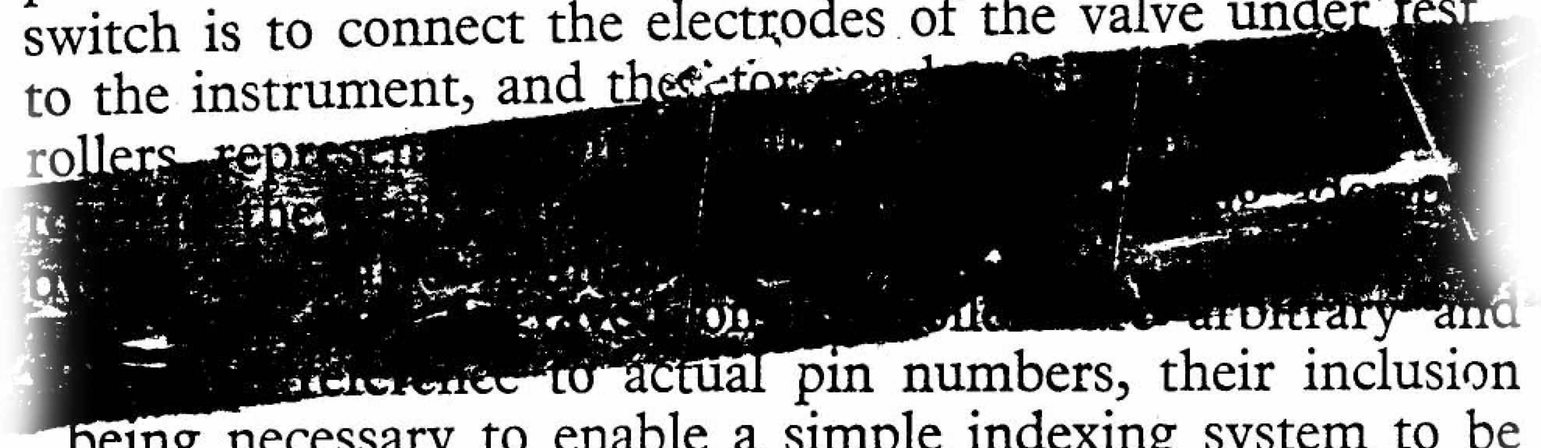
Voltage Supply.

The " Avo " Valve Tester is supplied adjusted to work from 230 V. A.C. mains (unless other instructions have been given).

Adjustments for other mains voltages may be easily carried out by removing the small circular disc underneath the meter unit. This will disclose a paxolin plate with holes marked 200, 210, 220, 230, 240, 250, with a small brass screw screwed into one of them (230). In order to set the instrument for any desired mains voltage it will be merely necessary to remove the brass screw and screw it into the socket marked with the voltage at which the instrument is desired to work.

For accurate results it is essential that the mains voltage tapping be correctly set.

Valve Holder Panel. This panel has one of each type of valve holder in common use at present, and two spare places for future development. The function of the rotary switch is to connect the electrodes of the valve under test to the instrument, and the [illegible] rollers [illegible] arbitrary and [illegible] reference to actual pin numbers, their inclusion being necessary to enable a simple indexing system to be used. In other words, each roller represents a valve pin, and each number on a roller represents an electrode connection to the instrument. Consequently, any roller, and therefore valve-pin, can be connected to any electrode connection in the instrument.



Every valve listed in the data book supplied with the instrument has, in the column next to the type number, a figure containing nine digits, each of which represents a roller. If the rollers are rotated until this figure shows in the window the panel is then set up to receive this particular valve. All rollers not connected to valve pins are set to " 0 " or earth. It should be noted that as the extreme left-hand roller is Pin No. 1, and the next roller

is Pin No. 2, and so on, a four-pin valve must have at least five noughts at the end of its set up figures.

Immediately under each number engraved on the roller is marked the corresponding electrode sign. This enables the operator to set up the number for a valve that is not listed in the data book from the pin connections in the maker's catalogue.

For instance, if we look at the pin connections of an octa frequency changer valve, they will be given as follows :—

Pin No. 1 Shielding.
„ 2 Heater.
„ 3 Anode (Hexode).
„ 4 Screen Grids (G.2, G.4).
„ 5 Oscillator and Mixer Grids.
„ 6 Oscillator Anode.
„ 7 Heater.
„ 8 Cathode.
Top Cap-Control Grid.

From this data, we can set up the nine rollers as follows, reading from left to right :—

0	2	7	5	4	6	3	1	0
E	H—	A2	S	G	A	H+	C	E

Thus we get the number 027546310 which is the number that would be shown in the data book. It will be noted that, as there are only eight electrode connections, the ninth roller is set to "0" or earth. The third roller, corresponding to valve pin No. 3, and therefore hexode anode, is set to A.2 and the sixth roller, representing valve pin No. 6, the oscillator triode anode, is set to "A" or normal anode. This enables the two halves of the valve to be tested by setting the anode selector to normal and A.2 respectively.

