

University

INSTRUCTION MANUAL

for

VALVE TESTER Model TVT

and

VALVE & CIRCUIT TESTER Model TST/2

MANUFACTURED BY

UNIVERSITY GRAHAM INSTRUMENTS PTY. LTD.

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University

Model T.V.T. Valve Tester



TVT Price : \$ 88-00

(+ Sales tax if applica

This instrument has been developed to fulfil the requirements of a completely flexible method of testing modern radio and television valves. It incorporates lever switches for element selection, which enables it to test any future types of valves, regardless of their base connections.

A masking plate covers three spare socket holes in the front panel to enable additional sockets to be fitted should new types come into use.

The unit is 240V A.C. operated and incorporates a University Model W4 polystyrene meter and comes complete with instruction book and all necessary data.

Size: 14" x 11" x 6".

Picture Tube Adaptor.

These flexible adaptors allow T.V. tubes to be tested without removing them from the T.V. Receivers.

For 90° tubes Model TV2.
for 110° " Model TV10.

Price : \$ 4-00 ea.
Price : \$

(+Sales tax if applicable)

OPERATING INSTRUCTIONS FOR THE "UNIVERSITY"
MODEL TVT VALVE TESTER AND THE TST/2 VALVE
AND CIRCUIT TESTER.

GENERAL

This instrument has been developed to fulfil the requirement of a completely flexible method of testing modern radio and television valves. It incorporates lever switches for element selection, which enables it to test any future types of valves regardless of their base connections.

A masking plate covers three spare socket holes in the front panel to enable additional sockets to be fitted should new types come into use.

The principle of testing conforms to standard RMA practice.

CONTROLS

"LINE" This control is situated in the bottom left hand corner of the front panel and its purpose is to compensate for varying line voltages.

FILAMENT VOLTS "A" Filament volts are selected for the valve under test by two switches, which are situated next to the "LINE" switch on the bottom of the front panel. The filament voltages available are from 0.6 to 117, the first switch selecting up to 12.6 volts and the second switch the higher voltages.

To obtain filament voltages above 12.6 it is necessary to turn the first filament switch to "HIGH VOLTS", then the second switch is set to the voltage required. Until the first is in the "HIGH VOLTS" position the second switch is inoperative.

ELEMENT SELECTOR "B-C-D" The element selector takes the form of ten lever switches, numbered from 1 to 10. Each of the switches from 1 to 9 represents the pins of a valve, the number above each switch from 1 to 9, corresponding to the pin numbers of the valve, according to standard valve numbering practice, and switch 10 represents the "TOP CAP".

This form of switching enables the tester to switch any valve connection to any test position, or in the case of a valve having an internal connection or tapped heater to completely isolate a valve pin.

The letters "B", "C" & "D" refer to the test positions to which valve elements may be switched. These test positions are given in the valve testing tables.

When the lever switches are in the "NORMAL" position they are connected together to one side of the heater voltage. Normally all elements are left in this position with the exception of the element nearest the cathode and one heater connection.

Position "B" is the heater connection and one heater pin is switched to this position.

Position "C" is an open circuit position and any valve pin which has an internal connection which may tend to interfere with testing is switched into this position.

Position "D" This is the "TEST" position. The element which is nearest to the cathode inside the valve is switched into this position and the tester applies a voltage to it for emission testing. Results are indicated directly on a three coloured scale marked good, questionable and bad.

TEST SELECTOR "E" This switch is situated fourth from the left on the bottom of the front panel, and its purpose is to select the test function required.

When switched to "LINE", the meter indicates line voltage, and the "LINE" switch should be set to a position to make the meter pointer reach the arrow at full scale deflection.

This test should be carried out with the valve under test in position.

In the "SHORTS" position the instrument will indicate shorts between any elements in the valve under test. To enable selection of shorts which may only occur when the cathode is heated, after applying filament voltage to the appropriate pin, the heater will warm up and each remaining lever switch in turn may be moved to the "TEST" position. The neon lamp will then indicate any continuous path between elements in a tube. When the levers corresponding to the second or other filament connections are operated, the lamp should light, indicating filament continuity. So this will not be mistaken for a short circuit, the levers corresponding to other filament connections are indicated at the left hand side of the column marked "SHORTS INDICATION" in the data sheets. Some modern tubes have one or more internal connections linking certain base pins. In order that these may be distinguished from actual short circuits, the number of any levers which should produce a glow in the neon lamp are also listed in the "shorts indication" column. Should the lamp glow when levers other than those listed in this column are moved to the "TEST POSITION" a short circuit exists in the valve and no attempt should be made to apply an emission test.

The positions "1", "2" and "3" of switch "E" are the test positions for emission, and in general position "1" tests diode plates and small battery valves with limited emission and TV picture tubes. Position "2" tests all general purpose R.F. pentodes, tetrodes, triodes etc., and position "3" all power valves and power rectifiers.

RANGE "F" The range potentiometer is situated in the bottom right hand corner of the front panel and its function is to correctly adjust the meter sensitivity. So that average new valves cause the pointer to register near the right hand end of the "GREEN" portion of the meter scale, valves which are better than average may cause the needle to read full scale deflection or ~~move~~ slightly beyond the green segment.

TOP CAP The top cap lead supplied with the instrument is plugged into the socket marked "TOP CAP" and is connected to those valves fitted with caps, prior to testing.

1. See that all lever switches are in the "NORMAL" positions.
2. FILAMENT VOLTS Switch "A" to correct voltage as shown in column "A" of valve tables.
NOTE: For voltages exceeding 12.6, the left hand "A" switch must be turned to "HIGH VOLTS".
3. Determine from "B" column in valve tables the pin number for one filament connection and move correspondingly numbered lever switch to "B" filament position.
4. Plug valve to be tested into appropriate socket.
5. Set "E" switch to "LINE" and adjust "LINE" switch to set meter pointer to arrow at full scale deflection.
6. Set "E" switch to "SHORTS" and test for shorts by setting each lever switch in turn to "D" "TEST" position, returning each switch to "NORMAL" after observing whether or not the lamp lights. It is not necessary to move the lever already in the "B" FILAMENT" position.

The lamp will normally glow when a lever corresponding to the second end of the filament or a filament tap is brought to the "TEST" position. To distinguish the normal glow indicating the filament continuity from a short circuit, base pins corresponding to filament connections which should produce a glow are listed on the left hand side of the shorts indication of the chart.

7. Refer to column "D" of valve tables and throw corresponding lever to "D TEST" position.
8. Set control "E" to position "1", "2" or "3" as indicated in "E" column in valve table.
9. Advance control "F" to number indicated in "F" column and observe condition of valve on meter scale.
10. Remove valve and return controls to "NORMAL" or off.

NOTE: To avoid any chance of danger to meter it is important that valve is removed before the lever switched to "B FILAMENT" is returned to "NORMAL".

In the case of centre tapped heaters the lever corresponding to the centre tap should be used and voltage should be that applicable to parallel operation of the heater halves.

TESTING NEW TYPE VALVES (not shown on chart)

1. Set FILAMENT VOLTS to correct position for valve as determined from published data books.
2. Select one heater pin and switch lever switch corresponding to this pin to "B FIL" position.

In the case of centre tapped heaters the lever corresponding to the centre tap should be used and the voltage should be that applicable to parallel operation of the heater halves.

3. Plug in valve and adjust "LINE" switch.
4. Set "E" switch to shorts and carry out shorts test in the normal manner by setting each lever switch in turn to "D TEST" position.

Base connections in a valve data book will reveal any internal connections which should produce an indication.

5. The emission can be tested by determining from a valve data book the lever switch with the number corresponding to the element closest to the tubes filament or cathode.

In all ordinary types of tubes this will be the control grid. In frequency changers it will be the oscillator grid and in diodes and rectifiers, it will be the diode plates.

6. Switch "E" should be set to position 1 for diodes, to position 2 for all battery tubes and for ordinary A.C. operated amplifying tubes, and to position 3 for A.C. operated power output tubes and rectifiers.
7. Slowly advance "F RANGE" control to a position to give a "GOOD" valve reading on the meter scale. This setting should be obtained with a valve known to be good and recorded for future use.
8. Remove valve, then return all switches to "NORMAL".

TST/2 MULTIMETER SECTION

The Multimeter facilities of this instrument have a wide range of applications. It will measure voltage, current and resistance values accurately, and the design incorporates an efficient output meter. Following is a description of how the various sections are used. There are further and wider applications for this instrument which will manifest themselves as the operator becomes more familiar with the Multimeter.

Unless the operator understands the voltage and current readings of various circuits, it is advisable to always use the highest range available to obtain an approximate reading, and then choose a lower range which will be more suitable for an accurate reading. This will prevent damage to the meter from excessive overload.

D.C. VOLTAGES

Turn the central selector switch to the desired voltage range and make sure that the right-hand switch is turned to that position marked "D.C." The negative, or black, test lead is inserted in the negative jack on the instrument, and the red test lead is inserted in the positive jack. The two test prods are then touched to the necessary parts of the apparatus under test, and the meter will read the difference in potential between the two points touched, which is actually the voltage. It is necessary to remember that voltage is the difference in potential between any two points.

If it is desired to measure the voltage on the elements of a valve, the metal chassis of a radio receiver or amplifier is usually regarded as forming the negative side of the circuit. For instance, if it is desired to measure the plate voltage of a valve, the appropriate range would be selected, the positive test lead placed on the plate contact of the valve, and the negative test lead placed on the chassis. The meter would then read the valve's plate voltage. This method does not apply to the measurement of negative grid bias.

To measure the negative grid bias, the negative test prod is placed on the grid and the positive test prod is placed on the negative filament or cathode contact. The negative bias will then be indicated on the meter. This method will be inaccurate if a high value of resistance is included in the grid circuit, such as a resistance capacity coupled stage. In this case, the negative test prod should be placed on the end of the grid leak resistor, which does not connect to the grid.

When making voltage measurements, it is not necessary to remove or disconnect any wires.

A.C. VOLTAGES

To measure alternating voltage, the only rearrangement of the controls on the instrument is to turn the right-hand switch to that position marked "A.C." The appropriate voltage range is then selected in the ordinary way on the range

selector switch, and the test prods, when plugged into the instrument, can then be connected to the two points between which it is desired to measure the voltage difference. Since alternating voltage has no fixed negative or positive potential, the negative or positive test lead from the instrument can be placed on either of the two points which are under test. However, to form a safety habit, it is always wise to place the negative lead on the low potential side of the circuit or that side of the A.C. voltage which is connected to earth. If this is inconvenient, the operator need not worry any further.

When measuring alternating voltages on the 10-volt range, the lowest meter scale, marked "10 V. A.C. only" should be used. When using the 50, 250 and 1,000 V. ranges, measurements should be made on the upper set of voltage graduations.

D.C. CURRENTS

In making current measurements, it is necessary to break the circuit and insert the test leads so that the meter is placed in series with the circuit. For instance, to measure the plate current of a tube, the wire on the plate contact would be removed and connected to the positive side of the meter. The negative meter lead would be connected to the plate contact and the selector switch would be turned to the desired range, and then the set switched on. The plate current of the valve would be registered on the meter. This procedure also applies to any other circuit in which it is desired to measure current in milliamperes. The circuit is simply broken and the meter inserted in the break to complete the circuit again.

