

PROFESSIONAL ELECTRON TUBES

1975/6
ABRIDGED DATA

BROADCASTING + COMMUNICATIONS

RADAR

ELECTRO-OPTICAL/TV

INDUSTRIAL + SCIENTIFIC



ENGLISH
ELECTRIC
VALVE
COMPANY
LIMITED



THE M-O
VALVE
COMPANY
LIMITED

PROFESSIONAL
ELECTRON TUBES

FOREWORD

This catalogue contains abridged data for all the current products of EEV and M-OV who together produce the most important range of professional electron tubes in Europe.

The data are presented as a series of five uniform sections, which are also available as separate booklets; these are easily identified by the colour bars at the edge of the pages and the letter referenced page numbers.

These five booklets cover:

- A - Products for Broadcasting and Communications Equipment
- B - Products for Radar Equipment
- C - Products for Electro-Optical/TV Equipment
- D - Products for Industrial and Scientific Equipment
- E - Comprehensive Equivalents Index

Colour Code

Throughout the catalogue the following colour code is used:-

Brown indicates manufacture by English Electric Valve Co Ltd

Blue indicates manufacture by The M-O Valve Company Ltd

Data

Full data for any tube are available upon request

Reply Cards

At the rear of the catalogue, inside the back cover, is a supply of postcards. It is important that you complete and return the first of these to ensure that our mailing list records are up to date and that your name is on our lists. The remaining cards are provided for requesting full data.

Ordering

So that you obtain prompt service please direct orders for EEV products to Chelmsford and for M-OV products to Hammersmith at the addresses given below. Please do not mix products of both companies on one order.

Represented in the Netherlands by

SAIT Electronics Nederland

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Issued by The GEC Electronic Tube Company Limited, a Management Company which unites the activities of The M-O Valve Company Limited and English Electric Valve Company Limited.

English Electric Valve Company Limited
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The M-O Valve Company Limited
Brook Green Works, Hammersmith, London W6 7PE
Telephone: 01-603-3431 Telex: 23435

BROADCASTING + COMMUNICATIONS

The following pages give abridged data for the current range of EEV/M-OV tubes, devices and accessories used in Broadcasting and Communications Equipment.

They comprise entries for:

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Comprehensive data sheets giving operating conditions, characteristic curves, and outline drawings are available on request.

Certain types listed in this catalogue may not be available from current production and their supply may be subject to a minimum order quantity.

Enquiries for special tubes not included in the catalogue are also welcome.

Colour Code

Throughout the data the following colour code is used:-

Brown indicates manufacture by English Electric Valve Company Ltd.

Blue indicates manufacture by The M-O Valve Company Ltd.

CARACTERISTIQUES ABREGÉES

Dans les pages suivantes sont données les caractéristiques abrégées pour la gamme courante de tubes, dispositifs et accessoires EEV/M-OV.

Des fiches de caractéristiques établissant les conditions de fonctionnement, les courbes et les schémas d'ensemble sont disponibles sur demande.

Certains types mentionnés dans ce catalogue peuvent ne pas être disponibles parmi les produits de production courante et leur livraison peut être sujette à la commande d'une quantité minimum.

Nous répondons également aux demandes de renseignements pour les tubes spéciaux non mentionnés dans ce catalogue.

Code des Couleurs

Pour toutes les indications nous utilisons le code de couleur suivant:

Marron: produits fabriqués par English Electric Valve Co Ltd

Bleu: produits fabriqués par M-O Valve Co Ltd

KURZGEFASSTE DATEN

Auf den folgenden Seiten finden Sie kurzgefaßte Daten für das gegenwertige Herstellungsprogramm von EEV/M-OV-Röhren, Geräten und Zubehör.

Ausführliche Datenblätter mit Betriebsbedingungen, Leistungskurven und Maßzeichnungen sind auf Anfrage erhältlich.

Es ist möglich, daß sich einige der in diesem Katalog angeführten Positionen nicht im gegenwertigen Produktionsprogramm befinden und daß daher deren Lieferung von einer Bestellung von Mindeststückzahlen abhängig gemacht werden muß. Anfragen wegen Spezialröhren, die nicht in diesem Katalog enthalten sind, bearbeiten wir gerne.

Farbkennzeichnung

Die folgende Farbkennzeichnung wird für die Daten verwendet:

Braun: Produkt der English Electric Valve Co Ltd

Blau: Produkt der M-O Valve Co Ltd

RESUMEN INFORMATIVO DE DATOS

En las páginas siguientes aparece un resumen informativo de datos correspondientes a la nueva gama de lámparas, dispositivos y accesorios EEV/M-OV.

Tendremos sumo gusto en facilitar, a solicitud de las partes interesadas, hojas con los datos completos, incluyendo condiciones de funcionamiento, curvas de característica y planos acotados.

Es posible que ciertos tipos detallados en este Catálogo no puedan obtenerse dentro de la línea normal de producción actual y su suministro puede estar sujeto a un pedido mínimo. Sírvanse solicitar información relativa a lámparas especiales, no incluidas en este Catálogo.

Clave de Colores

En todo lugar se ha utilizado la siguiente clave de colores:

Marrón indica fabricado por la English Electric Valve Co Ltd

Azul indica fabricado por la M-O Valve Co Ltd

DATI ABBREVIATI

Alle pagine seguenti figurano dati abbreviati inerenti la presente serie di valvole, dispositivi ed accessori EEV/M-OV.

Le pubblicazioni tecniche più approfondite, contenenti le condizioni di funzionamento, curve delle caratteristiche e disegni del contorno, vengono fornite su richiesta.

Alcuni modelli elencati nel presente catalogo non sono disponibili nella normale produzione e la relativa fornitura può essere subordinata all'ordinazione di un quantitativo minimo.

Nel caso di valvole speciali non incluse nel presente testo, il cliente è pregato di interpellarci.