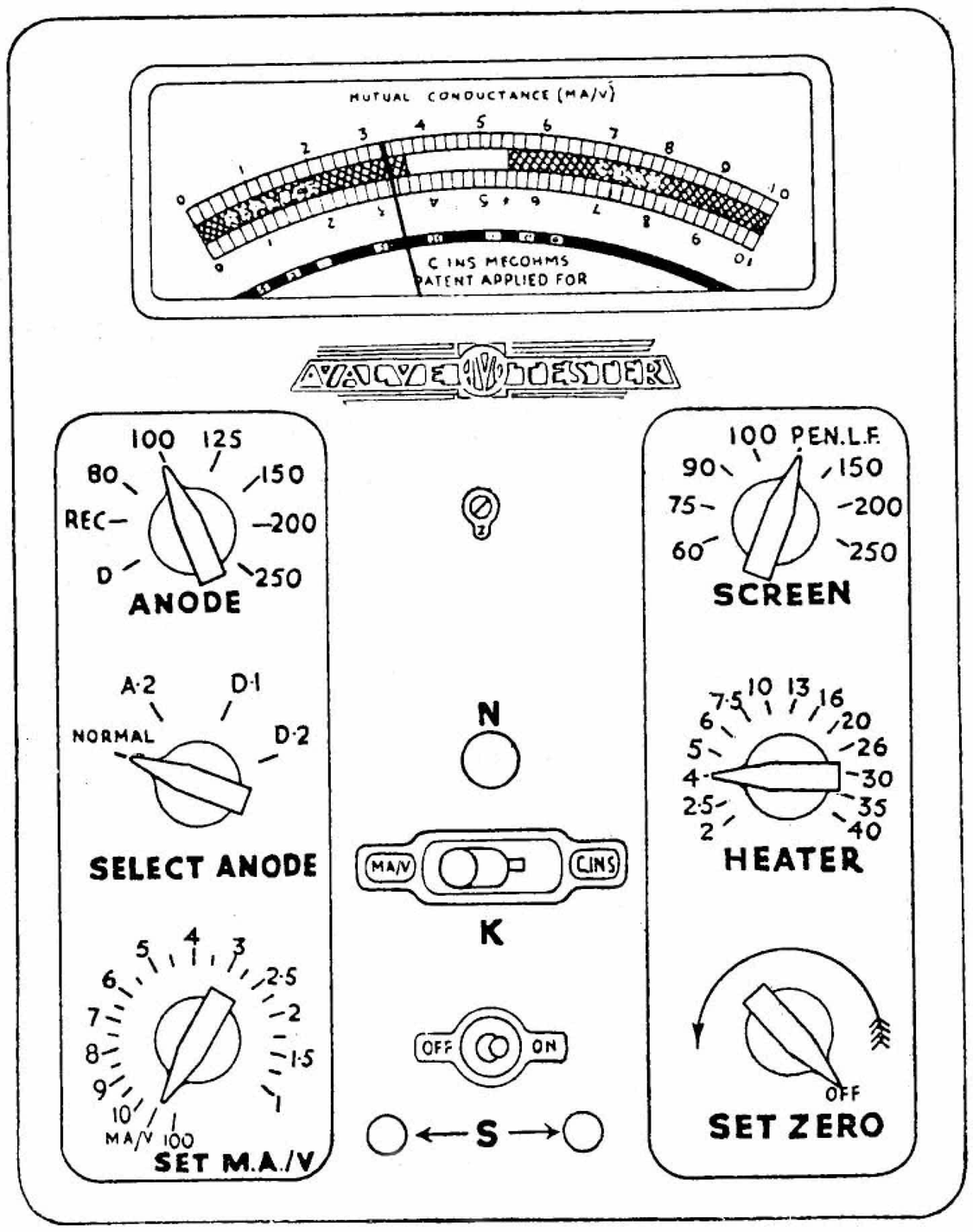
By following this procedure, any valve base arrangement can be set up, it being merely necessary to find the pin connections from the manufacturer's leaflet.

The other columns in the data book are almost self-explanatory. They show respectively the top cap connection, if any, the heater volts (H.V.), the anode volts (A.V.), the screen volts (S.V.), and lastly, the correct mutual conductance for the valve, or in the case of rectifiers the emission figure that should be obtained.

In the case of pentodes having a side terminal, the letter S in the column marked T.C. refers to the side terminal connection which is connected to screen volts.
The connection to the top cap or side terminal of a valve is made by one of the two leads provided having a plug at one end and a spade tag or grid clip at the other end. The plug is inserted into the appropriate socket on the valve holder panel marked A (anode), S (screen), or G (grid).

TESTING A VALVE.

First test the valve for electrode shorts. For this purpose two leads are supplied, one terminating in a crocodile clip and the other in a short prod. These leads should be plugged firmly into the sockets (S) at the foot of the instrument. If now the crocodile clip be clipped on to the anode pin of the valve and the prod touched on the other pins in turn, the neon light (N) will light if leakage is present between the anode and any other electrode. With valves such as pentodes, in which high voltage is applied to the screen, this process should be repeated with the clip



lead clipped on to the screen pin. The strength of the neon glow will indicate the amount of leakage present. *This test is important and should be applied before the valve is inserted in the tester* as a short between anode or screen and another electrode might cause excessive current to be taken from the tester. The above test can be utilised for testing filament continuity. It will be noticed that when the testing leads are not inserted in the sockets (S) the neon lamp merely serves as an indicator to show when the instrument is switched on.

Next, consult the data book to ascertain the set-up figure which should be set up in the window on the panel. Then, *with the instrument switched off*, the correct electrode voltages should be selected by means of the switches on the meter *before the valve is inserted.*

The mA/V control should be set to 100 and, in the case of triodes, screen grid valves, pentodes, etc., the anode selector should be set at " normal."

Now with the valve inserted, and the instrument switched on, the meter needle will rise, indicating the initial anode current of the valve. This current should be backed off to zero by means of the control marked " set zero " and the mA/V control then turned to the position marked " mA/V." The set zero control can now be finally adjusted so that the meter reads zero accurately. If now the key (K) is pressed in the direction marked M.C., the meter needle will rise and indicate on the scale (calibrated 0-10) the mutual conductance of the valve in mA/V. This can be compared with the figure given for a good valve. An alternative method of testing the comparative goodness of a valve is as follows :—When the initial current of a valve has been backed off to zero, consult the chart and note the mutual conductance figure given. The mA/V control should now be set to this figure and the meter needle set accurately to zero. If now the key (K) is pressed in the direction " M.C." the position of the needle on the coloured scale will show the valve as good —indifferent—or replace.

It will be noted that the mA/V control is set to 100 before a valve is tested as a precautionary measure to prevent the initial current of the valve from damaging the meter. If the initial current gives only a small deflection on this scale, the control may be turned to mA/V position before backing off.

If the valve passes these tests satisfactorily, its heater/cathode insulation can be checked by depressing the key in the direction marked " C ins." when the insulation will be shown in megohms on the black scale.
No hard and fast rule can be laid down with respect to a limit value of cathode/heater insulation, but in general with modern valves, this will be found to be several megohms.
A valve may be suspected of causing hum in a set if its insulation resistance is less than 250,000 ohms.
Before measuring the cathode/heater insulation of pentodes, return the screen voltage switch to " 60," otherwise erroneous results might be obtained.
Always return the set zero control to its zero position (as far as possible in a clockwise direction) after a test has been made.
Although no harm will be done if the instrument is left on for long periods it is best to switch off at the end of a test so that a subsequent valve is not accidentally inserted when the wrong heater volts are being applied.