Where the current value is unknown, it is always wise to commence on the highest range, and then turn the selector switch down to that range which give the most convenient deflection of the needle on the meter.

A.C. CURRENTS

The TST/2 by itself is only intended to measure alternating (A.C.) current on the 1 mA range, in which case the upper voltage graduations are used. This range can be extended by using the MRCT "University" current transformer which is available as an extra. The MRCT needs no soldered connections it simply connects by terminals to the TST/2 and a switch on the MRCT selects the desired A.C. current range. It extends the TST/2 to read the following A.C. current:-

2.5, 5, 10, 25, 50, 100, 250 and 500 mA A.C. and 1, 2.5, 5 and
10 amperes A.C.

RESISTANCE

This instrument will measure values of resistance in four convenient ranges - 0-1,000 ohms, 0-10,000 ohms, 0-100,000 ohms and 0-10 megohms.

To measure values of resistance below 1,000 ohms, the selector switch is turned to the position marked "R X 1." The test leads are inserted in the instrument and then the test prods are touched together so that the meter needle will swing right over to the position marked "0" on the upper meter scale. If it does not

exactly reach the "O" mark the ohms compensator at the left hand side of the instrument is turned until the needle indicates zero resistance. The meter is then ready for use.

To measure resistance one side or both of the resistance or other part should be disconnected from the rest of the circuit and the test prods placed on its terminals. The value of resistance will be shown on the ohms range.

For values up to 10,000 ohms the switch is turned to the position marked "R x 10" and the scale figures must be multiplied by 10 to give the correct resistance. For example if you are measuring a resistance of 4,000 ohms and the switches are turned to the correct position then the meter needle will indicate 400. Multiplying this by 10 gives 4,000 which is the correct reading assuming that the resistor is in good order.

When measuring in the range of 10,000 ohms, it is necessary that the prods are touched together again and the needle adjusted for zero resistance by use of the ohms compensator.

For values up to 100,000 ohms the range switch is turned to the position marked "R x 100" and the procedure is carried out as explained previously. For measurements up to 10 megohms turn switch to "R x 10,000" and proceed as before. When using the "R x 10,000" range the instrument must be connected to power mains.

In measuring resistance it is necessary that the right hand switch be turned to the position marked "D C" Always before measuring resistance make certain that the test prods are touched together and the ohms compensator adjusted so that the meter reads zero before operation. The purpose of this ohms compensator is to compensate for any variation in battery-voltage which will enable you to obtain a maximum life from the built in battery.

CAUTION - Before attempting to measure the resistance of any part of radio or electrical apparatus, be sure to switch off the power or to disconnect one wire from each battery in the case of battery-operated equipment.

OUTPUT METER

In addition to measuring ordinary A. C. voltages over a wide range the Multi-meter can also be used as an output meter the right hand knob on the instrument is turned to the position marked "OP" and the range selector is turned to an appropriate voltage and db range. The test leads are inserted in the instrument, and one lead is attached to the chassis while the other lead is touched to the plate of the output or power valve in the receiver or amplifier under test.

Small push-on clips are provided with the instrument. These easily and conveniently fit on the test leads, so that it will not be necessary for the operator to hold these on to the point under check in the chassis. They can be clipped on to any convenient wire or terminal leaving the operator's hands free for alignment of the set.

If the range selector is turned to 10 volts when using this as an output meter, it will give a very sensitive reading. However, it will be found necessary for the volume control of the receiver to be kept low, so as not to damage the meter. This 10-volt range is recommended for aligning sets. If the output meter is required for a purpose other than alignment, the 50-volt or 250-volt will be found quite suitable.

Used in this manner, the instrument will facilitate the alignment of a receiver, especially when a modulated oscillator or signal generator is used as the source of signal.

The meter scale is also calibrated in db. When using db ranges, the figure indicated by the Selector Switch must be added to that indicated by the meter pointer.

BATTERY REPLACEMENT

The resistance measurement section of this instrument utilises a standard 1.5-volt 950 dry battery cell, for the ranges R, R X 10 and R X 100. This usually lasts up to twelve months without replacement. It will be known when the battery is due for replacement by the fact that the ohms compensator on the panel will not enable the pointer of the meter to be brought right to the zero mark. The R X 10,000 range is powered by rectified A.C. furnished from the valve testing section.

GENERAL

The primary purpose of this instrument is to measure D.C. voltage, currents and resistances, as well as A.C. voltages and output voltages. The instrument is accurate and is easily portable.

It will cover nearly all of the routine checking required in a radio receiver, and in general radio equipment. It must be remembered that voltage measurements in a receiver will not only indicate that there is voltage available, but if they are measured through any of the components in the receiver, they will indicate whether that component is open circuit or otherwise by the indication of voltage on the meter. Faulty and intermittent transformers can be tested by using the ohms section of the instrument, and continuity tests of all components can be made with this section. The instrument will also indicate short circuits and open circuits, leaky condensers, faulty resistance, broken connections and incorrect values. The output meter section can be used to indicate a standard of output from apparatus under test, and constant use of the instrument will bring many new suggestions to mind.

The meter needle should normally coincide exactly with the zero end of the voltage and milliamp scales when the meter is not in use. Should it not do so, it can be adjusted to zero by means of the large bakelite screw on the face of the meter, just below the glass.

SHORTS INDI- CATION	A	B	C	D	E	F	TYPE
7W7	6.3	1		6	2		8
7X7	6.3	1		6	1		8
8D3	6.3	3		1	2		4
12ASGT	12.6	2		5	2	32	7
12AT6	12.6	3		6	1	80	4
12AU6	12.6	3		1	2	25	4
12AV6	12.6	3		6	1	100	4
12AX7	6.3	9		2	2	25	45
12BBGT	12.6	2		8	2		7
12BD6	12.6	3		1	2		4
12BH7	6.3	9		2	2	26	45
12C8	12.6	2		4	1		7
12F5GT	12.6	2		10	2		7
12J7GT	12.6	2		10	2	35	7
12L8GT	12.6	6		3	3		7
12Q7GT	12.6	2		4	1	80	7
12S8GT	12.6	7		4	1		8
12SF5	12.6	7		3	2		8
12SG7	12.6	2		4	2		735
12SK7	12.6	2		4	2	27	7
12SQ7	12.6	7		5	1	84	8
12SR7	12.6	7		4	1		8
12Z3	12.6	1		2	3	10	4
14B6	12.6	1		6	1		84
14C7	12.6	1		6	2		8
14E6	12.6	1		6	1		84
14E7	12.6	1		6	1		8

SHORTS INDI- CATION	A	B	C	D	E	F	TYPE
7S7	6.3	1		6	2		8
7X7	6.3	1		5	1		8
7Y4	6.3	1		6	3	14	8
7Z4	6.3	1		3	3		8
12A6	12.6	2		6	3		7
12A7	12.6	1		5	3	10	7
12AH7	12.6	7		1	2		8
12AH8	6.3	9		2	2	27	45
12AL5	12.6	3		2	3	9	4
12AT6	12.6	3		5	1	80	4
12AT7	12.6	3		2	2	25	45
12AU7	6.3	9		2	2	29	45
12AV6	6.3	9		5	1	100	4
12AX7	6.3	9		7	2	25	45
12BBGT	12.6	2		10	2		7
12BA7	12.6	4		2	2		5
12BH7	6.3	9		7	2	26	45
12C8	12.6	2		5	1		7
12H6	12.6	2		5	3	9	7
12J7GT	12.6	2		10	2	33	7
12L8GT	12.6	6		1	3		7
12Q7GT	12.6	2		5	1	80	7
12S8GT	12.6	7		3	1		8
12SN7	12.6	2		5	2	32	7
12SG7	12.6	7		4	2		8
12SF7	12.6	7		5	1		8
12SJ7	12.6	2		4	2		735
12SL7	12.6	7		1	2	26	8
12SN7	12.6	7		1	2	32	8
12SQ7	12.6	7		4	1	84	8
12SR7	12.6	7		5	1		8
12ZA	12.6	3		6	3	10	4
14AF7	12.6	1		5	2		8
14B6	12.6	1		5	1		84
14C5	12.6	1		6	3		8
14E6	12.6	1		5	1		84
14E7	12.6	1		5	1		8

SHORTS INDI- CATION	A	B	C	D	E	F	TYPE
7S7	6.3	1		4	2		8
7W7	6.3	1		6	2		8
7X7	6.3	1		3	3		8
7Y4	6.3	1		3	3	14	8
7Z4	6.3	1		6	3		8
9BW6	7.5	4		2	3		51
12A5	6.3	6		4	3		17
12A7	12.6	1		10	3	24	7
12AH7	12.6	7		5	2		8
12AH8	6.3	9		7	2	50	45
12AL5	12.6	3		7	3	9	4
12AT6	12.6	3		1	2	28	4
12AT7	12.6	3		7	2	25	45
12AU7	6.3	9		7	2	29	45
12AV6	6.3	9		1	2	30	4
12AW6	12.6	3		1	2		4
12B7	12.6	1		6	2		8
12BA6	12.6	3		1	2	26	4
12BB6	12.6	3		1	2	26	4
12BY7	6.3	6		2	2	27	4539
12C8	12.6	2		10	2		7
12H6	12.6	2		3	3	9	7
12J5	12.6	2		5	2	32	7
12L8	12.6	2		5	2	25	7
12Q7GT	12.6	2		10	2	28	7
12S8GT	12.6	7		10	2		8
12SG7	12.6	7		1	1		8
12SF7	12.6	7		3	2		8
12SJ7	12.6	2		2	2		735
12SL7	12.6	7		5	2		8
12SN7	12.6	7		4	2	26	8
12SQ7	12.6	7		4	2	32	8
12SR7	12.6	7		2	2	30	8
12ZA	12.6	3		2	2		8
14AF7	12.6	1		1	3	10	4
14B6	12.6	1		4	2		8
14E6	12.6	1		3	2		84
14E7	12.6	1		4	2		8
14B6	12.6	1		4	2		84
14E7	12.6	1		3	2		8

