

"TRADER" SERVICE SHEET

597

AMERICAN BALLAST TUBES

BASE CONNECTIONS AND CODING

THE object of this *Service Sheet* is to provide dealers with sufficient general information on the characteristics of American ballast tubes to enable them to use other types of resistance as substitutes for the tubes when replacements of the original types are not available. This is only possible where the original tube had a standard number, but fortunately most of those now in use are standard. Immediately below is a description of the method of coding, by which the tube characteristics can be determined, followed by a table of American scale lamp data. Then, commencing at the foot of column two on this page is a table giving the characteristics of many tubes, most of which are standard types. The table is continued overleaf, and is followed by diagrams showing the internal connections of the tubes.

CODING SYSTEM

When the ballast tube was first introduced, manufacturers in America made up types to suit the requirements of the sets in which they were to be used, and each type was given a number in order to identify it for replacement purposes. Each manufacturer gave his tubes type-numbers in the same way as he might number a range of receivers, and although two manufacturers might use the same type, each would give it a different number. As the use of the tubes became more general, many hundreds of different numbers were used. It was obvious that tubes for similar purposes in different sets must have similar characteristics, however, and a system of standardised numbering came into being. The tubes, which were all fitted with 4-pin UX bases, were given a number corresponding with the ohmic resistance of the element, followed by a lettered suffix indicating the type of circuit; that is, the number of lamps and number of tapplings. The system was as follows:

First there was a number, usually 140, 165 or 185, which represented the overall resistance. This was followed by a letter R or L, which might be followed by another number: 4, 8 or 44. If the letter was R, and it was not followed by a number, the resistance was untapped, as in Circuit A overleaf. If it was followed by a number, scale lamp tapplings were provided. Thus, R4 meant that there was one tapping for one scale lamp, as in circuit B; R8 that there was one tapping for two lamps in series as in circuit C; and R44 that there were two tapplings for two lamps as in circuit D. The R indicates that the lamps are type 40, rated at 0.15 A.

If the letter was L, the inference was the same except that the lamps were then type 46, rated at 0.25 A. The L was not used for untapped tubes.

AMERICAN RMA SYSTEM

In an endeavour to establish a nationally recognised coding for ballast tubes, the RMA of America devised a scheme which was sufficiently elastic to accommodate the growing range of tube types, and this is now the accepted standard.

The tube is given a number, which is usually provided with one or more prefix letters and one or more suffix letters. The number is the overall voltage drop in the tube. If the number is preceded by the letter K, L or M, this indicates that type 40, 46 or 50 scale lamps respectively should be used.

The suffix letter will be the circuit letter, and will be one of those shown in our diagrams overleaf; while a second suffix G or MG means octal, glass or metal glass, and can be ignored.

If a letter X is interposed between the original prefix and the number, this indicates that the tube has a 4-pin UX base. Other letters that may be found in this position are Y and Z. These mean that, while the tube is otherwise standard, the connections to the base, which is always octal, differ from the standard. They are indicated in our circuits by appropriate letters.

Another letter, which may prefix the whole code group, is B; this indicates that the tube has what is termed a "Ballast" action to protect the scale lamps from a high current surge when switching on the receiver.

Logically, it might be supposed that a tube coded with a suffix A (no scale lamp tapping) to indicate the circuit would also be coded without the scale lamp prefix. This is as a rule the case, but there are such numbers as the K42A, K49A, KX49A and K55A, none of which has a tapping.

In some cases the circuit suffix may consist of two letters, the second of which will be J. This appears to be confined to A, B, C and D circuits, and indicates a change of base connection, one

end of the element going to pin 4 instead of pin 3. The Acturus list states that it indicates a "Jumper" inside the tube between pins 3 and 4, so that no change of wiring would appear to be necessary when substituting, say, an AJ type for an A type.

From the foregoing it should now be possible for the reader to interpret the characteristics of a standard RMA tube from its code group, but the following summary will help to make it clearer. For example, the simplest code group for a 55-volt tube would be 55A; that is, circuit A.

Now consider **BK55C, KX55C, K55CJ, KY55C.**

In the first example, B indicates ballast action, K type 40 lamps, 55 the voltage drop, and C the circuit. The base is octal.

In the second example, the tube is the same except that there is no ballast action, and, as suggested by the X, it has a 4-pin UX base.

The third example is an octal-based tube with one end of the element connected to pin 4 instead of pin 3, while in the fourth example, the Y means entirely rearranged base connections.

It should be possible also to transpose the old standard coding to the later RMA code when it is explained that the number (voltage) in the RMA group is equivalent to the number (resistance) in the old group multiplied by 0.3. Thus: **185R8 = KX55C.**

$185 \times 0.3 = 55.5$, or practically speaking, 55 volts at 0.3 A; R8, as previously explained, means one tapping for two lamps, as in circuit C, and as all the old-type standard tubes had UX bases, the X is inserted in the RMA group. Also, as the letter is R, the scale lamp is type 40, which is indicated in the RMA group by the letter K.