Pentodes. In isolated cases, when testing certain valves of the H.F. and L.F. Pentode types, the initial anode current does not attain a definite maximum but rises gradually, making it difficult to read mutual conductance. A slight reduction of the screen volts below the rated figure will generally cure this trouble, without causing much error in the mutual conductance reading.

Q.P.P. Valves. In the case of Q.P.P. valves, which consist of two pentodes in the same glass envelope, only one set of figures will be found in the data chart. These figures, however, apply to each half of the valve, the two halves being selected by moving the Anode Selector switch to " normal " and A2 respectively.

Class B. Similar remarks apply to Class B. valves, but in this case mutual conductance figures are not often given, and it is sufficient to test the two halves of the valves for matching.

Rectifiers. Rectifiers are tested for emission by setting the mA/V scale to 100 and the anode selector switch to D.1 in the case of a half wave valve, and D.1 and D.2 respectively for the two halves of a full wave valve.
In this test it is not necessary to touch the key or move the mA/V control from 100. The set zero control should be left at its off position during the test. The meter needle

reading will show the emission of the rectifier in milliamps, full scale deflection representing 100 mA. The figure obtained can be compared with the value given in the chart.

Diode Test. H.F. diode and double diode valves are similarly tested for emission with the anode voltage switch set at D. and the mA/V control at mA/V. The emission figure for each diode can then be taken with the anode selector at D.1 and D.2 respectively, full scale representing 10 mA. No definite figure is given but the reading should be greater than 0.5 mA. In general it will be found to be between 1 and 5 mA.

Multiple Diode Valves. With multiple diode valves such as D.D. triode, the figures given in the chart refer to the triode only, which is tested as indicated, with the anode selector at normal. The diodes can be tested by moving the anode selector to D.1 and D.2 and setting the controls as explained in the diode test.

Frequency Changers. Frequency changer valves are tested in two halves, two sets of figures being given on the chart. The first set of figures relates to the oscillator section of the valve, taken with the anode selector at normal. The second set relates to the hexode or pentode section for which the anode selector should be turned to A.2.

American Valves. It will be noticed that the mutual conductance figures given in the American tables are often somewhat higher than those given on the valve makers' lists. This is because the figures given by the makers are dynamic figures, whereas this instrument measures the static mutual conductance of the valve which is generally between 10% and 25% higher than its dynamic equivalent.

Tuning Indicators. These valves are treated as triodes, and increasing screen volts should be applied to the target pin until a fluorescent glow appears. The manufacturers do not give a figure of mutual conductance for the triode section, but as a general rule it is in the neighbourhood of 1.5, and a reading in any way approximating to this will indicate that the valve is in good condition.

Dry Battery Valves. The universal panel includes a modification to enable 1.4 volts to be obtained at the heater sockets for testing the new dry battery valves. Full instructions for use are given in the 1941 Valve Data Book Supplement.

NOTES ON THE USE OF THE ROTARY SWITCH.

Although at the time of this issue all valves have their set-up figure recorded in the data book, it is quite possible that other valves will appear on the market in the future. These can easily be set up by the operator from the pin connections given in the maker's catalogue, always remembering that pin No. 1 is the left-hand roller, pin No. 2 the second roller from the left, and so on.

In the case of heptodes, octodes, triode hexodes, and triode pentodes, the oscillator anode should be set to A (6) and it naturally follows that the reading for this section of the valve will be taken with the Anode Selector switch set to "Normal." The other section of the valve must have its anode set to A.2 (7) and the reading will then be taken with the selector switch at "A.2."

All control grids should be set to G (4), top cap grids being plugged into the *grid socket*.

As "Class B" and Q.P.P. valves are double valves it is necessary to take two readings of mutual conductance, but here again, it is not necessary to set up the connections twice. The grids are coupled together by turning the appropriate rollers to G (4), and the screen grids, if any, by turning to S (5), but if the anodes are set to A (6) and A.2 (7), the two halves of the valve can be measured separately by turning the Anode Selector switch to "normal" and "A.2" respectively.

Valves having a heater with a centre tap taken out to a pin should be set up with the two halves of the heater in parallel and the voltage applied should be the lower of the two usually shown in the makers' catalogue. The centre-tap pin must be set to H—(2), and both heater pins set to H+(3) thus paralleling the two heaters. Great care should be taken when selecting the heater voltage for these valves as the makers do not always make the connections quite clear. For instance, the U.30 is always shown with a series filament and 26 volts, but when being tested in this instrument it *must* have parallel filaments and 13 volts. *This is important.* There are several of this type of valve listed in the data book, and they can easily be distinguished by the fact that their set-up number invariably carries one "2" and two "3's" somewhere on its make-up.