SHORTS INDI-CATION										SHORTS INDI-CATION										SHORTS INDI-CATION									
TYPE	A	B	C	D	E	F	INDI-	CATION		TYPE	A	B	C	D	E	F	INDI-	CATION		TYPE	A	B	C	D	E	F	INDI-	CATION	
14F7	12.6	1		6	2	8				14F7	t2	12.6	1	5	2	8				14F7	t2	12.6	1	5	2	8			
14J7	12.6	1		4	2	8				14J7	p	12.6	1	6	2	8				14J7	p	12.6	1	5	2	8			
14K7	12.6	1		4	2	8				14K7	t2	12.6	1	5	2	8				14K7	t2	12.6	1	5	2	8			
14L7	12.6	1		4	1	8				14L7	d1	12.6	1	3	1	8				14L7	d1	12.6	1	3	1	8			
15	2	1		6	2	8				14V7	t2	12.6	4	6	2	8				14V7	t2	12.6	4	6	2	8			
19	25	2		2	2	5				15A6	t2	25	2	2	2	5				15A6	t2	25	2	2	2	5			
25A6G	25	2		3	3	6				19	p	25	1	4	2	6				19	p	25	1	4	2	6			
25A05	25	2		5	3	7				25A7G	a	25	1	5	3	7				25A7G	a	25	1	5	3	7			
25B8	25	2		5	3	7				25B5	t	25	2	4	3	6				25B5	t	25	2	4	3	6			
25I6G	25	2		10	2	7				25B8	t	25	2	8	2	7				25B8	t	25	2	8	2	7			
25Y5	25	1		5	3	6				25N6	a2	25	2	5	3	7				25N6	a2	25	2	5	3	7			
25Z5	25	1		2	3	6				25Y5	a2	25	1	5	3	6				25Y5	a2	25	1	5	3	6			
25Z6	25	2		3	3	7				25Z5	a2	25	1	5	3	6				25Z5	a2	25	1	5	3	6			
26	1.5	1		3	2	4				25Z6	a2	25	2	5	3	7				25Z6	a2	25	2	5	3	7			
31	2	1		3	2	4				27	t	2	1	3	2	5				27	t	2	1	3	2	5			
34	2	1		3	2	4				32	t	2	1	3	2	5				32	t	2	1	3	2	5			
32I7GT	32	2		10	2	4				35	t	2	1	3	2	5				35	t	2	1	3	2	5			
35B5	32	2		5	3	7				32I7GT	a	32	2	10	2	4				32I7GT	a	32	2	10	2	4			
35Z4GT	32	2		1	3	4				35C5	t	32	2	5	3	7				35C5	t	32	2	5	3	7			
41	6.3	1		4	3	6				35Z3LT	t	32	1	8	7	4				35Z3LT	t	32	1	8	7	4			
45	2.5	1		3	3	4				42	t	6.3	1	4	3	6				42	t	6.3	1	4	3	6			
46	2.5	1		3	3	4				45Z3	t	45	1	17	4	5				45Z3	t	45	1	17	4	5			
49	2.5	1		3	3	5				47	t	2.5	1	16	5	5				47	t	2.5	1	16	5	5			
5006	50	2		5	3	7				50B5	t	50	3	19	5	5				50B5	t	50	3	19	5	5			
50Y6G	50	2		3	3	7				50I6GT	a2	50	2	5	3	10				50I6GT	a2	50	2	5	3	10			
50Y7	50	2		5	3	7				50Y6G	a2	50	2	5	3	10				50Y6G	a2	50	2	5	3	10			
53	2.5	1		3	3	7				50Y7	a2	50	2	6	3	10				50Y7	a2	50	2	6	3	10			
55	2.5	1		10	2	6				53	t2	2.5	1	5	3	13				53	t2	2.5	1	5	3	13			
56	2.5	1		3	2	5				55	d1	2.5	1	4	1	9				55	d1	2.5	1	4	1	9			
59	2.5	1		4	3	5				57	t	2.5	1	10	2	3				57	t	2.5	1	10	2	3			
75	6.3	1		10	2	6				75	d1	6.3	1	4	1	7				75	d1	6.3	1	4	1	7			
76	6.3	1		3	2	5				77	t2	6.3	1	10	2	3				77	t2	6.3	1	10	2	3			
79	6.3	1		10	3	6				79	a2	6.3	1	3	3	13				79	a2	6.3	1	3	3	13			
80	5	1		2	3	4				80	a2	5	1	3	3	16				80	a2	5	1	3	3	16			
82	2.5	1		2	3	4				82	a2	2.5	1	3	3	9				82	a2	2.5	1	3	3	9			
83	5	1		2	3	4				83	a2	5	1	3	3	10				83	a2	5	1	3	3	10			
83V	5	1		2	3	4				83V	a2	5	1	3	3	9				83V	a2	5	1	3	3	9			
84/6Z4	6.3	1		2	3	5				84/6Z4	a2	6.3	1	3	3	11				84/6Z4	a2	6.3	1	3	3	11			
85	6.3	1		10	2	6				85	d1	6.3	1	4	1	9				85	d1	6.3	1	4	1	9			
89	6.3	1		10	3	6				104V	t	6.3	1	3	2	28				104V	t	6.3	1	3	2	28			
154V	6.3	1		3	2	5				807	t1	6.3	1	3	2	10				807	t1	6.3	1	3	2	10			
1852	6.3	2		4	2	7				5920	t1	6.3	3	6	2	4				5920	t1	6.3	3	6	2	4			

SHORTS INDI- CATION							SHORTS INDI- CATION							SHORTS INDI- CATION						
TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F
ECH33	h	6.3	2	10	2	28	ECH33	t	6.3	2	5	2	32	EB80	6.3	4		2	2	
ECH35	p	6.3	2	10	2	28	ECH35	t	6.3	2	5	2	32	EB86	6.3	4		9	2	29
ECH80	t	6.3	4	9	2	26	ECH80	h	6.3	4	2	2	24	EF92	6.3	3		1	2	28
ECH81	t	6.3	4	9	2	5	ECH81	h	6.3	4	2	2	24	EF95	6.3	3		1	2	27
ECL80	t	6.3	4	2	2	5	ECL80	p	6.3	4	9	2	2	EK90	6.3	3		1	2	4
EF5	t	6.3	2	10	2	18	EF6		6.3	2	10	2	20	EL34	6.3	2		5	2	7
EF22		6.3	1	6	2	8	EF39		6.3	2	10	2	2	EL80	6.3	4		2	3	6
EF81		6.3	4	2	2	578	EF85		6.3	4	7	2	2	EL84	6.3	4	168	2	3	7
EF89		6.3	4	2	2	516	EF91		6.3	3	1	2	23	EL91	6.3	3		1	2	4
EF93		6.3	3	1	2	26	EF94		6.3	3	5	2	25							
EK2G		6.3	2	5	2	30	EL3NG		6.3	2	5	3	10							
EL3G		6.3	2	5	3	9	EL33A		6.3	2	5	3	9							
EL81		6.3	4	2	3	59617	EL83		6.3	4	2	3	3							
EL85		6.3	4	1	2	51268	EL90		6.3	3	1	2	2							
EY80		6.3	4	9	1	512678	EY91		6.3	3	5	3	10							
EZ80	a1	6.3	4	1	3	10	EZ80	a2	6.3	4	7	3	10							
EZ82	a1	6.3	4	1	3	10	EZ82	a2	6.3	4	7	3	10							
EZ90	a1	6.3	3	1	3	10	EZ90	a2	6.3	3	6	3	10							
GZ34	a1	5	2	4	3	8	GZ34	a2	5	2	6	3	8							
KBCL	t	2	1	10	2	32	KBCL	d1	2	1	4	1	76							
KF1		2	1	4	2	27	KF2		2	1	4	2	27							
KL4G		2	2	5	2	29	KL2G		2	2	5	2	40							
KT66		6.3	2	5	3	7	N78		6.3	3	1	3	9							
PABC80	t	7.5	4	8	2	5	PABC80	d1	7.5	4	6	1	5							
PABC80	d3	7.5	4	1	1	5	PC884	t1	7.5	4	6	2	2							
PCC85	t1	7.5	4	7	2	5	PCC85	t2	7.5	4	2	2	2							
PCF80	t	7.5	4	9	2	5	PCF80	p	7.5	4	2	2	2							
PL81		18	4	2	2	569	PL82		18	4	2	2	2							
PB81		18	4	17	2															
TDD2	t	2	1	10	2	32	TDD2	d1	2	1	4	1	76							
TDD4	t	4	1	10	2	32	TDD4	d1	4	1	6	1	100							
U52	d1	5	2	4	3	11	U52	d2	5	2	6	3	11							
UABC80	d1	25	4	8	2	5	UABC80	d1	25	4	6	1	5							
UABC80	d3	25	4	1	1	5														
UBC81	t	12.6	4	2	2	5	UBC81	d1	12.6	4	6	1	5							
UC885	t1	25	4	7	2	5	UC885	t2	25	4	2	2	25							
U76		32	2	5	3	7	VP4		4	1	5	2	25							
W76	t	12.6	2	10	2	21	X61M	t	6.3	2	5	2	21							
X76M	t	12.6	2	5	2	26	X76M	h	12.6	2	10	2	22							
X79	t	6.3	4	7	2	26	X79	h	6.3	4	2	2	26							
Y77		6.3	3	1	2	30	Z77		6.3	3	1	2	30							

TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION							
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F		
5CQ8 t	5	4		9	2		5CQ8TR	5	4		2	2		536	5CZ5	5	4		3	2		536
5J6 tl	5	3		5	2		5J6 t2	5	3		6	2										
5T4 al	5	2		4	3	10	5T4 a2	5	2		6	3	10		5T8 t	5	4		8	2		5
5T8 dl	5	4		6	1		5T8 d2	5	4		2	1		5	5T8 d3	5	4		1	1		5
5U8 t	5	4		9	2		5U8 p	4			2	2		5								
5U4G al	5	2		4	3	10	5U4G a2	5	2		6	3	10	8								
5V4G al	5	2		4	3	9	5V4G a2	5	2		6	3	9	8	5V6-GT	5	2		5	2		7
5W4 al	5	2		4	3	10	5W4 a2	5	2		6	3	10	8								
5X4G al	5	7		3	3	10	5X4G a2	5	7		5	3	10	8								
5Y3G al	5	2		4	3	14	5Y3G a2	5	2		6	3	14	8								
5Y4G al	5	2		4	3	14	5Y4G a2	5	2		6	3	14	8								
5Z3 al	5	1		2	3	10	5Z3 a2	5	1		3	3	10	4								
5Z4 al	5	2		6	3		5Z4 a2	5	2		4	3		8								
5x4Gal	5	7		5	3		5x4Ga2	5	7		3	3		8								
5x8 t	5	4		2	2		5x8 p	5	4		7	2		5								
5AS4 al	5	2		4	3	11	5AS4 a2	5	2		6	3	11	8								
5RGY al	5	2		4	3	11	5R4GY a2	5	2		6	3	11	8								
5Z4G al	5	2		4	3	10	5Z4G a2	5	2		6	3	10	8								
6A3	6.3	1		3	3	12	6A4	6.3	1		3	3	14	5								
6A6 tl	6.3	1		3	3	13	6A6 t2	6.3	1		5	3	13	7	6A7	6.3	1		5	2	32	
6A8G	6.3	2		5	2	32	6AB4	7	3		6	2	28	4	6AB5	6.3	1		3	2	45	5
6AB6G	6.3	2		5	3		6AB7	6.3	2		4	2	35	7								
6AB8 t	6.3	4		2	2	33	6AB8 p	6.3	4		9	3	26	5	6AC5G	6.3	2		5	3	10	7
6AC7	6.3	2		4	2	30	6AD7 t	6.3	2		1	2	28	7	6AD7 p	6.3	2		5	3	15	7
6AD8 p	6.3	4		2	2	36	6AD8 dl	6.3	4		7	1	100	5	6AD8 d2	6.3	4		8	1	100	
6AE5GT	6.3	2		5	2		6AE6G	6.3	2		5	2		7								
6AE7G tl	6.3	2		4	2		6AE7G t2	6.3	2		6	2		7	6AE8	6.3	4		9	2	25	5
6AE8 h	6.3	4	9	2	2	29	6AE8 t	6.3	4	9	7	2	29	5	6AF4A	6.3	3		2	2		41267
6AF6G	6.3	2		4	2		6AF6G	6.3	2		5	2		7	6AG5	6.3	3	7	1	2	25	4
6AG6G	6.3	2		5	3	7	6AG7	6.3	2		4	3	6	7	6AH4GT	6.3	2		1	2	26	7
6AH6	6.3	3		1	2		6AJ5	6.3	3		1	2		427	6AH4GT	6.3	2		1	2	26	7
6AJ8 h	6.3	4		2	2	28	6AJ8 t	6.3	4		9	2	30	5	6AK5	6.3	3	7	1	2	27	4
6AK6	6.3	3		1	3	15	6AL3	6.3	4	123678	9	2	25	5								
6AK8 t	6.3	4		8	2		6AK8 dl	6.3	4		6	1		5	6AK8 d2	6.3	4		2	1		5
6AK8 d3	6.3	4		1	1		6AL5 al	6.3	3		7	3	9	4	6AL a2	6.3	3		2	3	9	4