Colore Codice

Nel presente opuscolo, si usa il seguente codice:-

il marrone indica che la valvola è costruita dalla English Electric Valve Co Ltd

il blu indica che la valvola è costruita dalla M-O Valve Co Ltd

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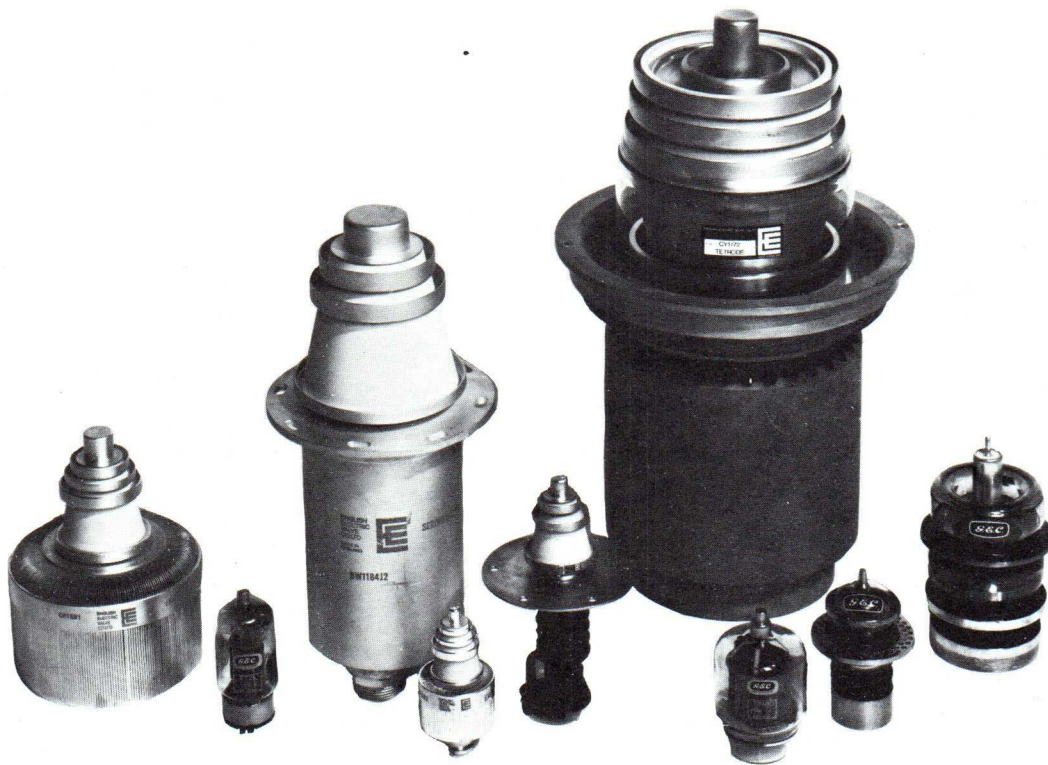
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Whilst the company has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice.

The company accepts no liability beyond that set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein.

M-OV Power Triodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)	Amplification factor	Filament ratings		Base
						(V)	(A)	
40	DA42 (CV2394)	0.2†	1.25	0.05	72	7.5	1.2	UX4
100	DA100 (CV1219)*■	0.3†	1.25	0.05	5.5	6.0	2.7	L4
275	V1505	1.0†	3.0	1.5	16	14	6.5	Special
380	DET40	1.2	4.0	150	28	5.0	15	B5F
1000	DET41	3.2	6.0	60	20	8.5	26	Special 4-Pin
1200	EHT7B	—	100	—	200	10	20	Flying lead
2000	DET42■	7.0	6.0	50	20	75	50	Special 4-Pin



Selection of Power Triodes and Tetrodes

EEV Power Triodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)	Amplification factor	Filament ratings		Base
						(V)	(A)	
25	3C24	0.1	2.0	60	25	6.3	3.0	Small UX4
1000‡ 500	B1152	2.4‡ 1.5	5.0	50	24	5.0	32.5	Special 4 pin
1500‡ 800	B1153	4.6‡ 2.7	6.0	50	22	6.3	32.5	Special 4 pin

■ Made to special order only.

* A pair of matched tubes with identical serial numbers can be supplied as the DA100B.

† Per pair of tubes.

§ Under Class C unmodulated conditions.

‡ Duty factor 0.2 averaging time 5s.

EEV Power Triodes — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
1.0	BR1167	—	2.0	30	12	6.0	10
1.5	BR1512●	2.7	5.5	250	20	6.3	33
1.5	BR1512A◆◆	2.7	5.5	250	20	6.3	33
2.5	BR1195●	4.6	7.2	85/160	20	6.3	33
3.0	BR1126△	7.0	6.0	30/110	30	15	39
3.5	BR1131A△	7.9	10	15/80	40	8.5	22
5.0	BR1160 (CV8730)	6.9	6.0	75/220	32	12.6	33
5.0	BR1165 (CV3926)	6.9	6.0	75/220	32	12.6	33
5.0	BR1196●	8.8	7.2	85/150	20	6.3	66
6.0	BR1162 (CV5239)●	10	7.2	30/85	32	12.6	33
8.0	BR140	—	12	15/40	45	19	75
8.0	BR179 (CV2323)	17	8.5	50/110	28	6.6	90
10	BR1106	15.5	6.6	30/220	30	5.0	175
10	BR1124●	20	8.5	100	37	6.0	115
10	BR1181●	26	8.0	100	11	6.6	103
10	BR1122 (CV10368)	29	12	5.0/110	37	6.0	115
15	BR161 (CV2322)	50	12	30/50	45	9.0	175
15	BR1121●	50	10	50	38	6.6	230
15	BR1182●	50	10	50	38	6.6	230
20	BR1102●	53	12	50	42	8.2	230
20	BR1183●	74	10	50	38	8.2	230
20	BR1143●	77.5	10	10	37	12	240
27	BR189 (CV5218)	80	15	5.0/50	34	9.0	240
35	BR1161 (CV9343)	100	14	10/30	90	11	155
40	BR194■	115	15	5.0/30	34	13	240

M-OV Power Triodes — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
0.4	ACT25 (CV436)△	0.256§	1.0	500/1000	75	13.5	2.8
0.8	ACT9△	2.8§	10	15/80	40	16	22
0.8	ACT9B△	2.8§	10	15/80	40	16	22
1.5	ACT27■	1.25§	1.5	160/500	50	15	6.7
1.5	ACT28 (CV2163)■	0.75§	11†	600	45	16	7.3
1.5	ACT28A (CV5326)■	300†	13†	600	45	16	7.3
2.0	ACM3△	1.0§	2.0	600	14	6.0	17

EEV Power Triodes — Water Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings		Water jacket
						(V)	(A)	
2.5	BW1195● BW1195J3●	4.6	7.2	85/160	20	6.3	33	BW4088A Integral
5.0	BW1196● BW1196J3●	8.8	7.2	85/150	20	6.3	66	BW4088B Integral
6.0	BW1165 BW1165J3	6.9	6.0	75/220	32	12.6	33	BW4088A Integral
6.0	BW1162● BW1162J3●	10	7.2	30/85	32	12.6	33	BW4088A Integral
7.5	CAT100●	27.5	10	40	23	6.5	95	—
10	BW179	17	8.5	50/110	28	6.6	90	BW4029
10	BW1124● BW1124J1● BW1124J2●	20	8.5	100	37	6.0	115	BW4029 Integral Integral
10	BW1122	29	12	5.0/110	37	6.0	115	BW4070
12	BW140 (CV2871)△	—	12	15/40	45	19	75	—
12	BW1181J3●	26	8.0	100	11	6.6	103	Integral
15	BW1121● BW1121J1● BW1121J2●	50	10	50	38	6.6	230	BW4034 Integral Integral
15	BW1182J1● BW1182J2●	52	10	50	38	6.6	230	Integral
18	BW153 (CV2872)△	—	15	20/40	45	19	100	—
20	BW1102● BW1102J2●	53	12	50	42	8.2	230	BW4028 Integral
20	BW1183J1● BW1183J2●	74	10	50	38	8.2	230	Integral
20	BW1176J1● BW1176J2●	82	10	20	38	8.2	230	Integral
30	BW1143● BW1143J2●	77	10	10	37	12	240	BW4050 Integral
35	BW189■	80	15	5.0/50	34	9.0	240	BW4050
50	BW194	115	15	5.0/30	34	13	240	BW4027
80	BW1184J2●	120	14.4	30	30	12.2	255	Integral
100	BW1144	200	14	27	34	9.6☆	290☆	BW4035
120	BW1185J2●	240	16.8	30	41	12.6	380	Integral
175	BW1156●	250	14	27	23	12.2☆	290☆	BW4035
175	BW1186J2●	250	14	27	23	18	330	Integral

Note Filament leads and grid connectors are available for most of the types listed above.