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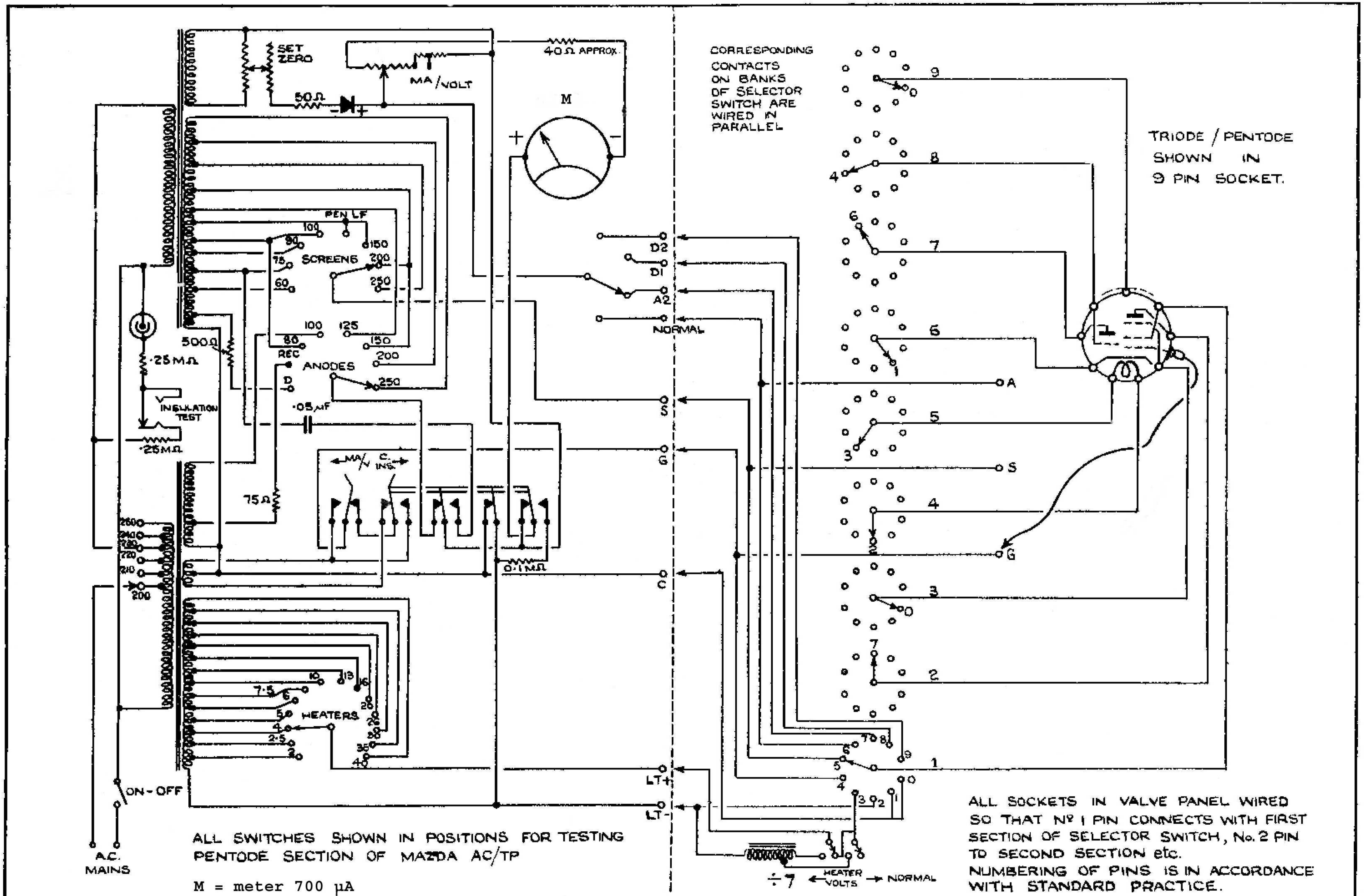


ALL SWITCHES SHOWN IN POSITIONS FOR TESTING PENTODE SECTION OF MAZDA AC/TP

M = meter 700 μA

ALL SOCKETS IN VALVE PANEL WIRED SO THAT Nº 1 PIN CONNECTS WITH FIRST SECTION OF SELECTOR SWITCH, No. 2 PIN TO SECOND SECTION etc. NUMBERING OF PINS IS IN ACCORDANCE WITH STANDARD PRACTICE.