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TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION							
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F		
6AM4	6.3	7	3469	1			6AM5	6.3	3		1	3	9	4	6AM6	6.3	3		1	2	23	4
6AM8 p	6.3	4		2	2	24	6AM8 t	6.3	4		8	1	26	5	6AN4	6.3	3		2	2		4617
6AN7 h	6.3	4	6	2	2	24	6AN7 t	6.3	4	6	9	2	26	5	6AN8 t	6.3	4		2	2	25	5
6AN8 p	6.3	4		8	2	25	6AO4	6.3	3	56	1	2	25	4	6AQ5	6.3	3	1	7	3	10	4
6AQ6 t	6.3	3		1	2		6AQ6 dl	6.3	3		5	1		4	6AQ6 d2	6.3	3		6	1		4
6AQ7GT	6.3	7		4	2		6AQ7GT d1	6.3	7		3	1		8	6AQ7GT d2	6.3	7					8
6AQ8 tl	6.3	4	9	7	2	25	6AQ8 t2	6.3	4	9	2	2	25	5								
6AR5	6.3	3		1	3										6AR7GT d2				6	1	100	8
6AR7GT p	6.3	1		10	2	30	6ARGT dl	6.3	1		5	1	100	8	6AS5	6.3	1					
6AS5	6.3	3	5	2	2		6AS6	6.3	3		1	2		4	6AS7G t2	6.3	7		1	3		8
6AS8 p	6.3	4		2	2		6AS7G tl	6.3	7		4	3		8								
6AS8 d	6.3	4		6	1										6AT6 d2	6.3	3		6	1	35	4
6AT6 t	6.3	3		1	2	24	6AT6 dl	6.3	3		5	1	35	4	6AU4GT	6.3	7	12	5	3	8	8
6AT8 t	6.3	4		1	2		6AT8 p	6.3	4		9	2		5								
6AU5GT	6.3	2		1	3		6AU6	6.3	3		1	2	25	4								
6AU7 tl	6.3	9		7	2	45	6AU7 t2	6.3	9		2	2		45	6AV5GT	6.3	2		1	2		7
6AU8 t	6.3	4		2	2		6AU8 p	6.3	4		7	2		5	6AV6 d2	6.3	3		5	1	100	4
6AV6 t	6.3	3		1	2	30	6AV6 dl	6.3	3		6	1	100	4								
6AW8 p	6.3	4		7	2	30	6AW8 t	6.3	4		2	2	28	5	6AX5GT a2							
6AX4 GT	6.3	7		5	2	26	6AX5GT a1	6.3	2		5	3	12	7	6AX8 t	6.3	2		3	3	12	7
6AX8 t	6.3	4		9	2		6AX8 p	6.3	4		2	2		5	6B4G	6.3	2		5	2	12	7
6AZ8 t	6.3	4		9	2		6AZ8 p	6.3	4		6	2		5	6B6G t	6.3	2		10	2	33	7
6B6G t	6.3	2		10	2	33	6B6G d2	6.3	2		4	1	50	7	6B7 p	6.3	1		10	2	85	7
6B6G dl	6.3	2		5	1	50	6B7 dl	6.3	1		5	1	40	7	6B8 dl	6.3	2		5	1	40	7
6B7 d2	6.3	1		4	1	85	6B8 p	6.3	2		10	2	75	7	6BA7	6.3	4	8	2	2	26	5
6B8 d2	6.3	2		4	1	75	6BA6	6.3	3		1	2	26	4	6BC4	6.3	4	3789	3	2		5
6BA8 ap	6.3	4		7	2		6BA8 at	6.3	4		2	2		5								
6BC5	6.3	3		1	2	427									6BC7 d3	6.3	4		2	3	25	5
6BC7 dl	6.3	4		8	2	25	6BC7 d2	6.3	4		6	3	25	5	6BD4	6.3	2		5	2		7
6BC8 tl	6.3	4		2	2	26	6BC8 t2	6.3	4		7	2	26	5	6BD7 t	6.3	4	79	2	2	26	5
6BD5GT	6.3	2		1	2	28	6BD6	6.3	3		1	2	30	4	6BE6	6.3	3		1	2	26	4
6BD7 dl	6.3	4	79	6	1	100	6BD7 d2	6.3	4	79	8	1	100	5	6BE8 p	6.3	4		9	2		5
6BE7	6.3	4	8	7	2	29	6BE8 t	6.3	4		1	2		5								
6BF5	6.3	3		7	1	3									6BF6 d2	6.3	3		5	1	100	4
6BF6 t	6.3	3		1	2	26	6BF6 dl	6.3	3		6	1	100	4	6BG6G	6.3	2		5	3	10	7
6BF7 tl	6.3	3		2	2		6BF7 t2	6.3	3		7	2		6								

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SHORTS INDICATION							SHORTS INDICATION							SHORTS INDICATION								
TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F		
12A4	6.3	3		2	2		12A5	6.3	6		4	3		17	12A6	12.6	2		6	3		7
12A7 p	12.6	1		10	3	24	12A7 a	12.6	1		5	3	10	7	12A8GT	12.6	2		5	2	32	7
12AB5	12.6	4		3	2		12AC6	12.6	3		1	2		4	12AD6	12.6	3		1	2	25	4
12AD7 t	6.3	9		2	2		12AD7 t2	6.3	9		7	2		54	12AE6 t	12.6	3		1	2		4
12AE6 d	12.6	3		6	1		12AE6 d2	12.6	3		5	1		4	12AF6	12.6	3		1	2		4
12AJ6 d	12.6	3		6	1		12AJ6 d2	12.6	3		5	1		4	12AJ6 t	12.6	3		1	2		4
12AH7 t	12.6	7		5	2		12AH7 t2	12.6	7		1	2		8								
12AH8 t	6.3	9		7	2	30	12AH8 h	6.3	9		2	2	27	45								
12AJ7 t	12.6	4		9	2		12AJ7 p	12.6	4		2	2		5								
12AL5 a	12.6	3		7	3	9	12AL5 a2	12.6	3		2	3	9	4								
12AN7 t	12.6	4	6	9	2	34	12AN7 h	12.6	4	6	2	2	28	5	12AQ5	12.6	3	7	1	2	30	4
12AT6 t	12.6	3		1	2	28	12AT6 d	12.6	3		5	1	80	4	12AT6 d2	12.6	3		6	1	80	4
12AT7 t	6.3	9		7	2	25	12AT7 t2	6.3	9		2	2	25	45	12AU6	12.6	3		1	2	28	4
12AU7 t	6.3	9		7	2	29	12AU7 t2	6.3	9		2	2	29	45	12AV5GA	12.6	2		1	2		7
12AV6 t	12.6	3		1	2	30	12AV6 d	12.6	3		5	1	100	4	12AV6 d2	12.6	3		6	1	100	4
12AV7 t	6.3	9		7	2	54	12AV7 t2	6.3	9		2	2	54	45	12AW6	12.6	3		1	2		4
12AX4GT	12.6	7	12	5	3	10	12AX7 t2	6.3	9		2	2	25	45	12AX7 t1	6.3	9		7	2	25	45
12AY7 t	6.3	9		2	2	54	12AY7 t2	6.3	9		7	2		54								
12AZ7 t2	6.3	9		2	2	54	12AZ7 t1	6.3	9		7	2		45								
12B7	12.6	1		6	2	8	12B8GTp	12.6	2		10	2		7	12B4A	6.3	3	678	2	2	26	45
12BA6	12.6	3		1	2	26	12BA7	12.6	4		2	2		5	12B8GTt	12.6	2		8	2		7
12BE6	12.6	3		1	2	26	12BF6 t	12.6	3		1	2		4	12BD6	12.6	3		1	2		4
12BF6 d2	12.6	3		5	1	4	12BH7 t1	6.3	9		7	2	26	45	12BF6 d1	12.6	3		6	1		4
12BK5	12.6	4		3	3	5	12BL6	12.6	3		1	2	28	4	12BH7 t2	6.3	9		2	2	26	45
12BQ6GTB															12BN6	12.6	3		2	2		4
	12.6	2		5	3	6																
12BR7 t	6.3	9		2	2	45	12BR7 d1	6.3	9		7	1	45	12BR7 d2	6.3	9		6	1		45	
12BV7	6.3	6	9	2	2	45	12BY7	6.3	6	9	2	2	27	45								
12BZ7 t	6.3	9		7	2	45	12BZ7 t2	6.3	9		2	2		45								
12C8 p	12.6	2		10	2	7	12C8 d	12.6	2		5	1		7	12C8 d2	12.6	2		4	1		7
12CA5	12.6	3	5	2	2	4	12CN5	12.6	3		2	2		4	12CR6 d	12.6	3		2	1		4
12CR6 p	12.6	3		7	2	4	12CU5	12.6	3	5	2	2		4	12CX6	12.6	3		1	2		4
12DL7 d	12.6	4		9	1	5	12DL7 d2	12.6	4		1	1		5	12DLSTR	12.6	4		3	2		5
12DS7 t	12.6	4		3	2	5	12DS7 d1	12.6	4		9	1		5	12DS7 d2	12.6	4		1	1		5
12DT8 t	12.6	4		7	2	5	12DT8d2	12.6	4		2	2		5	12DQ6A	12.6	2		5	2		7
12DZ6	12.6	3		1	2	4																

"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 9.