★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

☆ Per section.

§ Under Class C unmodulated conditions.

● Recommended for industrial heating service.

△ Maintenance type, not recommended for use in new equipment.

■ Made to special order only.

† Pulse only.

◆ BR1512 with mounting flange.

EEV Power Triodes — Vapour Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings		Boiler unit
						(V)	(A)	
10	BY1124●	20	8.5	100	37	6.0	115	BY4048A‡ BY4064▲
10	BY1122	29	12	5.0/110	37	6.0	115	BY4048A‡ BY4064▲
18	BY1121●	50	10	50	38	6.6	230	BY4032** BY4033▲ BY4063‡
25	BY1102●	53	12	50	42	8.2	230	BY4030** BY4031▲
35	BY1143●	77	10	10	37	12	240	BY4037‡ BY4038▲ BY4038A**
35	BY189A■	80	15	5.0/50	34	9.0	240	BY4037‡ BY4038▲ BY4038A**
50	BY194●	115	15	5.0/30	34	13	240	BY4039▲ BY4049‡
60	BY1161	120	14	10/30	90	11	155	BY4059‡ BY4093▲
125	BY1144● BY1144L●	200	14	27	34	9.6☆	290☆	BY4036▲ BY4060‡
125	BY1156●	250	14	27	23	12.2☆	290☆	BY4036▲ BY4060‡



Vapour Cooled Triodes BY1156 (left) and BY1161 (right)

Note Filament leads and grid connectors are available for most of the types listed above.

- Recommended for industrial heating service.

☆ Per section.

§ Under Class C unmodulated conditions.

- ★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

■ Made to special order only.

‡ Single unit, separate condenser required.

▲ Single unit with integral condenser.

** Double unit with integral condenser.

EEV Power Tetrodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (W) §	Anode voltage max (V)	Frequency (MHz)★	Amplification factor (g ₁ -g ₂)	Filament or heater		Base
						(V)	(A)	
2 x 10	C1134 (CV2799)††	48◆	600	150/600	8.0	12.6	0.65	B7A
						6.3	1.3	
2 x 20	C178A/5894 (CV2797)††	90◆	600	250/500	8.0	6.3	1.8	B7A
						12.6	0.9	
50	4D32 (CV3543)	140	750	60	10	6.3	3.75	B7A
90	C1158 (CV8061)§§	—	800	—	4.5*	13	2.6	B7A
						26	1.3	
125	C1108 (CV2130)	375	3000	120/200	6.2	5.0	6.5	B5F
250	C1112 (CV2131)	1000	4000	75/120	5.1	5.0	14.1	B5F
400	C1136 (CV5959)	1100	4000	110	5.1	5.0	14.5	B5F

M-OV Power Tetrodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (W) §	Anode voltage max (V)	Frequency (MHz)★	Amplification factor (g ₁ -g ₂)	Filament or heater		Base
						(V)	(A)	
37.5	TT21 (CV8286)	174	1250	30/60	8	6.3	1.6	B8.0
37.5	TT22	174	1250	30/60	8	12.6	0.8	B8.0
100	TT100	200	1250	30/100	5.5	6.3	3.6	B12F
						12.6	1.8	
450	TT26■	1160	4000	120	5.2	5.0	15	B5F

M-OV Power Tetrodes — Conduction Cooled

Anode dissipation max (kW)	Type	Output power (kW)	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g ₁ -g ₂)	Filament or heater	
						(V)	(A)
0.25	CCS1■⊕	0.4 §	2.0	175/500	5	6.0	2.6
0.25	CCS2■	0.4 §	2.0	175/500	5	6.0	2.6
0.30	YL1550	0.06◇	2.0	80◇	6	6.0	2.4



Conduction Cooled Power Tetrodes CCS1 (left), CCS2 (centre) and YL1550 (right)

§§ Series regulator tube; mutual conductance 35mA/V at $V_a = V_{g2} = 150V$, $I_a = 500mA$.

†† VHF double beam tetrode.

◆ With 2 sections in push-pull.

* Triode connected.

⊕ A heat conducting, electrically insulating, anode mounting block HC1 is available.

◇ In mobile radio applications, with $V_a = 800V$, $I_k = 165mA$, $V_{drive} = 40V$ crest, $I_{g1} \geq 4mA$.

M-OV Power Tetrodes — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g1-g2)	Filament or heater	
						(V)	(A)
0.25	4CX250B	0.4	2.0	175/500	5	6.0	2.6
3.0	(CV5219) ACS4 (CV10369)■	4.1	5.0	75/220	8.5	6.3	30.5

EEV Power Tetrodes — Forced air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g1-g2)	Filament or heater	
						(V)	(A)
1.0	4CX1000A	3.2†	3.0	110	—	6.0	9.0
1.5	4CX1500B	2.7†	3.0	30	—	6.0	9.0
1.5	CR1502	2.2‡	4.0	260	16	4.2	53
5.0	4CX5000A (CV8295)	16	7.5	30/110	4.5	7.5	75
10	CR192A (CV8244)	9.0	6.9	60/220§	10	5.0	175
10	4CX10,000D (CV6184)	16	7.5	30/110	4.5	7.5	75
12	6166A	12	7.5	60/220§	10	5.0	175
12	CR1501	13‡	9.0	260	8.5	8.0	120
15	4CX15,000A	36.5	10	110	4.5	6.3	160
35	4CX35,000C (CV11107)	82	20	30	4.5	10	300

EEV Power Tetrodes — Water Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g1-g2)	Filament ratings		Water jacket
						(V)	(A)	
10	4CW10,000A	16	7.5	30/110	4.5	7.5	75	Integral
20	CAS1■	13	8.0	220	5.5	10	110	Integral
25	4CW25,000A	36.5	10	110/225	4.5	6.3	160	Integral
150	CW1506J2	220*	15	30	4.0	20	340	Integral

EEV Power Tetrodes — Vapour Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)	Amplification factor (g1-g2)	Filament ratings		Boiler unit
						(V)	(A)	
75	CY1170J	82	15	30	4.5	10	300	Integral
150	CY1172	220*	15	30	4.0	20	340	CY4120

★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

§ Under Class C unmodulated conditions.

† Two tubes, class AB1, audio.

‡ Class B service.

■ Made to special order only.

* Class C, anode and screen modulated.

◆ Low noise type.

● UHF diode.