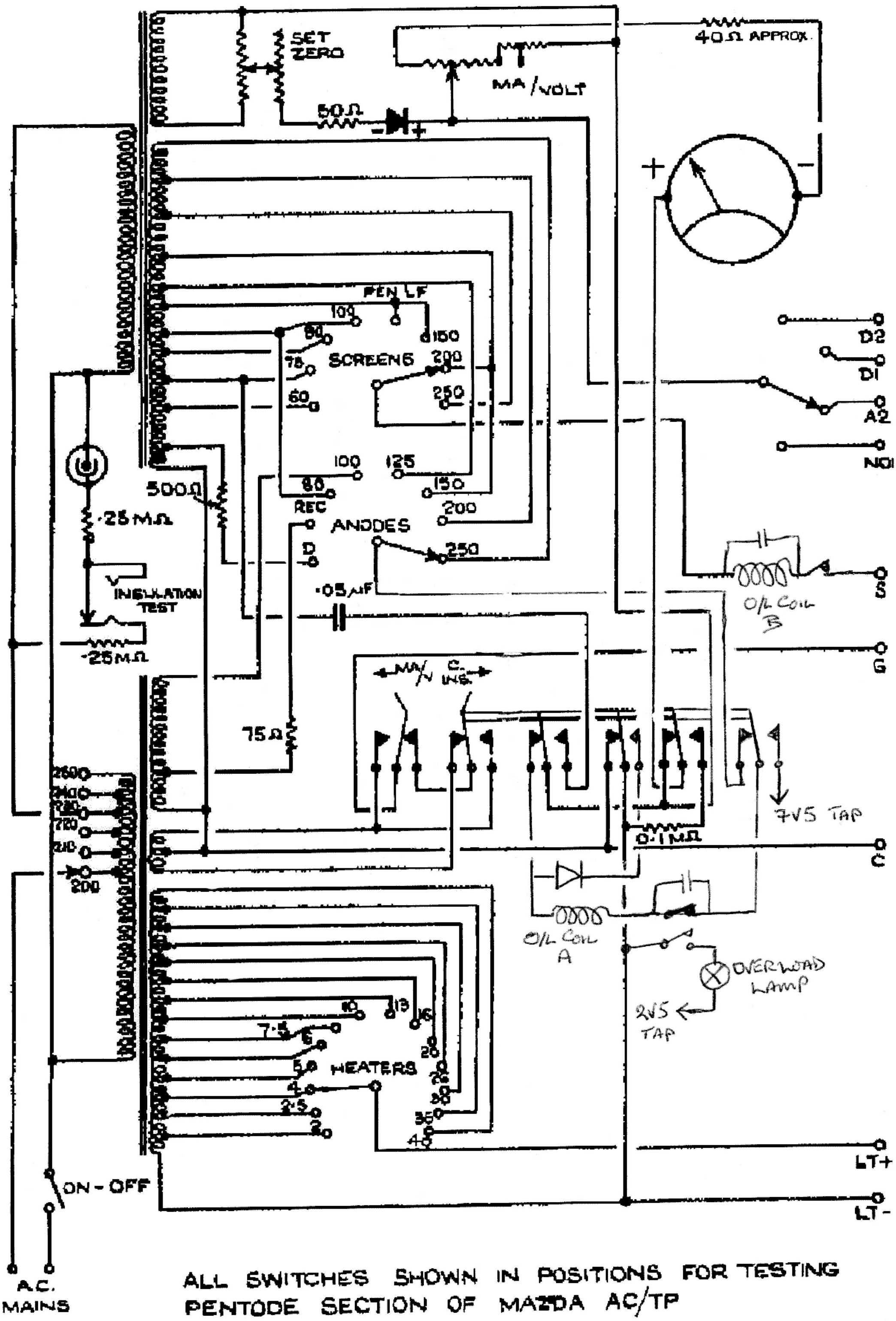
'AVO' VALVE TESTER

M.C.S./F.C.I./T 12A

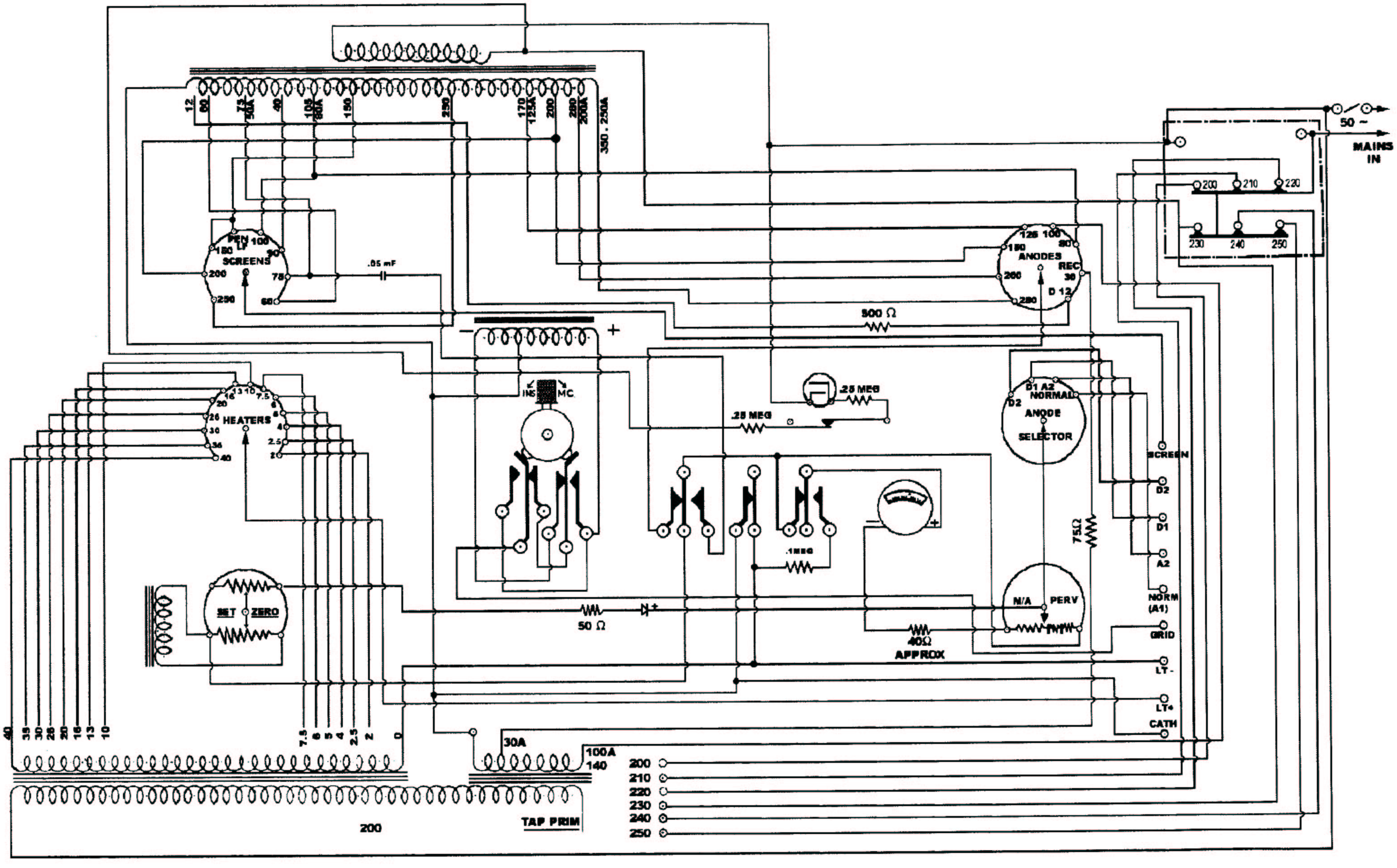
1212.