SHORTS INDICATION							SHORTS INDICATION							SHORTS INDICATION								
TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F		
12EG6	12.6	3		1	2	4	12EH5	12.6	3		5	2	425	12EK6	12.6	3		1	2		4	
12F5GT	12.6	2		10	2	7	12FK6 d1	12.6	4		6	1	75	5	12F8 d2	12.6	4		1	1	75	5
12FK6 t	12.6	3		1	2	30	12FK6 d2	12.6	3		5	1	80	4	12FK6 d1	12.6	3		6	1	80	4
12F8 p	12.6	4		8	2	32	12G4	12.6	3	25	6	2	4									
12H6 a	12.6	2		3	3	9	12H6 a2	12.6	2		5	3	9	7	12J5	12.6	2		5	2	32	7
12J8 t	12.6	4		1	2	25	12J8 d1	12.6	4		9	1	30	5	12J8 d2	12.6	4		8	1	30	5
12J7 GT	12.6	2		10	2	33	12K5	12.6	3	6	5	3	10	4	12K7 GT	12.6	2		10	2	35	7
12K8	12.6	2		5	2	25	12L4GT	12.6	2		5	3		7								
12L8GT p	12.6	6		1	3	7	12L8GT p2				3	3		7								
								12.6	6		3	3		7								
12Q7GT t	12.6	2		10	2	28	12Q7GH1	12.6	2		5	1	80	7	12Q7GH2	12.6	2		4	1	80	7
12R5	12.6	3		2	2	4																
12S8GT t	12.6	7		10	2	8	12S8GT d1	12.6	7		3	1	8	12S8GT d2	12.6	7		4	1		8	
12S8GT d	12.6	7		1	1	8	12SA7	12.6	2		5	2	32	7								
12SC7 t	12.6	7		3	2	8	12SC7 t2	12.6	7		4	2	8									
12SF7 p	12.6	7		2	2	8	12SF7 d	12.6	7		5	1	8	12SF5	12.6	7		3	2		8	
12SH7	12.6	2		5	2	735	12SL7	12.6	2		4	2	30	7	12SG7	12.6	2		4	2		735
12SL7 t	12.6	7		4	2	26	12SL7 t2	12.6	7		1	2	26	8	12SK7	12.6	2		4	2	27	7
12SN7 t	12.6	7		4	2	32	12SN7 t2	12.6	7		1	2	32	8								
12SQ7 t	12.6	7		2	2	30	12SQ7 d1	12.6	7		4	1	84	8	12SQ7 d2	12.6	7		5	1	84	8
12SR7 t	12.6	7		2	2	8	12SR7 d1	12.6	7		5	1	8	12SR7 d2	12.6	7		4	1		8	
12V6GT	12.6	2		5	3	7	12W6GT	12.6	2		5	3	7									
12X4 a	12.6	3		1	3	10	12X4 a2	12.6	3		6	3	10	4	12Z3	12.6	1		2	3	10	4
14A4	12.6	1		6	2	8	14A5	12.6	1		6	3	8	14A7	12.6	1		6	2		8	
14AF t	12.6	1		4	2	8	14AF7 t2	12.6	1		5	2	8									
14B6 t	12.6	1	4	3	2	8	14B6 d1	12.6	1	4	5	1	8	14B6 d2	12.6	1	4	6	1		8	
14B8	12.6	1		4	2	8	14C5	12.6	1		6	3	8	14C7	12.6	1		6	2		8	
14E6 t	12.6	1		4	3	8	14E6 d1	12.6	1	4	5	1	8	14E6 d2	12.6	1	4	6	1		8	
14E7 t	12.6	1		6	2	8	14E7 d1	12.6	1		3	1	8	14E7 d2	12.6	1		4	1		8	
14F7 t	12.6	1		4	2	8	14F7 t2	12.6	1		5	2	8									
14F8 d	12.6	2		8	2	7	14F8 t2	12.6	2		1	2	7	14H7	12.6	1		6	2		8	
14J7 t	12.6	1		4	2	8	14J7 p	12.6	1		6	2	8									
14K7 t	12.6	1		4	2	8	14K7 t2	12.6	1		5	2	8	14Q7	12.6	1		4	2		8	
14R7 p	12.6	1		6	2	8	14R7 d1	12.6	1		3	1	8	14R7 d2	12.6	1		4	1		8	
14S7	12.6	1		6	2	8	14V7	12.6	1		6	2	8									

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TYPE	SHORTS INDICA-TION						TYPE	SHORTS INDICA-TION						TYPE	SHORTS INDICA-TION									
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F				
15	2	1		10	2	40	5	15A6	12.6	4			2	2	27	5	16A5	12.6	4	168	2	3	10	5
15CW5	12.6	4	168	2	2	25	5	15DQ8	12.6	4			8	2	26	5								
16A0t	16.6	4		1	2	30	5	16A8p	12.6	4			3	2	25	5								
17AX4GT	18	7		5	3		8	17BQ6GTB																
17Z3	18	4	123678	9	3	10	5		18	2			5	2		7	17DQ6A	18	2		5	2		7
19 tl	2	1	3	2	2	34	6	19 t2	2	1			4	2	34	6	19AU4	18	7		5	3		8
19BG6A	18	2		5	2		7	19J6 tl	18	3			5	2		4	19J6 t2	18	3		6	2		4
19T8 t	18	4		8	2		5																	
19T8 dl	18	4		6	1		5	19T8 d2	18	4			2	1		5	19T8 d3	18	4		1	1		5
19X0t	18	4		2	2		5	19X8 p	18	4			7	2		5	19Y3	18	4	12678	9	3	10	5
21A6	18	4	167	2	2	24	5	24A	2.5	1			10	2	38	5								
25A6G	25	2		5	3	14	7	25A7Gp	25	2			5	3	16	7	25A7G a	25	2		6	3	10	7
25AC5	25	2		5	3		7	25AX4GT	25	7			5	3		8	25AV5GT	25	2		1	3		7
25B5	25	1		4	3		6	25B6G	25	2			5	3		7								
25B8 p	25	2		10	2		7	25B8t	25	2			8	2		7	25BQ6GT	25	2		5	3		7
25C5	25	3		5	2		425	25C6	25	2			5	3		7	25CD6	25	2		5	3		7
25DN6	25	2		5	3		7	25E5	25	2	13		5	3	8	7	25EH5	25	3		2	2		425
25L6G p	25	2		5	3	10	7	25N6	25	2			5	3		7	25W4G7	25	7		5	3		8
25Y5a l	25	1		2	3	10	6	25Y5 a2	25	1			5	3	10	6	25Z4	25	2		5	3		73
25Z5 al	25	1		2	3	10	6	25Z5 a2	25	1			5	3	10	6								
25Z6 al	25	2		3	3	10	7	25Z6 a2	25	2			5	3	10	7								
26	1.5	1		3	2		4	27	2	1			3	2		5	30	2	1		3	2		4
30AE3	32	4	123678	9	2	25	5	31	2	1			3	2		4	32	2	1		10	2		4
32L7 GT	32	2		5	3		7	32L7G7	32	2			6	3		7	33	2	1		3	2		5
34	2	1		10	2		4	35	2	1			10	2		5	35L6GT	32	2		5	3	10	7
32L7GT t	32	2		5	3	14	7	32L7GT a	32	2			6	3	10	7	35A5	32	1		6	3		8
35B5	32	3	7	1	3		4	35C5	32	3			2	3		45	35W4	32	3	6	5	3	7	4
35Z4GT	32	2		5	3	8	7	35Z3LT	32	1			2	3		8	35Z5GT	32	2	3	5	3		37
35Y4	32	1	3456	2	3		8	36	6.3	1			10	2		5	37	6.3	1		1	2		5
38	6.3	1		10	2		5	38A3	32	4			9	3		5	39/44	6.3	1		10	2		5
41	6.3	1		4	3	20	6	42	6.3	1			4	3	16	6	43	25	1		4	3	14	6
45	2.5	1		3	3	17	4	45Z3	4.5	1	36		2	3	8	7	45B5	45	4		2	3		5
45Z5GT	45	2	3	5	3	8	7	46	2.5	1			3	3	16	5	47	2.5	1		3	3	16	5
48	32	1		4	3	40	6	49	2	1			3	3	19	5	50A5	50	1		6	3		8
50B5	50	3	7	1	3	10	4	50C5	50	3	5		2	3	10	4	50C6	50	2		5	3		7
50EH5	50	3		2	2		425	50L6GT	50	2			5	3	10	7								

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TYPE	SHORTS INDICA-TION						TYPE	SHORTS INDICA-TION						TYPE	SHORTS INDICA-TION										
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F					
50X6 al	50	1		6	3		8	50X6 a2	50	1			3	3		8									
50Y7 al	50	2	6	5	3	10	7	50Y7 a2	50	2	6		3	3	10	7									
50Y6G al	50	2		3	3	10	7	50Y6G a2	50	2			5	3	10	7	51	2.5	1		10	3		5	
53 tl	2.5	1		3	3	13	7	53 t2	2.5	1			5	3	13	7									
55 t	2.5	1		10	2	42	6	55 dl	2.5	1			4	1	90	6	55 d2	2.5	1		3	1	90	6	
56	2.5	1		3	2	35	5	57	2.5	1			10	2	33	6	58	2.5	1		10	2	33	6	
59	2.5	1		4	3	20	7	70L7GT	70	2			8	3	7	70L7GT	70	2		5	3		7		
75 t	6.3	1		10	2	32	6	75 dl	6.3	1			4	1	70	6	75 d2	6.3	1		3	1	70	6	
76	6.3	1		3	2	34	5	76R	6.3	1			2	2		5	77	6.3	1		10	2	32	6	
78	6.3	1		10	2	33	6	79 tl	6.3	1			10	3	13	6	79 t2	6.3	1		3	3	13	6	
80 al	5	1		2	3	16	4	80 a2	5	1			3	3	16	4	81	7.5	1		2	3	21	4	
82 al	2.5	1		2	3	9	4	82 a2	2.5	1			3	3	9	4									
83 al	5	1		2	3	10	4	83 a2	5	1			3	3	10	4									
83 V al	5	1		2	3	9	4	83 V a2	5	1			3	3	9	4									
84/6Z4 al	6.3	1		2	3	11	5	84/6Z4 a2	6.3	1			3	3	11	5									
85 t	6.3	1		10	2	43	6	85 dl	6.3	1			4	1	90	6	85 d2	6.3	1		3	1	90	6	
89	6.3	1		10	3	19	6	104V	4	1			3	2	28	5									
117L7 R	117	2		6	3		7	117L7 p	117	2			4	3		7									
117Z3	117	3		5	3		4	117Z4GT	117	2			5	3		7									
117Z6	117	2		3	3		7	117Z6	117	2			5	3		7	164V	4	1		3	2	30	5	
354 V	4	1		3	2		5	807	6.3	1			3	3	10	5	866	2.5	1		10	3	7	4	
1603	6.3	1		10	2		6	1620	6.3	2			10	2	33	7	1852	6.3	2		4	2	30	7	
5654	6.3	3		1	2		4	5879	6.3	4			1	2		5	5881	6.3	2		5	2		7	
5726 dl	6.3	3		7	1		4	5726 d2	6.3	3			2	1		4									
5920 tl	6.3	3		6	2		4	5920 t2	6.3	3			5	2		4									
6084	6.3	4		9	2		5	6085 tl	6.3	9			2	3		45	6085 t2	6.3	9		7	3		45	
6201 t2	6.3	9		2	2		45	6201 tl	6.3	9			7	2		45	6086	18	4		2	2		5	
6227	6.3	4		2	3		5	6267	6.3	4			9	2		5	6374	6.3	4		10	3		5	
6686	18	4	16	2	2		5	6687	6.3	3			1	2		4	6688	6.3	4		2	2		5	
6689	6.3	4	78	2	2		5	6922 tl	6.3	4			2	2		5	6922 t2	6.3	4		7	2		5	
6973	6.3	4		3	3		56318	7025 tl	6.3	9			7	2		45	7025t2	6.3	9		2	2		45	
7027	6.3	2		5	2		76514	7199 tl	6.3	4			9	2		5	7199 p	6.3	4		7	2		5	
9001	6.3	3		1	2	33	427	9002	6.3	3			6	2	10	427	9003	6.3	3		1	2	30	427	
9006al	6.3	3	7	1	1		4	9006 a2	6.3	3			5	1		427	18043	6.3	4		2	3		578	
18042	18.0	4		2	2		5	18045	18.0	4			2	2		5	18046	18.0	4		2	2		5	
CBC1 t	12.6	2		10	2		29	3	CBC1d1	12.6	2			6	1	18	3	CBC1 d2	12.6	2		5	1	18	3
CC1	12.6	2		10	2		35	3	CF1	12.6	2			10	2	27	3	CF2	12.6	2		10	2	33	3