EEV Power Pentode — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW)	Anode voltage max (kV)	Screen voltage max (kV)	Frequency (MHz)	Amplification factor (g ₁ -g ₂)	Filament ratings	
							(V)	(A)
1.5	5CX1500A	3.2†	5.0	0.75	110	5.5	5.0	40

M-OV Conduction-cooled Disc-seal Tubes

Anode dissipation max (W)	Type	Output power (W)	Anode voltage max (V)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
10	DET22 (CV273)	4.0	350	1000/3000	30	6.3	0.4
10	DET23◆	—	350	—	70	6.3	0.4
10	DET29 DET29M CV5400	1.5	450	4000/5000	55	6.3	0.5
20	A3012■	—	—	—	—	6.3	1.0
20	DET24 (CV397)	10	400	1000/2000	28	6.3	1.0

The DET22 series of disc-seal triodes consists of a range of mechanically identical tubes with electrical characteristics selected into various bands. The DET22 (CV273) is the basic type and has the widest characteristic spread, while the DET22D, E, G, R and S have more tightly controlled characteristics. All the types give similar performance, but one or other of the selections may be preferred when the range of circuit adjustment is limited.

Details of other DET22 variants available on request.

Type	at $V_a = 250V$			c_{a-g} (pF) (measured on a cold unscreened tube)
	at $I_a = 40mA$		at $I_a = 20mA$	
	$-V_g$ (V)	$-V_g$ (V)	g_m (mA/V)	
DET22	—	5.0 ± 4	6.0 ± 3	1.05 ± 0.35
DET22D■	5.5 ± 2.5	8.0 ± 2	6.0 ± 2	1.05 ± 0.35
DET22E■	2.0 ± 1	6.0 ± 1	6.0 ± 2	1.05 ± 0.35
DET22G■	—	5.5 ± 3.5	6.3 ± 1.7	1.13 ± 0.07
DET22R■	—	6.7 ± 2.2	6.3 ± 1.7	1.1 ± 0.1
DET22S■	—	6.7 ± 2.2	6.3 ± 1.7	0.95 ± 0.25



Conduction Cooled Disc-seal Triode DET24

M-OV Tetrodes

Anode dissipation max (W)	Type	Anode voltage max (V)	Anode current (mA)	Mutual conductance (mA/V)	Filament ratings		Base
					(V)	(A)	
4.0	D3a●	220	22	35	6.3	0.32	B9A
30	KT66 (CV1075)¶	550	85	7.3	6.3	1.6	B8.0
35	(CV345) 12E1 (CV8025)▲	800	200	13	6.3	1.6	B8.0
42	KT88 (CV5220)¶	800	150	12	6.3	1.6	B8.0

EEV High Vacuum Rectifiers

Peak inverse voltage max (kV)	Type	Average anode current max (mA)	Peak anode current max (A)	Filament		Base
				Voltage (V)	Current (A)	
20	3B24W (CV2858)	60	0.3	2.5/5.0	6.0/3.0	B4G
45	(CV2160) A207 (CV8051)	350	1.1	4.0	12	G.E.S.
65	A237 (CV482)	250	1.5	4.0	12	G.E.S.

M-OV High Vacuum Rectifiers

Peak inverse voltage max (kV)	Type	Average anode current max (mA)	Peak anode current max (A)	Filament or heater		Base
				Voltage (V)	Current (A)	
1.375	CV4005‡	75.0	0.230	6.3	0.6	B7G
7.1	U19 (CV187)	250	1.5	4.0	3.3	B4

M-OV Surge Protection Devices

Anode voltage (kV)	Type	Peak anode current (A)	Trigger voltage (V)	Anode/cathode breakdown time (μ s)	Total discharge per operation (Coulombs)	Trigger duration (μ s)
6.0	SD6000■	2000	3500	0.5	0.5	1.0
15	SD15000	2000	3500	1.5	5.0	1.0
15	SD15000A■	2000	§	1.5	5.0	—

§ The SD15000A is a self-triggered diode. It fires if the rate of rise of anode voltage exceeds $3\text{ kV}/\mu\text{s}$ but does not fire if the rate of rise of anode voltage is less than $30\text{ kV}/\text{ms}$.

- ▲ Series stabilizer type.
- Wideband amplifier type.
- ¶ Audio type.

- ‡ Special quality.
- Made to special order only.

EEV High Vacuum Variable Capacitors — Glass Envelope

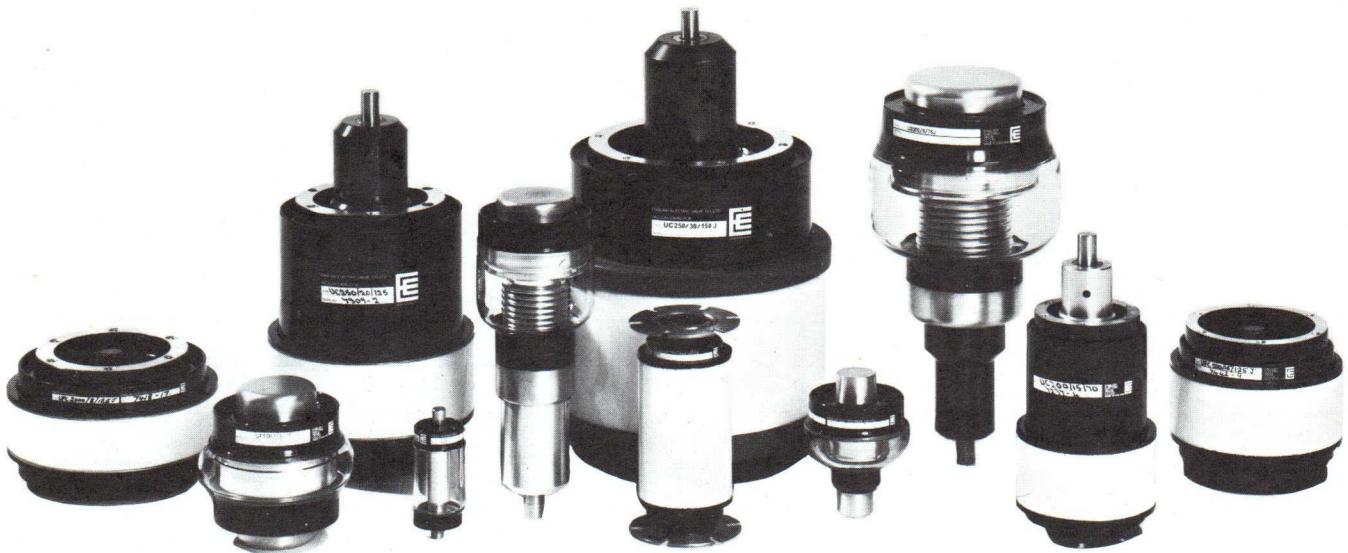
Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
5.0–30	U30/15/20	—	15	20	10.4	Integral
8.0–50	U50/15/30	—	15	30	10.4	Integral
4.0–50	U50/20/40	—	20	40	22	MA52, MA164
6.0–60	U60/30/75	—	30	75	35	MA54, MA125
4.0–75	U75/15/40	—	15	40	22.5	MA52, MA164
16–80	U80/15/40	—	15	40	10.4	Integral
16–90	U90/15/40	—	15	40	10.4	Integral
7.0–100	U100/20/40	—	20	40	22.5	MA52, MA164
8.0–100	U100/25/75	—	25	75	35	MA54, MA125
7.0–150	U150/15/40	—	15	40	23.5	MA52, MA164
10–150	U150/25/75	—	25	75	36	MA54, MA126
5.0–200	U200/10/40	—	10	40	22	MA52, MA164
7.0–200	U200/15/40	—	15	40	24	MA52, MA164
7.0–200	U200/15/40A	—	15	40	24	MA52, MA125
10–200	U200/20/75	—	20	75	35.5	MA54, MA125
10–250	U250/15/75J	UXCF250	15	75	22	MA54, MA125☆
7.0–300	U300/10/40	—	10	40	23	MA52, MA164
10–300	U300/15/40	—	15	40	22.5	MA52, MA164
11–300	U300/20/75	—	20	75	36	MA54, MA126
11–300	U300/20/75A	—	20	75	36	MA54, MA126
7.0–400	U400/10/40	—	10	40	23.5	MA52, MA164
7.0–400	U400/10/40A	—	10	40	23.5	MA52, MA164
5.0–500	U500/3/40J	USL500	3.0	40	19	Integral, MA281
5.0–500	U500/5/40J	USL500	5.0	40	19	Integral, MA281
10–500	U500/10/40	—	10	40	23.5	MA52, MA164
10–500	U500/10/40A	—	10	40	23.5	MA52, MA125
12–500	U500/15/75	—	15	75	36	MA54, MA125
12–500	U500/15/75A	—	15	75	36	MA54, MA125
15–500	U500A/15/75J	UXCF500	15	75	25.5	2 MA126☆
12–600	U600/8/40	—	8.0	40	23.5	MA52, MA164
5.0–650	U650/3/40	—	3.0	40	19	Integral, MA281
10–750 ϕ	U750/5-20/40J	UCSLPS10-750	5.0/20	40	Pull rod	MA52
15–750	U750/10/40	—	10	40	23	MA52, MA164
15–750	U750/10/40A	—	10	40	35.5	MA52, MA164
10–750	U750/10/75J	UCSXF750	10	75	27	MA54, MA125
20–750	U750/15/75	—	15	75	36.5	MA54, MA126
7.0–1000	U1000/3/40	—	3.0	40	15.5	MA52, MA296
7.0–1000	U1000/3/40A	—	3.0	40	15.5	MA52
7.0–1000	U1000/3/40C	—	3.0	40	15.5	MA52, MA296
20–1000	U1000/10/75J	UCSX1000	10	75	36	MA54, MA125