AMERICAN SCALE LAMPS

Type	Voltage	Current	Base	Bead Colour
40	6-8	0.15	MES	Brown
41	2.5	0.5	MES	White
42	3.2	0.5	MES	Green
43	2.5	0.5	MBC	White
44	6-8	0.25	MBC	Blue
45	3.2	0.5	MBC	Green
46	6-8	0.25	MES	Blue
47	6-8	0.15	MBC	Brown
48	2.0	0.06	MES	Pink
49	2.0	0.06	MBC	Pink
49-A	2.1	0.12	MBC	White
50	6-8	0.2	MES	White
51	6-8	0.2	MBC	White
55	6-8	0.4	MBC	White
292	2.9	0.17	MES	White
292-A	2.9	0.17	MBC	White
631	6-8	0.1	MES	Black
713	3.8	0.3	MES	Green
714	2.5	0.3	MES	Blue

AMERICAN BALLAST TUBE TABLE

Type	Voltage drop	Circuit letter	Base	Scale lamps	
				Quantity	Type
36A	36.0	A	Octal	—	—
K36B	36.0	B	Octal	1	40
K36C	36.0	C	Octal	2	40
K36D	36.0	D	Octal	2	40
K36E	36.0	E	Octal	3	40
L36B	36.0	B	Octal	1	46
L36C	36.0	C	Octal	2	46
L36D	36.0	D	Octal	2	46
42A	42.3	A	Octal	—	—
42A1	42.3	AY	Octal	—	—
42A2	42.3	BY	Octal	1	40
42B2	42.3	CY	Octal	2	40
K42A	42.3	A	Octal	—	—
K42B	42.3	B	Octal	1	40
K42C	42.3	C	Octal	2	40
K42D	42.3	D	Octal	2	40
K42E	42.3	E	Octal	3	40
KX42B	42.3	BX	UX	1	40
KX42C	42.3	CX	UX	2	40
KY42D	42.3	DY	Octal	2	40
L42B	42.3	B	Octal	1	46
LX42B	42.3	BX	UX	1	46
L42C	42.3	C	Octal	2	46

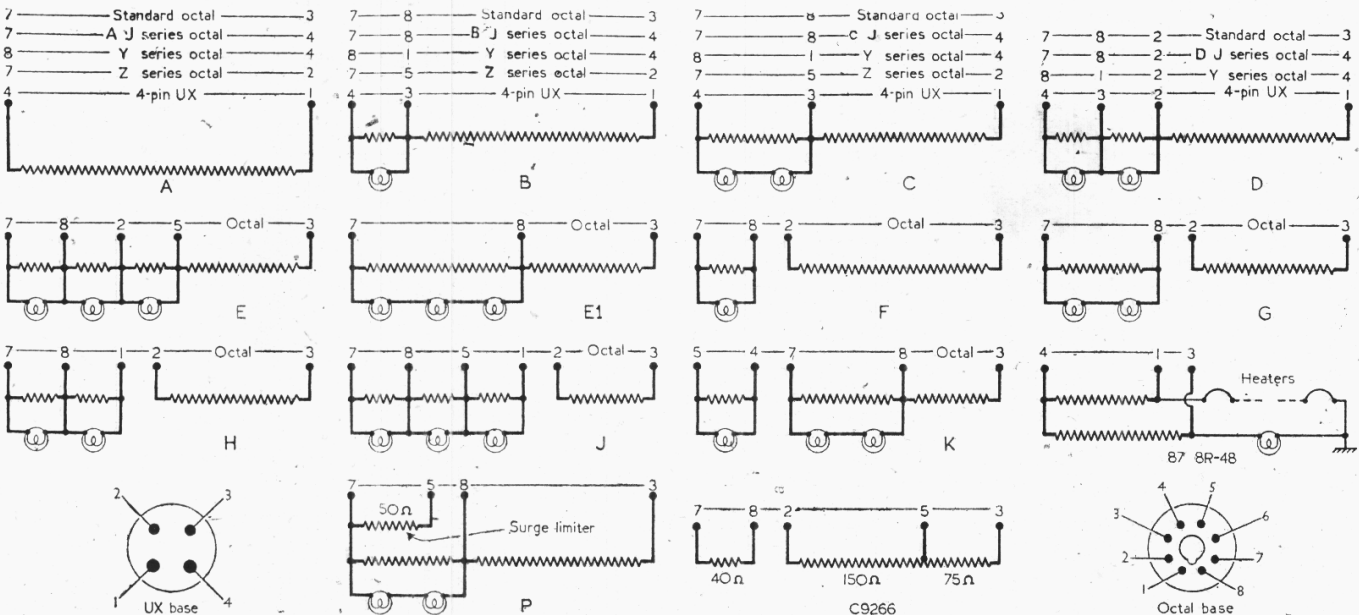
(continued overleaf)