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SHORTS INDICATION							SHORTS INDICATION							SHORTS INDICATION										
TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F				
CF3	12.6	2		10	2	28	3	CBL1 t 45	2			10	3	9	3	CBL1 d1	45	2			6	1	46	3
CBL1 d2	45	2		5	1	46	3	CK1	12.6	2		6	2	28	3	CL2	25	2		10	3	10	3	
CL4	32	2		10	3	9	3	CY1G	18	2		8	3	7	3	CY31	18	2			5	3	7	
CY2 a1	32	2		5	3	8	3	CY2 a2	32	2		8	3	8	3	DAC21 d	1.4	8			6	1	1	
DA90	1.4	1	456	2	1		7	DAC21 t	1.4	8		10	2	1		DAF96 p	1.4	7			6	2	1	
DAC31 t	1.4	2		10	2		7	DAC31 d	1.4	2		5	1	7		DBC31 d1	1.4	2			5	1	7	
DAC32 t	1.4	2		10	2		7	DAC32 d	1.4	2		5	1	7		DC90	1.4	7	346	5	2		1	
DAF91 p	1.4	7		6	2		1	DAF91 t	1.4	7		3	1	1		DF21	1.4	8		10	2		1	
DAF92 p	1.4	7		6	2		1	DAF92 d1	1.4	7		4	1	1		DF91	1.4	7		6	2		1	
DAF96 d	1.4	7		3	1		1	DBC31 t	1.4	2		10	2	7		DF97	1.4	7		6	2		1	
DBC31 d2	1.4	2		4	1		7	DC80	1.4	4		1	2	35		DH76 d2	12.6	2		5	1	100	7	
DCC90 t	1.4	4		5	2	17		DCC90 t2	1.4	4		3	2	17		DH77 d2	6.3	3		5	1	4		
DCH31 t	1.4	7		5	2		2	DCH31 h	1.4	7		10	2	2		DH107d2	18.0	3		5	1	4		
DF31	1.4	2		10	2		7	DF33	1.4	2		10	2	7		DK91	1.4	7		4	2	15		
DF92	1.4	7		6	2		1	DF96	1.4	7		6	2	1		DL21	1.4	8		5	2		1	
DH76 p	12.6	2		10	2	28	7	DH76 d1	12.6	2		4	1	100	7	DL35	1.4	2		5	2		7	
DH77 t	6.3	3		1	2		4	DH77 d1	6.3	3		6	1	4		DL91	1.4	7		3	2		15	
DH107t	18.0	3		1	2		4	DH107 d1	18.0	3		6	1	4		DL94	1.4	5		3	2		17	
DK31	1.4	2		5	2		7	DK32	1.4	2		5	2	7		DK91	1.4	7		4	2	15		
DK92	1.4	7		4	2		1	DK96	1.4	7		4	2	1		DL21	1.4	8		5	2		1	
DL31	1.4	2		5	2		7	DL33	1.4	8		5	2	27		DL35	1.4	2		5	2		7	
DL36	1.4	2		5	2		7	DL41	1.4	1	3	6	2	78		DL91	1.4	7		3	2		15	
DL92	1.4	5		3	2		17	DL93	1.4	5		4	2	17		DL94	1.4	5		3	2		17	
DL95	1.4	5		3	2		17	DL96	1.4	5		6	2	17										
DLL21 pl	1.4	1		2	2		78	DLL21 p2	1.4	1		5	2	78										
DLL31 pl	1.4	1		4	2		27	DLL31 p2	1.4	1		5	2	27										
DY86	1.4	1	37	10	3	46925		DY87	1.4	1	345 6789	10	1	100	2									
E80CC t1	6.3	9		2	2	30	45	E80CC t2	6.3	9		7	2	30	45	E80F	6.3	4		27	9	2	32	5
E80L	6.3	4	16	2	3	8	5	E81L	6.3	4	16	2	2	29	5	E83F	6.3	4		78	2	3	8	5
E88CCd1	6.3	4		2	2		5	E88CC t2	6.3	4		7	2	5		E91H	6.3	3		1	2		4	
E90CCd1	6.3	3		6	2		4	E90CC t2	6.3	3		5	2	26	4	E180F	6.3	4		2	2		513	
E92CCd1	6.3	3		6	2		4	E92CC t2	6.3	3		5	2	4		E415	4.0	1		3	2		5	
E406N	4.0	1		3	2		4	E408N	4.0	1		3	2	4										
E424	4.0	1		3	2		5	E443H	4.0	1		3	2	5										
E444Nt	4.0	1		4	2		6	E444Nd	4.0	1		3	1	6										

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SHORTS INDICATION							SHORTS INDICATION							SHORTS INDICATION										
TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F	TYPE	A	B	C	D	E	F				
EAA91d1	6.3	3		7	1		4	EAA91d2	6.3	3		2	1		4	EABC80 d2								
EABC80 t	6.3	4		8	2		5	EABC80d1	6.3	4		6	1		5	EBC3 d2	6.3	2		5	1		50	3
EABC80d3	6.3	4		1	1		5	EAC91 t	6.3	3		6	2		4	EBC33 d2	6.3	2		5	1		6	
EAC91 d	6.3	3		1	1		4	EB4 d1	6.3	2		5	3	9	3	EBC41 d2	6.3	1		5	1		8	
EB41 t	6.3	1		6	3		8	EB41 t2	6.3	1		4	3		8	EBC80 d2	6.3	4		79	8	1	100	5
EB91 a1	6.3	3		7	3	9	4	EB91 a2	6.3	3		2	3	9	4	EBC81 d2	6.3	4		79	8	1	100	5
EB34 d1	6.3	2		3	1		7	EB34 d2	6.3	2		5	1		7	EBC90 d2	6.3	3		5	1		4	
EBC3 t	6.3	2		10	2	30	3	EBC3 d1	6.3	2		6	1	50	3	EBC91 d2	6.3	3		5	1		100	4
EBC33 t	6.3	2		10	2		6	EBC33 d1	6.3	2		4	1	6		EBF1 d2	6.3	2		5	1		80	3
EBC41 t	6.3	1		3	2		8	EBC41 d1	6.3	1		6	1	8		EBF2G d2	6.3	1		6	1		25	8
EBC80 t	6.3	4	79	2	2	26	5	EBC80 d1	6.3	4	79	6	1	100	5	EBF35 d2	6.3	1		6	1		25	8
EBC81 t	6.3	4	79	2	2	26	5	EBC81 d1	6.3	4	79	6	1	100	5	EBF80 d2	6.3	4		8	1		100	5
EBC90 t	6.3	3		1	2		4	EBC90 d1	6.3	3		6	1	4		EBF81 d2	6.3	4		8	1		100	5
EBC91 t	6.3	3		1	2	30	4	EBC91 d1	6.3	3		6	1	100	4	EBF83 p	6.3	4		2	2		5	
EBF1 p	6.3	2		10	2	48	3	EBF1 d1	6.3	2		6	1	80	3	EBF89 d2	6.3	4		8	1		100	5
EBF2G p	6.3	1		10	2	27	8	EBF2G d1	6.3	1		5	1	25	8	EBF89 d2	6.3	4		8	1		100	5
EBF35 p	6.3	1		10	2	27	8	EBF35 d1	6.3	1		5	1	25	8	EBF83 p	6.3	4		2	2		5	
EBF80 p	6.3	4		2	2	24	5	EBF80 d1	6.3	4		7	1	100	5	EBF89 d2	6.3	4		8	1		100	5
EBF81 p	6.3	4		2	2	36	5	EBF81 d1	6.3	4		7	1	100	5	EBL1 d2	6.3	2		5	1		46	3
EBF83 d1	6.3	4		7	1		5	EBF83 d2	6.3	4		8	1	5		EBL21 p	6.3	1		3	2		8	
EBF89 p	6.3	4		2	2		5	EBF89 d1	6.3	4		7	1	5		EBL31 p	6.3	2		10	3	10	7	
EBL1 p	6.3	2		10	3	10	3	EBL1 d1	6.3	2		6	1	46	3	EC31	6.3	2		5	2		7	
EBL21 p	6.3	1		3	2		8	EBL21 d1	6.3	1		6	1	8		EC81	6.3	4		1	2		5	
EBL31 p	6.3	2		10	3	10	7	EBL31 d1	6.3	2		4	1	50	7	EC92	6.3	3		6	2		4	
EC31	6.3	2		5	2		7	EC40	6.3	1	356	2	2	8	ECC32 t1	6.3	7		1	2		8		
EC81	6.3	4		1	2		5	EC91	6.3	3	56	2	1	25	4	ECC33 t1	6.3	7		1	2	28	8	
EC92	6.3	3		6	2		4	EC93	6.3	3		2	2		41726	ECC35 t1	6.3	7		1	2	30	8	
ECC32 t1	6.3	7		1	2		8	ECC32 t2	6.3	7		4	2		8	ECC81 t1	6.3	9		7	2	25	45	
ECC33 t1	6.3	7		1	2	28	8	ECC33 t2	6.3	7		4	2	28	8	ECC82 t1	6.3	9		7	2	25	45	
ECC35 t1	6.3	7		1	2	30	8	ECC35 t2	6.3	7		4	2	30	8	ECC83 t1	6.3	9		7	2	25	45	
ECC81 t1	6.3	9		7	2	25	45	ECC81 t2	6.3	9		2	2	25	45	ECC84 t1	6.3	4		6	2		578	
ECC82 t1	6.3	9		7	2	25	45	ECC82 t2	6.3	9		2	2	25	45	ECC85 t1	6.3	4		7	2	24	5	
ECC83 t1	6.3	9		7	2	25	45	ECC83 t2	6.3	9		2	2	25	45	ECC91 t1	6.3	3		5	2		4	
ECC84 t1	6.3	4		6	2		578	ECC84 t2	6.3	4		2	2		578									
ECC85 t1	6.3	4		7	2	24	5	ECC85 t2	6.3	4		2	2	24	5									
ECC91 t1	6.3	3		5	2		4	ECC91 t2	6.3	3		6	2		4									

"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 14.

TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION								
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F			
ECF80 t	6.3	4		9	2	5	ECF80 p	6.3	4		2	2	5	ECH3Gt	6.3	2		5	2	27	7		
ECF82	6.3	4		9	2	25	5	ECH3G	6.3	2		10	2	30	7								
ECH4G p	6.3	2		10	2	7	7	ECH4G t	6.3	2		5	2	27	7	ECH33	6.3	2		10	2	28	7
ECH21 t	6.3	1		4	2	8	8	ECH21 h	6.3	1		6	2	8									
ECH33 h	6.3	2		10	2	28	7	ECH33 t	6.3	2		5	2	32	7								
ECH34 t	6.3	2		5	2	25	7	ECH34 h	6.3	2		10	2	25	7								
ECH35 p	6.3	2		10	2	28	7	ECH35 t	6.3	2		5	2	32	7								
ECH80 t	6.3	4		9	2	26	5	ECH80 h	6.3	4		2	2	24	5								
ECH81 t	6.3	4		9	2	5	5	ECH81 h	6.3	4		2	2	5									
ECH83 t	6.3	3		9	2	4	4	ECH83 p	6.3	3		2	2	4									
ECL80 t	6.3	4		2	2	5	5	ECL80 p	6.3	4		9	2	5									
ECL82 t	6.3	4		1	2	5	5	ECL82 p	6.3	4		3	2	5	ECL83	6.3	4		9	2	28	5	
EF5	6.3	2		10	2	18	3	EF6	6.3	2		10	2	3	EF22	6.3	1		6	2	28	8	
EF36	6.3	2		10	2	30	7	EF37	6.3	2		10	2	30	7	EF38	6.3	2		10	2	7	
EF39	6.3	2		10	2	20	7	EF51	6.3	1		6	2	837	EF80	6.3	4	36	2	2	5		
EF81	6.3	4	789	2	2	24	5	EF83	6.3	4		9	2	5	EF85	6.3	4		2	2	513		
EF86	6.3	4	27	9	2	29	5	EF89	6.3	4		2	2	516	EF91	6.3	3		1	2	23	4	
EF92	6.3	3		1	2	28	4	EF93	6.3	3		1	2	26	4	EF94	6.3	3		1	2	25	4
EF95	6.3	3		1	2	27	427	EF97	6.3	3		1	2	4	4	EF98	6.3	3		1	2	4	
EF800	6.3	4	3	2	2	25	5	EH90	6.3	3		1	2	4									
EK2G	6.3	2		5	2	30	7	EK32	6.3	2		5	2	7	EK90	6.3	3		1	2	4		
EL3G	6.3	2		5	3	9	7	EL3NG	6.3	2		5	3	10	7	EL5G	6.3	2		5	2	7	
EL22	6.3	1		6	2	8	8	EL31	6.3	2		5	2	7	EL32	6.3	2		10	2	30	7	
EL33A	6.3	2		5	3	9	7	EL34	6.3	2		5	2	7	EL35	6.3	2		5	2	7		
EL36	6.3	2		5	2	7	7	EL37	6.3	2		5	2	7	EL38	6.3	2		5	2	7		
EL80	6.3	1	68	2	3	6	5	EL81	6.3	4	167	2	3	5	EL82	6.3	4	1689	2	2	5		
EL83	6.3	4		2	3	5	5	EL84	6.3	4	168	2	3	7	5	EL85	6.3	4	28	1	2	5	
EL86	6.3	2		4	2	5	5	EL90	6.3	3	7	1	2	4	4	EL91	6.3	3		1	2	4	
EL95	6.3	3	7	1	2	4	5	EM80 t	6.3	4		1	2	5	5	EM80 1	6.3	2		2	1	5	
EM81 1	6.3	4		2	2	5	5	EM81	6.3	4		1	2	5									
EM85 t	6.3	4		1	2	5	5	EM85 1	6.3	4		3	2	5	5	EN31	6.3	2		5	2	7	
EQ80	6.3	4	8	7	2	5	5	EY81	6.3	4		9	3	5	5	EY82	6.3	4		9	3	5	
EY80	6.3	4	12678	9	1	5	5	EY84	6.3	4		10	3	5	5	EY86	6.3	3		10	3	4	
EY87	6.3	1	578	10	1	100	2	EY91	6.3	3	5	1	3	4									
EZ35 al	6.3	5		3	3	6	6	EZ35 a2	6.3	5		5	3	6									
EZ80 al	6.3	4		1	3	10	5	EZ80 a2	6.3	4		7	3	10	5								

"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 15.

TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION						TYPE	SHORTS INDICATION								
	A	B	C	D	E	F		A	B	C	D	E	F		A	B	C	D	E	F			
EZ81 al	6.3	4		1	3	5	EZ81 a2	6.3	7		3	3	5	F443N	6.3	1		3	2	5			
EZ82 al	6.3	4		1	3	10	5	EZ82 a2	6.3	4		7	3	10	5								
EZ90 al	6.3	3		1	3	10	4	EZ90 a2	6.3	3		6	3	10	4								
GZ30 al	5.0	8		4	3	2	2	GZ30 a2	5.0	8		6	3	2	2								
GZ32	5	2		6	3	10	8	GZ34 al	5	2		4	3	8									
HCH8 p	12.6	4		2	2	5	5	HCH81 t	12.6	4		9	2	5									
KBC1 t	2	1		10	2	32	6	KBC1 d1	2	1		4	1	76	6	KBC d2	2	1		3	1	78	6
KBC32 t	2.0	2		10	2	7	7	KBC32 d12.0	2			4	1	7	7	KBC32 d2 2.0	2			5	1	7	
KCF30	2.0	2		5	2	7	7	KCF30 p	2.0	2		10	2	7									
KF1	2	1		4	2	27	6	KF2	2	1		4	2	27	6	KF3G	2	2		10	2	35	7
KF35	2.0	2		10	2	7	7	KK2G	2	2		5	2	40	7	KK32	2.0	2		5	2	7	
KL4G	2	2		5	2	29	7	KL35	2.0	2		5	2	7									
KLL32 pl	2.0	2		5	2	7	7	KLL32 p2 2.0	2			4	2	7									
KT61	6.3	2		5	3	9	7	KT66	6.3	2		5	3	10	7	KT33 c	25	2	1	5	3	7	
KT81	6.3	1		6	3	8	8	KT88	6.3	2		5	3	7	7	KT71	45	2		5	3	10	7
N37	12.6	3		1	3	4	4	N78	6.3	3	6	1	3	9	4	L63	6.3	2		5	2	7	
N709	6.3	4		2	3	5	5									N108	32	3		1	3	4	
PABC80t	7.5	4		8	2	5	5	PABC80d1								PABC80 d2							
									7.5	4		6	1	5			7.5	4		2	1	5	
PABC80d37.5	4			1	1	5	5	PCC84 t1	7.5	4		6	2	5		PCC84t2	7.5	4		2	2	5	
PCC85 t1	7.5	4		7	2	26	5	PCC85t2	7.5	4		2	2	26	5								
PCC88 t1	7.5	4		1	2	5	5	PCC88 t27.5	4			7	2	5									
PCF82 t	7.5	4		9	2	5	5	PCF82 p	7.5	4		2	2	5	5								
PCF80 t	7.5	4		9	2	5	5	PCF80 p	7.5	4		2	2	5	5								
PCL81t	12.6	4		1	2	5	5	PCL81 p12.6	4			9	3	5		PL2d21	6.3	3	7	1	2	30	4
PCL82 t	12.6	4		1	2	5	5	PCL82p	12.6	4		3	3	5		PL33	18	2		1	3	7	
PL36	25	2		5	3	7	7	PL81	18	4	176	2	2	5		PL82	18	4	168	2	2	5	
PL83	12.6	4		2	2	5	5	PL84	12.6	4		2	2	5		PX81	18	4	12678	9	2	5	
PY31	18	2		5	3	7	7	PY80	18	4		9	3	5		PY81	17	4		9	3	5	
PY82	18	4		9	3	5	5	PY83	18	4		9	3	8	5								
PZ30 al	50	2	16	3	3	7	7	PZ30 a2	50	2	16	5	3	7		R10	4.0	3		10	10	412567	
R17	6.3	4		10	3	5	5	R18	6.3	4		10	3	5		R19	1.4	2	3456789	10	3	100	1
S4VA	4	1		5	2	33	5	S4VB	4	1		3	2	25	5								
TDD2 t	2	1		10	2	32	6	TDD2 d12	1			4	1	76	6	TDD2 d2	2	1		3	1	76	6
TDD4 t	4	1		10	2	32	6	TDD4 d14	1			6	1	100	7	TDD4 d24	4	1		4	1	100	7
U30	70	1		10	3	2	2	U52 d1	5	2		4	3	11	8	U52 d2	5	2		6	3	11	8