☆ Supplied with the capacitor.

ϕ Special non-linear characteristic.

EEV High Vacuum Variable Capacitors — Glass Envelope continued

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
7.0–1000	U1000A/3/40J	Special	3.0/6.0	40	Pull rod	Integral, MA296
7.0–1000	U1000A/3/40JA	Special	3.0/6.0	40	Pull rod	Integral, MA296
7.0–1000	U1000A/3/40JB	UCSL1000	3.0/6.0	40	18	MA52, MA296
7.0–1000	U1000A/3/40JD	UCSL1000	3.0/6.0	40	18†	MA52, MA296
12–1000	U1000A/10/75J	UCSXF1000	10	75	31	MA54, MA125
15–1000	U1000B/10/75	—	10	75	37	MA54, MA125
15–1200	U1200/10/75J	UCSXF1200	10	75	35	MA54, MA125
25–1500	U1500/8/75	—	8.0	75	36	MA54, MA126
10–2000	U2000/3/40	UCSL2000	3.0	40	32	MA52, MA125
10–2000	U2000/3/40A	—	3.0	40	25	MA52, MA125
10–2000	U2000/3/40B	—	3.0	40	Pull rod	MA100, MA125
10–2000	U2000/3/40C	—	3.0	40	32	MA52, MA125
50–2000	U2000/8/75J	UCSXF2000	8.0	75	33	MA54, MA126
50–2000	U2000/8/75JA	UCSXF2000	8.0	75	35	MA54, MA126
30–2000	U2000A/8/75	—	8.0	75	35	MA54, MA126
30–2000	U2000A/8/75A	—	8.0	75	34	MA54, MA126
15–3000	U3000/3/40J	UCSL3000	3.0	40	26	MA52, MA125
20–4000	U4000/2/40	—	2.0	40	30	MA52, MA125



Selection of Vacuum Capacitors

EEV High Vacuum Variable Capacitors — Miniature Ceramic Envelope

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 16MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
8.0–400	UCM400/5/25	CMV1-400	5.0	25	Pull rod	Integral
5.0–500	UCM500/5/25	CMV1-500	5.0	25	Pull rod	Integral
12–2000	UCM2000/5/40	CMV1-2000	5.0	40	Pull rod	Integral
20–2000	UCM2000A/5/40	—	5.0	40	20	Integral

EEV High Vacuum Variable Capacitors — Ceramic Envelope

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
15–200	UC200/15/70	CVDD200	15	70	24.5	Integral
15–250	UC250/20/125	—	20	125	33	Integral
15–250	UC250/25/125J	CVFP250	25	125	27	Integral
10–250	UC250/30/150J	CVHP250	30	150	55	Integral
10–250	UC250/30/150JA	VMMHC250*	30	150	55	Integral
10–250	UC250/30/150JD	VMMHC250*	30	150	55	Integral
10–300	UC300/10/70J	CVDD300	10	70	19	Integral
25–450	UC450/30/150J	CVHP450	30	150	42	Integral
25–450	UC450A/30/150	VMMHC450*	30	150	52	Integral
30–650	UC650/30/150J	CVHP650	30	150	56	Integral
20–750	UC750/20/150J	CVFP750	20	150	43.5	Integral
35–880	UC880/15/125	—	15	125	34	Integral
25–1000	UC1000/8/125J	CVDD1000	8.0	125	24	Integral
25–1000	UC1000/10/125J	CVDD1000	10	125	24	Integral
35–1000	UC1000/15/125	—	15	125	38.5	Integral
50–1000	UC1000/15/150J	CVDP1000	15	150	22	Integral
35–1000	UC1000/20/150J	CVFP1000	20	150	49	Integral
60–1000	UC1000A/20/150	VMMHC1000*	20	150	56	Integral
35–1500	UC1500/8/125J	CVDP1500	8.0	125	24	Integral
35–1500	UC1500/10/125J	CVDP1500	10	125	24	Integral
100–1500	UC1500/15/150J	CVDP1500	15	150	30	Integral
100–1500	UC1500/20/150J	CVFP1500	20	150 [‡]	62	Integral
100–2000	UC2000/12/150J	CVDP2000	12	150	40.5	Integral
50–2300	UC2300/8/125J	CVDP2300	8.0	125	35	Integral
50–2300	UC2300/10/125J	CVDP2300	10	125	35	Integral
25–2500	UC2500/5/60J	CVCC2500	5.0	60	Pull rod	Integral

EEV High Vacuum Fixed Capacitors — Glass Envelope

Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Mounting flange
6.25	UF6/15/7	X–6.25	15	7.0	—
10	UF10/15/7J	X–10	15	7.0	—
12	UF12/20/40	VCCA12	20	40	MA281 or MA282
25	UF25/20/40	VCCA25	20	40	MA281 or MA282
50	UF50/10/40	JCS1-50	10	40	MA164
50	UF50/20/40	VCCA50	20	40	MA281 or MA282
75	UF75/10/40	JCS1-75	10	40	MA164

[†] 21 turns over extended range.