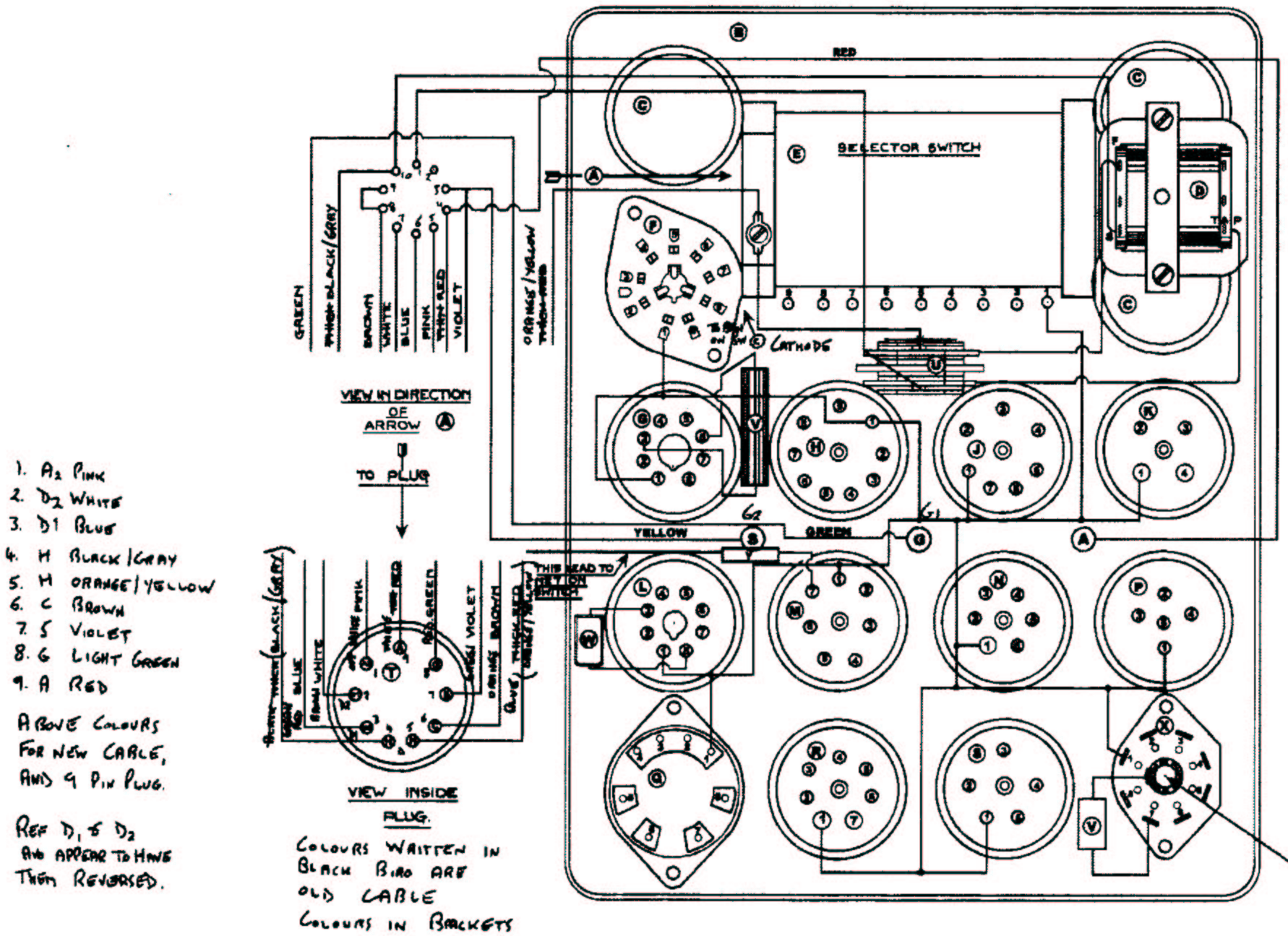
2 PANEL AVO VALVE TESTER

(NAVY VERSION)



ALL SWITCHES SHOWN IN POSITIONS FOR TESTING PENTODE SECTION OF MAZDA AC/TP


12
60
73
30A
40
103
80A
150
250
170
125A
200
280
200A
350 . 250A
SCREENS
PCN
LF
100
150
50
200
75
250
60
.05 mF
500 Ω
ANODES
125
100
150
80
200
REC
30
D 12
280
50 ~
MAINS
IN
200
210
220
230
240
250
HEATERS
16
13
10
7.5
20
8
26
6
30
4
36
2.5
40
2
INS
MC
.25 MEG
.25 MEG
D1 A2
NORMAL
D2
ANODE
SELECTOR
SCREEN
D2
D1
A2
NORM
(A1)
GRID
LT -
LT+
CATH
75Ω
.1MEG
SET
ZERO
50 Ω
M/A
PERV
40Ω
APPROX
40
35
30
26
20
16
13
10
7.5
6
5
4
2.5
2
0
30A
100A
140
200
TAP PRIM
200
210
220
230
240
250



INDEX	DESCRIPTION	PT No.
B	PANEL (BARE)	AVT 100
C	VALVE HOLDER BLANK	A.V.T. 104
D	1-4 VOLT TRANSFORMER	
E	SELECTOR SWITCH	SS 14
F	E F 50 VALVE HOLDER	AVT 95
G	ENGLISH OCTAL	AVT 103
H	ENGLISH 9 PIN	AVT 27
J	CONTINENTAL 7 PIN	AVT 102
K	AMERICAN 4 PIN	AVT 87
L	AMERICAN OCTAL	AVT 82
M	ENGLISH 7 PIN	AVT 28
N	AMERICAN 6 PIN	AVT 85
P	ENGLISH 5 PIN	AVT 29
Q	ENGLISH 8 WAY SIDE CONT	AVT 30
R	AMERICAN 7 PIN	AVT 86
S	AMERICAN 5 PIN	AVT 84
T	9 PIN PLUG	AVT 28
U	2 POLE 2 WAY SWITCH	AVT 113
V	ABOUT .001 M/d. STABILISING COND	
W	STABILISING COND	
X	ORIGINALLY 3 WAY SIDE CONTACT. SINCE 1:4:42 BLANMOR AMERICAN LOCTAL	
Y	100 Ω RESISTANCE	AWD 70
REDRAWN JAN 2002 CHRIS COLEBROOK		

1. A_2 Pink
2. D_2 White
3. D_1 Blue
4. H Black/Grey
5. H Orange/Yellow
6. C Brown
7. S Violet
8. G Light Green
9. A Red

Above Colours For New Cable, And 9 Pin Plug.

Ref D_1 & D_2 Ave Appear To Have Them Reversed.

Colours Written In Black Bird Are Old Cable
Colours In Brackets New Cable.

Colours Printed On Blueprint Are Avo's Colours. New Cable Matched To These Except Heaters

WIRING OF SWITCH CONTACTS 2 TO 9 AS No. 1.

Colour Codes For Valve Pins:

Pin 1 Red
2 White
3 Pink
4 Blk
5 Brn
6 Grey
7 Grn
8 Yel
9 Orange

INSTRUCTIONS

FOR USING THE

"AVO"

VALVE TESTER

Published by AVO LTD.

Avocet House, 92-96 Vauxhall Bridge Road, London, S.W.1

Although the "Avo" Valve Tester has been out of production for some years, the following operational notes will be of assistance to the user not familiar with the instrument, and its employment in conjunction with the "Avo" Valve Data Manual

The "Avo" Valve Tester is supplied adjusted to work from 230 V. A.C. mains. Adjustments for other mains voltages may be easily carried out by removing the small circular disc underneath the meter unit. This will disclose a paxalin plate on which is mounted a screwdriver-operated switch, two terminals and a floating mains lead. In order to set the instrument for operation upon 100-150 V. or 200-250 V. A.C., the floating mains lead is set to the 100 V. terminal for the 100-150 V. range, and the nearest make-up number is set upon the switch. For example, for operation upon 220 V. supply, the floating lead would be set to 200 and the switch set to 20. **For accurate results it is essential that the mains voltage tapping be correctly set.**

The Valve Holder Panel. This panel has one of each type of valve holder in common use, and one or two spare positions. The function of the rotary switch is to connect the electrodes of the valve under test to the instrument, and therefore each of the nine rotatable rollers represents a pin number, and reading from left to right they conform to the standard pin numbering adopted by all valve manufacturers,

with the exception of the eight-pin continental base (F8), for which there appears to be no rigid universal pin numbering. The "Avo" Valve Data Manual shows the pin numbering which we have adopted, the base being viewed from underneath.