Type	Voltage drop	Circuit letter	Base	Scale lamps		Type	Voltage drop	Circuit letter	Base	Scale lamps	
				Quantity	Type					Quantity	Type
L42D	42.3	D	Octal	2	46	M55H	54.9	H	Octal	2	50
LX42D	42.3	DX	UX	2	46	100R8	29.7	CX	UX	2	40
L42E	42.3	E	Octal	3	46	120R8	36.0	CX	UX	2	40
L42F	42.3	F	Octal	1	46	140L4	42.3	BX	UX	1	46
M42C	42.3	C	Octal	2	50	140L8	42.3	CX	UX	2	46
49A	48.6	A	Octal	—	—	140L44	42.3	DX	UX	2	46
49A1	48.6	AY	Octal	—	—	140R	42.3	AX	UX	—	—
49A2	48.6	BY	Octal	1	40	140R4	42.3	BX	UX	1	40
49B2	48.6	CY	Octal	2	40	140R8	42.3	CX	UX	2	40
K49A	48.6	A	Octal	—	—	140R44	42.3	DX	UX	2	40
K49B	48.6	B	Octal	1	40	140L4	42.3	BX	UX	1	46
K49C	48.6	C	Octal	2	40	140L8	42.3	CX	UX	2	46
K49D	48.6	D	Octal	2	40	140L44	42.3	DX	UX	2	46
K49E	48.6	E	Octal	3	40	165L4	48.6	BX	UX	1	46
KX49A	48.6	AX	UX	—	—	165L8	48.6	CX	UX	2	46
KX49C	48.6	CX	UX	2	40	165R	48.6	AX	UX	—	—
KZ49B	48.6	BZ	Octal	1	40	165R4	48.6	BX	UX	1	40
KZ49C	48.6	CZ	Octal	2	40	165R8	48.6	CX	UX	2	40
L49B	48.6	B	Octal	1	46	165R44	48.6	DX	UX	2	40
L49C	48.6	C	Octal	2	46	165L4	48.6	BX	UX	1	46
L49D	48.6	D	Octal	2	46	165L8	48.6	CX	UX	2	46
L49E	48.6	E	Octal	3	46	165L44	48.6	DX	UX	2	46
L49F	48.6	F	Octal	1	46	185L4	54.9	BX	UX	1	46
M49B	48.6	B	Octal	1	50	185R	54.9	AX	UX	—	—
M49C	48.6	C	Octal	2	50	185R4	54.9	BX	UX	1	40
M49H	48.6	H	Octal	2	50	185R8	54.9	CX	UX	2	40
55A	54.9	A	Octal	—	—	185R44	54.9	DX	UX	2	40
55A1	54.9	AY	Octal	—	—	185L4	54.9	BX	UX	1	46
55A2	54.9	BY	Octal	1	40	185L8	54.9	CX	UX	2	46
55B2	54.9	CY	Octal	2	40	185L44	54.9	DX	UX	2	46
K55A	54.9	A	Octal	—	—	200R	60.0	AX	UX	—	—
K55B	54.9	B	Octal	1	40	290L4	—	BX	UX	1	46
K55C	54.9	C	Octal	2	40	300R4	79.5	BX	UX	1	40
K55CP	54.9	CP	Octal	2	40						
K55D	54.9	D	Octal	2	40						
K55H	54.9	H	Octal	2	40						
L55B	54.9	B	Octal	1	46						
L55C	54.9	C	Octal	2	46						
L55CP	54.9	CP	Octal	2	46						
L55D	54.9	D	Octal	2	46						
L55F	54.9	F	Octal	1	46						
M55B	54.9	B	Octal	1	50						
M55F	54.9	F	Octal	1	50						

(continued in next column)

Special Types

2UR-224	49.0	B	Octal	1	46
610G	2.8	A	—	—	—
115-40	55.0	A	Octal	—	—
115-41	49.0	B	Octal	1	40
115-53	55.0	B	Octal	1	40
C9266	55.0	—	Octal	1-2	—
60R30G	22.7	B	UX	1	40
87R-48	23.6	—	UX	1-2	40



Circuit diagrams showing the internal connections of American ballast tubes and external scale lamp connections. Above each diagram are the pin numbers of the bases, and beneath each diagram is the circuit letter. 87R-48, P and C9266 are special types. P may in some cases be called CP. At bottom, right and left, are the tube base diagrams viewed from the free ends of the pins.

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