[‡] Up to 16MHz.

* Adaptor kit available for EEV type.

EEV High Vacuum Fixed Capacitors — Glass Envelope continued

Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Mounting flange
100	UF100/10/40	JCS1-100	10	40	MA164
150	UF150/10/40	JCS1-150	10	40	MA164
250	UF250/8/40	JCS1-250	8.0	40	MA164
300	UF300/10/50	—	10	50	MA125
300	UF300/15/75	—	15	75	MA125
500	UF500/10/50	—	10	50	MA125
750	UF750/8/75	—	8.0	75	MA125
800	UF800/3/50J	JCSL800	3.0	50	—
900	UF900/3/50J	JCSL900	3.0	50	—
1000	UF1000/8/75	—	8.0	75	MA125
2000	UF2000/7/75	—	7.0	75	MA126

EEV High Vacuum Fixed Capacitors — Ceramic Envelope

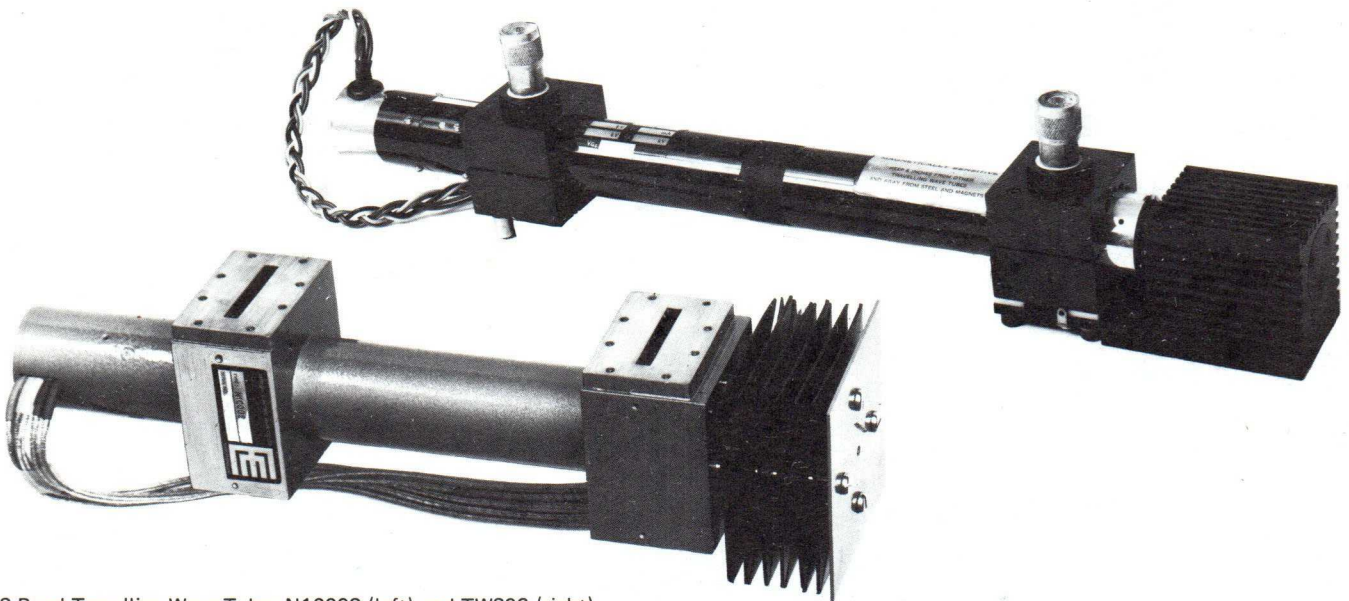
Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Mounting flange
6.5	UFC6/30/140J	CFHE6.5	30	140	Integral
12	UFC12/30/140J	CFHE12	30	140	Integral
18.5	UFC18/30/140J	CFHE18.5	30	140	Integral
34	UFC34/30/140J	CFHE34	30	140	Integral
40	UFC40/30/140J	CFHE40	30	140	Integral
50	UFC50/30/140J	CFHE50	30	140	Integral
100	UFC100/15/80	—	15	80	Integral
100	UFC100/15/140	—	15	140	Integral
100	UFC100/30/120J	CFHD100	30	120	Integral
150	UFC150/15/140	—	15	140	Integral
450	UFC450/12/125J	CFED450	12	125‡	Integral
450	UFC450/15/125J	CFED450	15	125‡	Integral
500	UFC500/12/125J	CFED500	12	125‡	Integral
500	UFC500/15/125J	CFED500	15	125‡	Integral
750	UFC750/15/125	—	15	125	Integral
1000	UFC1000/15/125	—	15	125	Integral
1000	UFC1000/20/200	—	20	200‡	Integral
1000	UFC1000A/12/125J	CFED1000	12	125‡	Integral
1000	UFC1000A/15/125J	CFED1000	15	125‡	Integral
1500	UFC1500/12/125	—	12	125	Integral
2000	UFC2000/8/125J	CFDP2000	8.0	125	Integral
3000	UFC3000/7/125	—	7.0	125	Integral

‡ Up to 16MHz.

In addition to the range of communications tubes specified below, a series of helix type travelling wave tubes with c.w. power levels up to 500W is also available. These tubes are designed primarily for rugged military applications and are ideally suited to communications applications where higher power or resistance to extreme environmental conditions are required. Abridged details are given in the publication 'Tubes for Radar'.

EEV Travelling Wave Tubes — S-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB) ¶	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
3.55–4.2	N1073Z †	20	23	38	2.97	1.7	45	Waveguide	N4136★☆
3.55–4.2	N10004 †	35	23	41	3.2	2.4	60	Waveguide	N4136★☆
3.6–4.2	N1086 †	17	24	39	3.03	1.3	40	Coaxial	Integral★
3.55–5.0	N1073 †	20	23	40	2.97	1.7	45	Waveguide	N4136★☆
3.55–5.0	N10002 †	20	23	40	2.97	1.7	45	Waveguide	Integral★☆
3.8–4.8	N1033 (CV5403) △	7.0	28	37	2.17	1.4	24	Waveguide	N4006⊕■
3.6–5.0	N1056 △	17	27	38	3.0	2.0	45	Waveguide	N4074□△ N4075□△



S-Band Travelling Wave Tubes N10002 (left) and TWS36 (right)

M-OV Travelling Wave Tubes — S-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB) ¶	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
1.67–1.9	TWS25 ■	15	30	33	2.1	2.0	75	Coaxial	PPM★
1.7–2.3	TWS10/7642	18	28	30	2.1	2.3	73	Coaxial	PPM
1.7–2.3	TWS36	18	28	30	2.1	2.3	73	Coaxial	PPM★
1.7–2.7	TWS12	20	30	34	2.15	2.2	75	Coaxial	PPM
1.9–2.33	TWS24 ■	18	30	35	2.1	2.0	75	Coaxial	PPM

- ☆ Convection cooled version available.
- ★ Conduction cooled periodic permanent magnet.
- † High efficiency design to minimize power consumption.
- ⊕ Solenoid.
- Made to special order only.