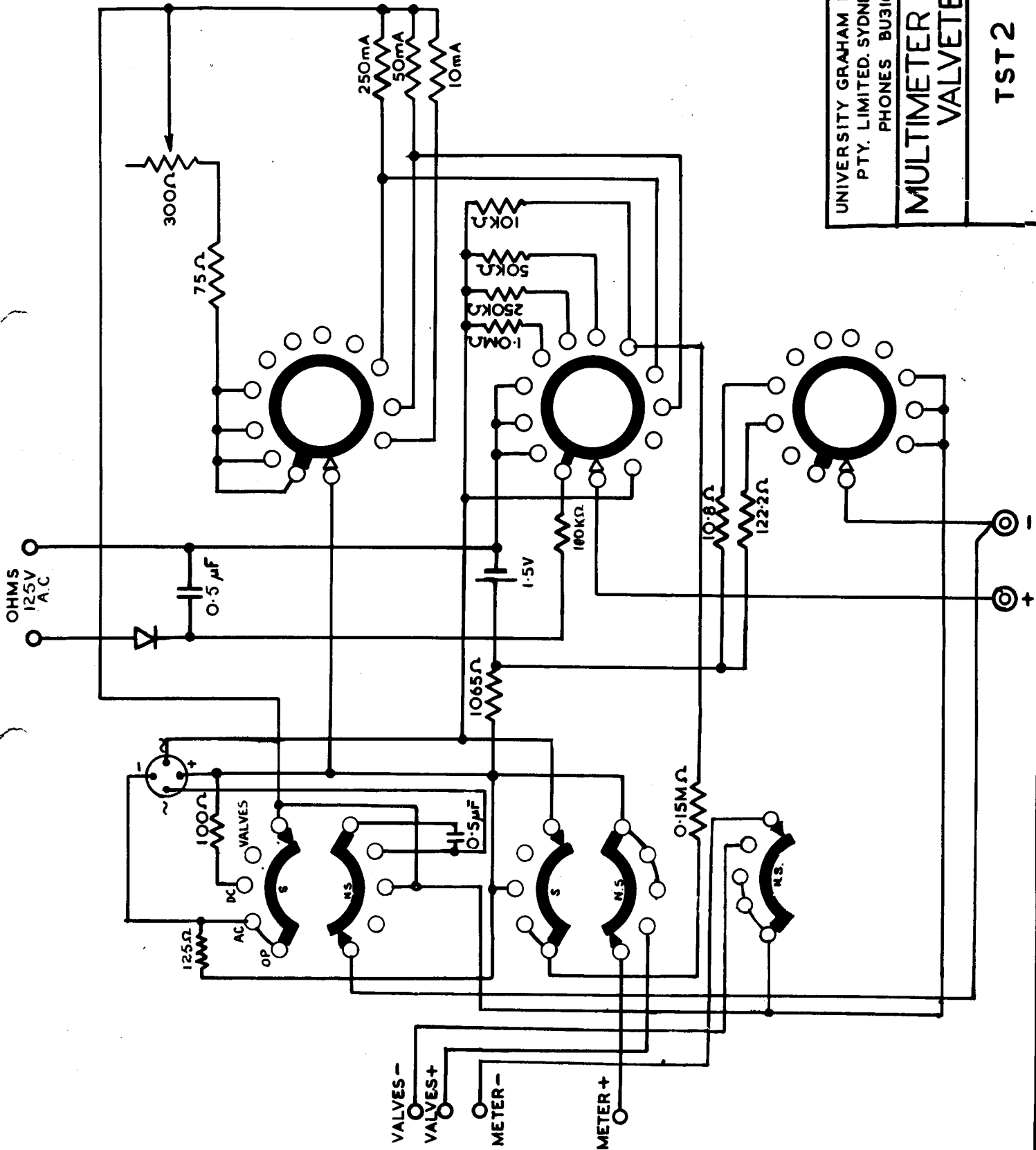
"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 16.

							SHORTS INDICA-TION								SHORTS INDICA-TION								SHORTS INDICA-TION										
TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F			
U76	25	2		5	3		7	U107	32	1	456	2	3		7																		
U709 al	6.3	4		7	3		5	U709 a26.3	4			1	3		5																		
UAABC80t	25	4		8	2		5	UAABC80							5	UAABC80																	
									d1	25	4		6	1																			
UAABC80								UBC1d1	12.6	1		7	1		8	UBC1t	12.6	1															
43	25	4		1	1		5	UBC80d2	12.6	4		8	1		5	UBC80t	12.6	4															
UBC80d1	12.6	4		6	1		5	UBC81d1	12.6	4		6	1		5	UBC81d2	12.6	4															
UBC81t	12.6	4		2	2		5	UBF2t	12.6	1		7	1		8	UBF2d2	12.6	1															
UBF2t	12.6	1		10	2		8	UBF80d1	18.0	4		7	1		5	UBF80d2	18.0	4															
UBF80t	18.0	4		2	2		5	UBF89d1	18.0	4		7	1		5	UBF89d2	18.0	4															
UBF89p	18.0	4		2	2		5	UBL1d1	50	1		7	1		8	UBL1d2	50	1															
UBL1p	50	1		10	3	10	8	UBL21d1	50	1		6	1	100	8	UBL21d2	50	1															
UBL21p	50	1		3	3	10	8	UCC85	25	4		7	2	25	5	UCC85d1	25	4															
UC92	9.5	3		6	2		4	UCH4t	18	1		5	2		8	UCH4h	18	1															
UCC85 t2	25	4		2	2	26	5	UCH21h	18	1		6	2		8	UCH80t	12.6	4															
UCH21t	18.0	1		4	2		8	UCH81t	18	4		9	2	30	5	UCH81	18	4															
UCH80h	12.6	4		2	2		5	UCL82p	50	4		3	3		9	5	UF8	12.6	1														
UCL82t	50	4		1	2	30	5	UF21	12.6	1		6	2		8	UF80	18	4	36														
UF9	12.6	1		10	2		8	UF85	18	4		36	2	2	25	5	UF89	12.6	4	16													
UF81t	12.6	4		2	2		5	UL80	45	4		2	2		5	UL84	45	4															
UL1	50	1		5	2		8	UM41	12.6	1		7	1		8	UM80t	18	4															
UM4t	12.6	1		5	2		8	UM81	18	4		1	2		5	UM811	18	4															
UM801	18	4		2	1		5	UY1N	50	1		3	3		58	UY21	50	1															
UQ80	12.6	4		7	2		538	UY82	50	4		9	3		5	UY85	32	4															
UY31	50	2		5	3		7	U81	6.3	1		6	2		8																		
UY92	25	3		5	3		4	VP4	4	1		5	2	25	7	W76	12.6	2															
VP2	2	1		4	2	35	6	X61Mt	6.3	2		5	2	21	7	X61Mh	6.3	2															
W107	12.6	3		1	2		4	X76Mh	12.6	2		10	2	22	7																		
X76Mt	12.6	2		5	2	21	7	X79 h	6.3	4		2	2	26	5	X81t	6.3	1															
X79t	6.3	4		7	2	26	5	Y61t	6.3	2		5	2		7	Y611	6.3	2															
X99	3.3	1		3	2		4	Z77	6.3	3		1	2	30	4																		
Z66	6.3	2		9	2		7																										

"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 17.

							SHORTS INDICA-TION								SHORTS INDICA-TION								SHORTS INDICA-TION										
TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F		TYPE	A	B	C	D	E	F			
A43-64	6.3	1		2	1		12	AW36-80	6.3	1		2	1		12	AW43-20	6.3	1															
AW43-80	6.3	1		2	1		12	AW53-80	6.3	1		2	1		12																		
CRM171	12.6	1		2	1		12	CRM211	12.6	1		2	1		8	MW43-43	6.3	1															
MW43-64	6.3	1		2	1		12	MW43-69	6.3	1		2	1		12	MW53-206.3	1																
MW53-21	6.3	1		2	1		12	MW53-80	6.3	1		2	1		12	5-3T	7.5	5															
SAXF4	6.3	1		2	1		12	14RP4	6.3	1		2	1		12	14RP4-A	6.3	1															
17AVR4	6.3	1		2	1		12	17BP4-B	6.3	1		2	1		12	17HP4b	6.3	1															
21ALP4-A	6.3	1		2	1		12	24DP4-A	6.3	1		2	1		12																		

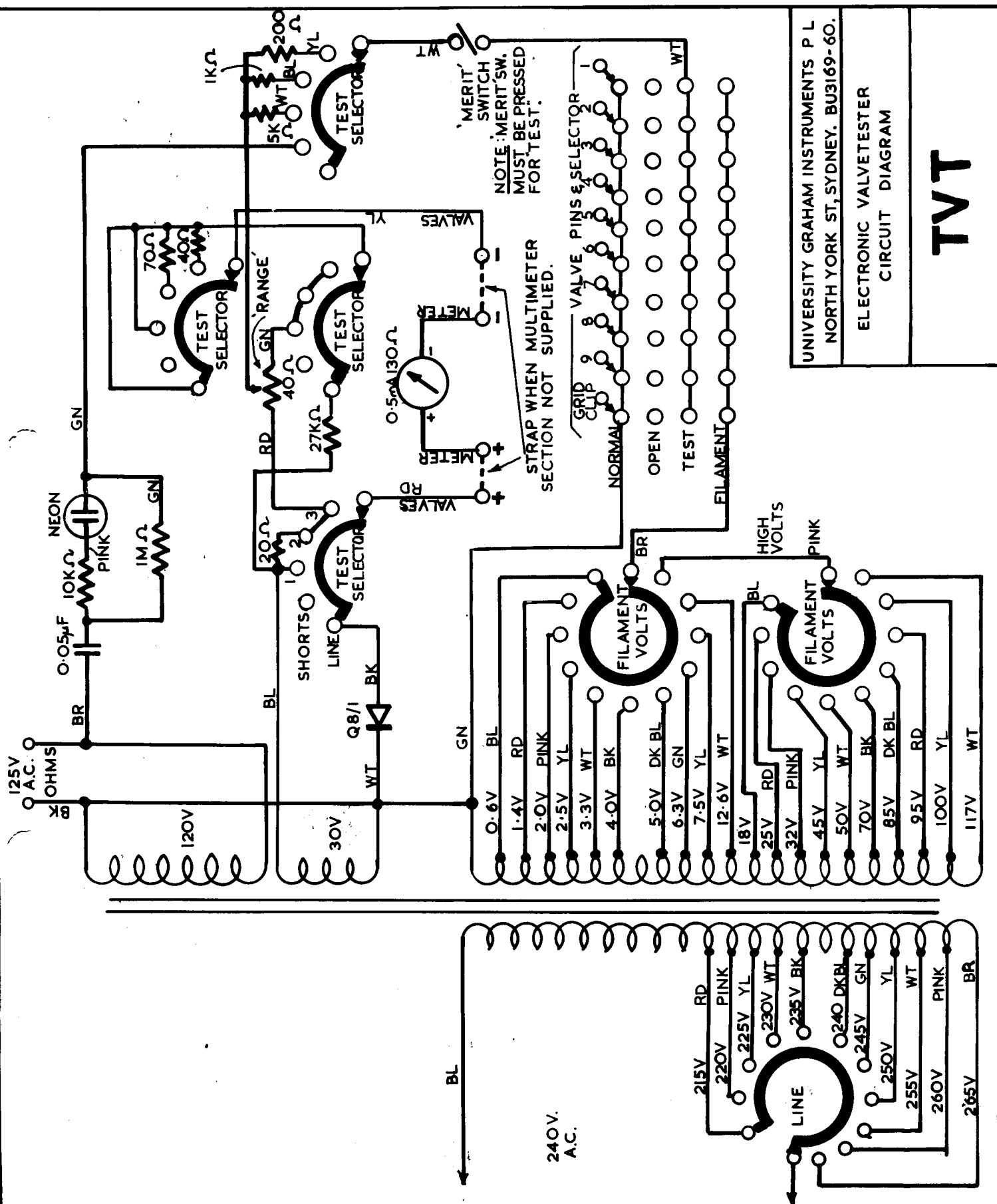
"UNIVERSITY" VALVE TESTER
Supplementary Valve Data Card No. 18.



UNIVERSITY GRAHAM INSTRUMENTS
 PTY. LIMITED. SYDNEY. AUSTRALIA.
 PHONES BU3160, BU3169.

MULTIMETER CIRCUIT VALVETESTER

TST 2



NOTE: 'MERIT' SWITCH MUST BE PRESSED FOR TEST.

STRAP WHEN MULTIMETER SECTION NOT SUPPLIED.

GRID CLIP
 VALVE PINS & SELECTOR

UNIVERSITY GRAHAM INSTRUMENTS P L
 NORTH YORK ST, SYDNEY. BU3169-60.

ELECTRONIC VALVETESTER
 CIRCUIT DIAGRAM

T V T