The numbers engraved on the rollers are arbitrary and have no reference to actual pin numbers, their inclusion being necessary to enable a simple indexing system to be used. In other words, each roller represents a valve pin, and each number on a roller represents an electrode connection to the instrument. Consequently, any roller, and therefore valve pin, can be connected to any electrode connection in the instrument.

Every valve listed in the "Avo" Valve Data Manual has in the next column to the type number, a figure containing nine digits, each of which represents a roller. If the rollers are rotated until this figure shows in the window, the panel is then set to receive this particular valve. All rollers not connected to the valve pins are set to "0" (earth). It should be noted that as the extreme left-hand roller is Pin No. 1, and the next roller is Pin No. 2, and so on, a four-pin valve must have at least five noughts at the end of its set-up figures. Immediately under each number engraved on the roller is marked the corresponding electrode sign. This enables the operator to set the number for a valve not listed in the Data Manual from the pin connections given in the valve manufacturer's literature.

For instance, if we look at the pin connections of an octal frequency-changer valve, they will be given as follows:

Pin No.	1	Shielding
,,	2	Heater
,,	3	Anode (Hexode)
,,	4	Screen Grids (G.2, G.4)
,,	5	Oscillator and Injector Grid
,,	6	Oscillator Anode
,,	7	Heater
,,	8	Cathode
Top Cap		Control Grid

From this data, we can set up the nine rollers as follows, reading from left to right:

0 E	2 H–	7 A.2	5 S	4 G	6 A	3 H+	1 C	0 E

Thus we get the number 027 546 310, which is the number

that would be shown in the Valve Data Manual. It will be noted that, as there are only eight electrode connections, the ninth roller is set to "0" (earth). The third roller, corresponding to valve pin No. 3 and therefore hexode anode, is set to "A.2" and the sixth roller, representing valve pin No. 6, the oscillator triode anode, is set to "A" or normal anode. This enables the two halves of the valve to be tested by setting the anode selector to "normal" and "A.2" respectively. By following this procedure, any valve base arrangement can be set up, it being merely necessary to find the pin connections from the manufacturer's data.
By ignoring the columns specifically headed "Valve Characteristic Meter," the data applicable to the valve tester is obvious. They show, respectively, the top-cap connection (if any), the heater volts, the anode volts, the correct mutual conductance for the valve, or in the case of rectifiers the emission figure that should be obtained, followed by the type of base, and lastly the type of valve. In the case of valves having a side contact, this should be taken to the socket marked in the top-cap column.

Internal Connection (*)

When the symbol * appears in the selector switch figures, it indicates that the unknown electrode may be connected to a pin internally. To obtain the complete selector switch coding, test with an ohmmeter between the pin marked and all the others (the ohmmeter should be on a sufficiently low range to discriminate between a dead short and the filament resistance). Dependent upon the electrode to which this pin is connected, the correct selector switch code can be set up and the valve tested in the normal manner.
When the pin marked * is open circuit to all the others,

set roller to 0.

When the pin marked * is connected to:

Cathode	set roller to	1.
Heater –	,,	2.
Heater +	,,	3.
Grid	,,	4.
Screen	,,	5.
Anode 1	,,	6.
Anode 2	,,	7.
Diode 1	,,	8.
Diode 2	,,	9.

1.4 Volt Dry Battery Valves

To obtain the filament supply for the 1.4 V. series of valves, set the filament voltage switch to "10 volts" and the toggle switch on the valve holder panel to the "÷7" position. The toggle switch must always be returned to "normal" after such tests have been made. Where the Filament Voltage Extension Unit is used, 1.4 V. can be obtained direct by setting to "1.4 V.," but in these circumstances the "÷7" switch must be left at "normal."

Note.—Some early instruments were not fitted with the "÷7" switch.

TESTING A VALVE

First test the valve for electrode shorts. For this purpose two leads are supplied, one terminating in a crocodile clip and the other in a short prod. These leads should be plugged firmly into the sockets at the foot of the instrument. If the crocodile clip is now clipped on to the anode pin of the valve and the prod touched on the other pins in turn, the neon will light if leakage is present between anode and any other electrode. With valves such as pentodes, in which high voltage is applied to the screen, this process should be repeated with the clip connected to the screen pin. The strength of the glow will indicate the amount of leakage present. This test is important and should be applied before the valve is inserted into the valve tester, as a short between anode or screen and another electrode might cause excessive current to be taken from the tester. The above test can be utilised for testing filament continuity. It will be noticed that when the test leads are removed the neon lamp serves as an indicator to show when the instrument is switched on.

Next, consult the Valve Data Manual to ascertain the figures which should be set in the window of the valve panel. Then, with the instrument switched off, the correct electrode voltages should be set up by means of the switches on the meter panel before the valve is inserted.
The mA/V control should be set at "100" and, in the case of triodes, screen grid valves, pentodes, etc., the anode selector switch should be at "normal."

The valve should now be inserted, and the instrument switched on: the meter pointer will rise, indicating the initial

anode current of the valve. This current should be backed off to zero by means of the control marked "set zero" and the mA/V control should then be turned to the position marked mA/V." The set zero control can now be finally adjusted so that the meter reads zero accurately. If the key is now pressed in the direction marked "mA/V," the meter needle will indicate on the scale marked "0-10" the mutual conductance in mA/V. This can be compared with the figure given in the Valve Data Manual.

An alternative method of testing the comparative goodness of a valve is as follows: When the initial current has been backed off to zero, consult the Valve Data Manual and note the mutual conductance figure given. The mA/V control should now be set to this figure and the meter needle set accurately to zero. If the key is now pressed in the direction marked "mA/V," the position of the needle on the coloured scale will show the valve as "good," "indifferent" or "replace."

It should be noted that the mA/V control is set to "100" before a valve is tested as a precautionary measure to prevent the initial anode current of the valve damaging the meter movement. If the initial current gives only a small deflection on this scale, the control may be turned to the "mA/V" position before backing off.

Valves with a Mutual Conductance of less than 1

The introduction of the 1.4 V valves series has resulted in a great increase in the number of valves with a mutual conductance of less than 1 mA/V. Most of these valves cannot be tested on the comparative scale using the coloured zones because the mA/V control is not calibrated below 1 mA/V, and when using the normal mA/V scale a small deflection is obtained since the full-scale deflection is 10 mA/V.