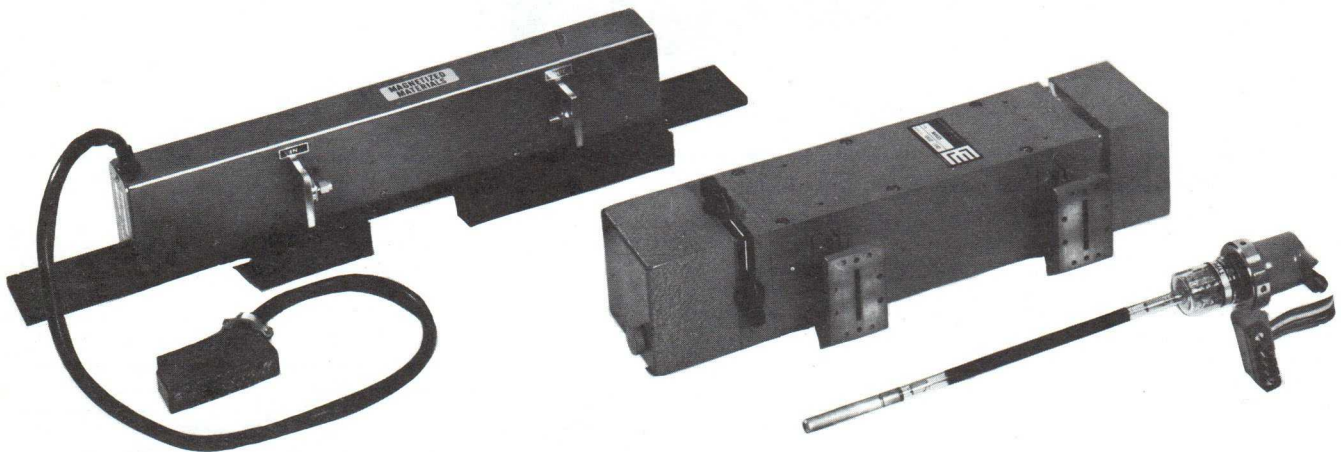
- △ Maintenance type, not recommended for use in new equipment.
- ¶ Gain at 3dB below saturation output power level.
- Conduction cooled periodic permanent magnet. Covers part of frequency range given.

EEV Travelling Wave Tubes — C-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
5.925–6.425	N1070 ■	10	27	35	2.52	1.5	30	Waveguide	N4132▲■
5.925–6.425	N10003 †	35	23	44	3.9	2.0	60	Waveguide	Integral★☆
5.8–7.2	N1029 △	10	27	43	2.64	1.8	35	Waveguide	N4047★■
5.85–7.15	N1055 △	18	27	43	3.4	2.0	45	Waveguide	N4085□△ N4094□△
5.8–7.2	N1072 †	20	23	44	3.4	1.7	45	Waveguide	N4135★☆
5.8–7.2	N10001 †	20	23	43	3.4	1.7	45	Waveguide	Integral★☆

M-OV Travelling Wave Tubes — C-Band

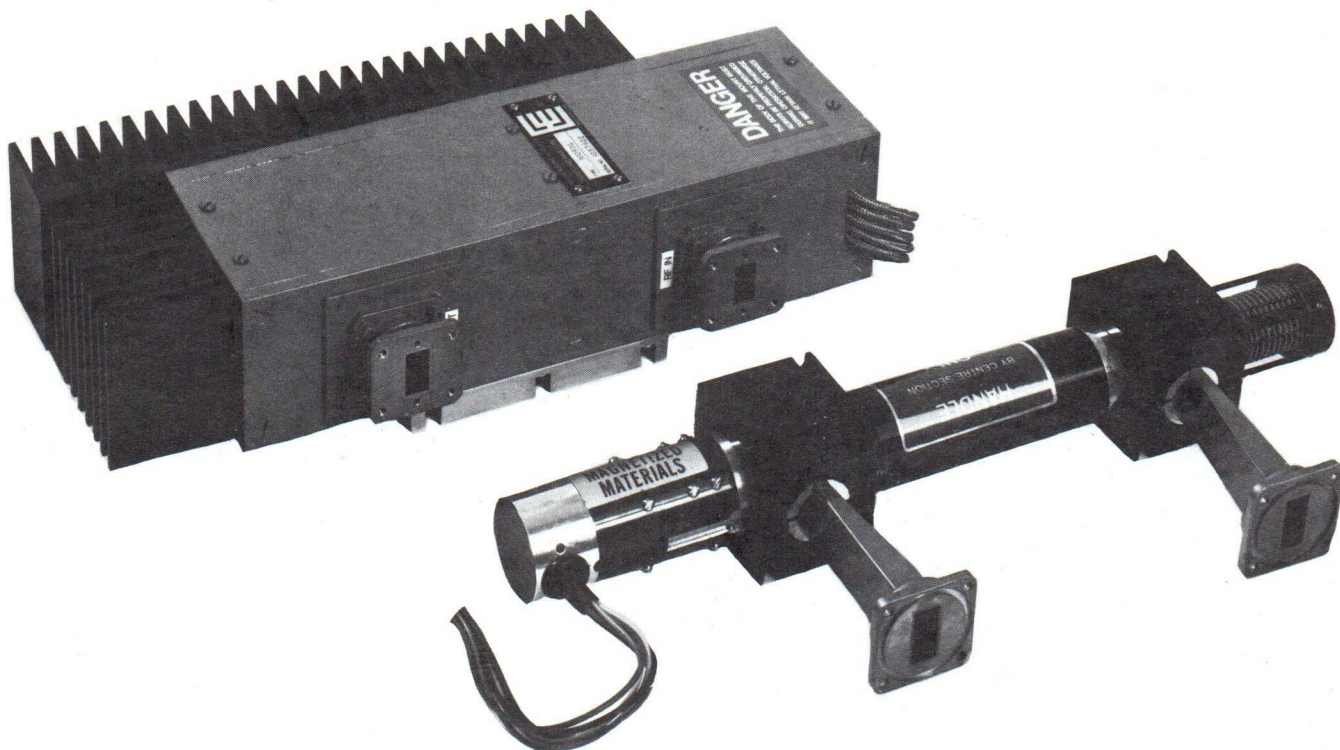
Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
5.925–6.425 7.4–7.8 6.9–7.4 6.425–7.11	TWC5 (CV5438) TWC5A TWC5B TWC5C	10	28	37	3.7	1.8	40	Waveguide	PMC5▲
5.925–6.425 7.4–7.8 6.9–7.4 6.425–7.11	TWC14 (CV11039) TWC14A TWC14B TWC14C	18	27	36.5 33 33 36.5	3.2	1.8	45	Waveguide	PMC14▲
5.925–6.425 7.4–7.8 6.9–7.4 6.425–7.11	TWC35 † TWC35A ■† TWC35B ■† TWC35C ■†	15	25	38 35 35 38	3.5	1.3	35	Waveguide	PPM▲†
5.925–6.425 7.4–7.8 6.9–7.4 6.425–7.11	TWC37 † TWC37A ■† TWC37B ■† TWC37C ■†	15	25	38 35 35 38	3.5	1.3	35	Coaxial	PPM★☆☆†