Such valves may be more easily tested for a direct reading of mutual conductance by setting the mA/V control to "1" and then proceeding as if testing in the normal manner. The full-scale deflection will then represent 1 mA/V, the 0-10 scale being used, which should be divided by 10.

If the valve passes these tests satisfactorily, its heater/cathode insulation can be checked by pressing the key in the direction marked "C ins." when the insulation will be shown in megohms on the black scale. A valve should be suspected of causing hum if its insulation resistance falls below 250,000 ohms.

Before measuring heater/cathode insulation the screen voltage switch should be turned to "60," otherwise erroneous results might be obtained.
Always return the set zero control to its zero position (clockwise) after a test has been made.
Although no harm will be done if the instrument is left on for long periods, it is best to switch off at the end of a test so that a subsequent valve is not accidentally inserted when the wrong heater volts are applied.

Pentodes. In some isolated cases, when testing certain types of pentode valves the initial anode current does not attain a definite maximum but rises gradually, making it difficult to read mutual conductance figures. A slight reduction of screen volts will generally cure this trouble, without causing any appreciable errors.

Twin Triodes and Pentodes. The mutual conductance figures should be checked with the anode selector at "normal" and at "A.2." Where no mutual conductance figure is given, each half of the valve should be checked for matching of mutual conductance.

Diodes. These should be tested with the anode volts control at "D" and the mA/V control at "mA/V." The anode selector switch should be at "D.1" (in the case of a single diode) or at "D.1" and "D.2" in the case of a double diode. The full-scale deflection of the instrument is then 10 mA. Readings should be greater than 0.5 mA and in general it will be found that readings will be between 2 mA and 5 mA.
Where the symbol ' † is found in the selector switch code, the roller should be set to 7; the third diode can then be tested with the anode selector in the "A.2" position.
Where "D.1" or "D.2" appears under the column "top cap," the top cap should be connected to the "A" socket on the panel; the diode can then be tested with the anode selector in the "normal" position.

Diode-Pentodes and Diode-Triodes, etc. (valves with an electrode assembly in addition to the diode section). The mutual conductance of the triode or pentode section is checked with the anode selector in the "normal" position. The diode sections are then tested as indicated in the previous paragraph.

Rectifiers. To test rectifying valves for emission, set the mA/V control to "100" and the anode volts switch to "Rec." Emission of each anode (in the case of full-wave rectifiers) will be obtained by setting the anode selector to "D.1" and "D.2." The emission of the two halves (in the case of full-

wave rectifiers) should match within small limits and can be compared with the figures given in the Valve Data Manual.

Frequency Changers. To test frequency changers, two sets of figures are given. First check the triode section (oscillator) with the anode selector at "normal" and then the pentode (mixer) section with the selector switch at "A.2."

Note.—When checking the triode section, the screen volts switch should be set to "60"; this reduces the screen current when the anode voltage is removed from the mixer section and is transferred to the triode section.

NOTES ON THE USE OF THE ROTARY SWITCH

Although at the time of issue all valves have their selector switch figures recorded in the Valve Data Manual, it is quite possible that other valves will appear on the market in the future. These can easily be set up by the operator from the pin connections given in the valve manufacturer's literature, always remembering that Pin No. 1 is the left-hand roller, Pin No. 2 is the second roller from the left, and so on.

In the case of heptodes, octodes, triode-hexodes and triode-pentodes, etc., the oscillator anode should be set to "A" (6), and it follows that the reading for this section of the valve will be taken with the anode selector switch set to "normal." The other section of the valve must have its anode set to "A.2" (7), and the reading will then be taken with the anode selector switch at "A.2."

All control grids should be set to "G" (4), top-cap grids being plugged into the grid socket.

In the case of twin electrode assembly valves, it is necessary to take two readings of mutual conductance, but it is not necessary to set up the selector switch twice. The grids are coupled together by turning the appropriate rollers to "G" (4), and the screen grids (if any) by turning to "S" (5); but if the anodes are set to "A" (6) and "A.2" (7), the two halves of the valve can be measured separately by turning the anode selector switch to "normal" and "A.2" respectively.

Valves having a heater with a centre tap taken to a pin should be set up with the two halves of the heater in parallel and the voltage applied should be the lower of the two shown in the manufacturer's data. The centre-tap pin must be set to "H −" (2), and both heater pins set to "H +" (3), thus paralleling the two heaters. Great care should be taken when selecting the heater voltage for these valves, as the

manufacturers do not always make the connections quite clear. For example, the U30 is always shown with a series heater and 26 volts, but when being tested on this instrument it must have parallel heaters and 13 volts. This is important. There are several examples of this type of valve listed in the Valve Data Manual, and they can easily be distinguished by the fact that their selector switch invariably has in it one "2" and two "3's" or two "2's" and one "3."

ACCESSORIES FOR THE "AVO" VALVE TESTER

Adaptors. If the panel does not carry the valve base required, it is necessary to use an adaptor which plugs into an existing valve holder. These are supplied as follows:

No. 1 B7G and B8A
,, 2 B9G
,, 3 B8B
,, 4 B3G, SM4 and SM5
,, 5 Blank (for special valves)
,, 6 Sm7 (6A7 base)
,, 7 B9A
,, 8 F8 (Continental eight-pin)
,, 9 B7A

Special Note for use with Adaptor No. 2. When using data contained in the Valve Data Manual in conjunction with Adaptor No. 2, Pin No. 1 must be connected to "H+" (3) and Pin No. 8 connected to "H−" (2). In these circumstances most types will show a heater-cathode short which can be ignored. Apart from the heater connections referred to, all other set up figures remain as printed, but Pin No. 9 should be connected to "0" (earth).

Example. EF50: Using Valve Base Adaptor No. 2, selector switch code will read 356 101 420 and not as stated in the Valve Data Manual.

"AVO" VALVE DATA MANUAL

The "Avo" Valve Data Manual lists all available data for use with this instrument. Ensure that you always have a current copy.

IMPORTANT NOTE REGARDING THE LIMITATIONS OF PERFORMANCE

The "Avo" Valve Tester was introduced in 1936 and does not therefore produce all the information required today by service engineers. Moreover, many recently introduced valves cannot be tested due to parasitic oscillation, whilst for others it is impossible to obtain data from valve manufacturers in the form required by this instrument.

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