C-Band Travelling Wave Tubes TWC37 (left) and N1072 with Mount (right)

M-OV Travelling Wave Tubes — X-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB) †	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
7.0–11.5	TWX8	0.5	30	35	2.4	2.7	8.0	Waveguide	PPM▲
7.0–11.5	TWX22§	0.5	30	35	2.3	2.6	8.0	Waveguide	PPM▲
7.0–11.5	TWX34§	0.5	30	35	2.3	2.6	8.0	Waveguide	PPM▲



X-Band Travelling Wave Tubes N1095 (left) and TWX22 (right)

EEV Travelling Wave Tubes — X-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB) †	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
7.0–8.5	N1038△	10	27	40	2.79	1.8	35	Waveguide	N4051★■
7.0–8.5	N1071	20	24	43	3.38	2.0	45	Waveguide	N4134★☆
7.0–8.5	N10000	20	24	43	3.38	2.0	45	Waveguide	Integral★☆
9.5–12.4	N1065§	38	28	40	4.83	2.0	64	Coaxial	Integral★
10.7–13.25	N1095	20	25	40	4.2	1.7	40	Waveguide	Integral★☆
10.7–13.25	N1093	35	25	43	4.2	2.3	65	Waveguide	Integral★☆

△ Maintenance type, not recommended for use in new equipment.

† High efficiency design to minimize power consumption.

☆ Convection cooled version available.

□ Conduction cooled periodic permanent magnet. Covers part of frequency range given.

★ Conduction cooled periodic permanent magnet.

† Gain at 3dB below saturation output power level.

■ Made to special order only.

▲ Convection cooled periodic permanent magnet.

§ Rugged.

EEV Amplifier Klystrons — CW Operation for Television Service

Output power† (kW)	Type	Mechanical tuning range (MHz)	Typical Operation					Cooling (see foot of page)	Circuit assembly
			Drive power‡ (W)	Drive power● (W)	Beam voltage (kV)	Beam current (A)			
6.0	K383	470–610	1.0	—	9.5	1.9	1	K4140	
6.0	K384	590–720	1.0	—	9.5	1.9	1	K4141	
6.0	K385	700–860	1.0	—	9.5	1.9	1	K4142	
7.5	K3004	470–610	1.0	—	10.5	2.2	1,3	K4145	
7.5	K3005	590–720	1.0	—	10.5	2.2	1,3	K4146	
7.5	K3006	700–860	1.0	—	10.5	2.2	1,3	K4147	
11**	K365*	400–610	5.0	—	17.0	1.8	1,2	K4019A	
11.5	K370	470–606	1.0	—	12.5	2.8	1,3	K4145	
11.5	K371	606–742	1.0	—	12.5	2.8	1,3	K4146	
11.5	K372	742–854	1.0	—	12.5	2.8	1,3	K4147	
28.0	K376††	470–610	2.0	—	18.0	4.8	1,2	K4163	
28.0	K377‡‡	590–720	2.0	—	17.5	4.5	1,2	K4164	
28.0	K3014	470–610	2.0	1.5	18.0	4.6	1,2,3	K4158	
28.0	K3015	590–720	1.2	1.0	18.0	4.6	1,2,3	K4159	
28.0	K3016	700–860	1.2	1.0	18.0	4.6	1,2,3	K4160	
28.0	K3082	470–610	0.9	—	18.5	4.8	1,2,3	K4158	
45.0			0.9	—	22.0	6.4			
28.0	K3083	590–720	1.1	—	18.5	4.8	1,2,3	K4159	
45.0			0.9	—	22.0	6.4			
28.0	K3084	700–860	1.1	—	18.5	4.8	1,2,3	K4160	
45.0			0.9	—	22.0	6.4			
28.0	K3282	470–610	0.9	—	18.5	5.0	1,2,3	K4158	
45.0			0.9	—	22.0	6.5			
28.0	K3283	590–720	1.1	—	18.5	5.0	1,2,3	K4159	
45.0			0.9	—	22.0	6.5			
28.0	K3284	700–860	1.1	—	18.5	5.0	1,2,3	K4160	
45.0			0.9	—	22.0	6.5			
47.0	K3017	470–610	4.0	1.5	21.5	6.2	1,2,3	K4158	
47.0	K3018	590–720	1.5	1.2	21.5	6.2	1,2,3	K4159	
46.0	K3019	700–860	1.2	1.0	21.5	6.2	1,2,3	K4160	
47.0	K3217	470–610	4.0	1.5	21.5	6.3	1,2,3	K4158	
47.0	K3218	590–720	1.5	1.2	21.5	6.3	1,2,3	K4159	
46.0	K3219	700–860	1.2	1.0	21.5	6.3	1,2,3	K4160	
55.0	K3382	470–566	2.0	—	22.0	7.0	1,2,3	K4166	
55.0	K3383	566–698	2.0	—	22.0	7.0	1,2,3	K4167	
55.0	K3384	694–890	2.0	—	22.0	7.0	1,2,3	K4168	

Note: Beam perveance of K365 is 1×10^{-6} ; perveance of other types listed above is 2×10^{-6} .

Power Klystron Cooling

- 1 Forced-air cooled.
- 2 Water cooled.
- 3 Vapour cooled.

† At klystron output flange.

** Bandwidth 6MHz.

● Bandwidth 7MHz.

‡ Bandwidth 8MHz.

☆ Equivalent to SAL89.

* Near equivalent of 4KM50,000LA3.

†† Near equivalent of 4KM100LA.

‡‡ Near equivalent of 4KM100LF.

★ Vapour cooled.

■ Made to special order only.

EEV Amplifier Klystrons — CW Operation for Tropospheric Scatter Service

Output power (kW)	Type	Mechanical tuning range (MHz)	Narrow Band Operation				Cooling (see foot of page A20)	Circuit assembly
			Drive power (W)	Beam voltage (kV)	Beam current (A)			
2.3	3KM3000LA	375–585	2.0	9.0	0.6	1	—	
2.8	3K3000LQ	610–985	10	9.0	0.6	1	—	
10	3K50,000LF	570–720	17	16	1.7	1,2	—	
10.5	4KM50,000LQ	610–985	0.05	17	1.7	1,2	—	
11.5‡	K386	755–985	0.5	12	2.7	1,3	K4148	
12	4KM50,000LR	755–985	0.05	17	1.8	1,2	—	

Note: Beam perveance of K386 is 2×10^{-6} ; perveance of other types listed above is 1×10^{-6} .

EEV Amplifier Klystron — Pulse Operation

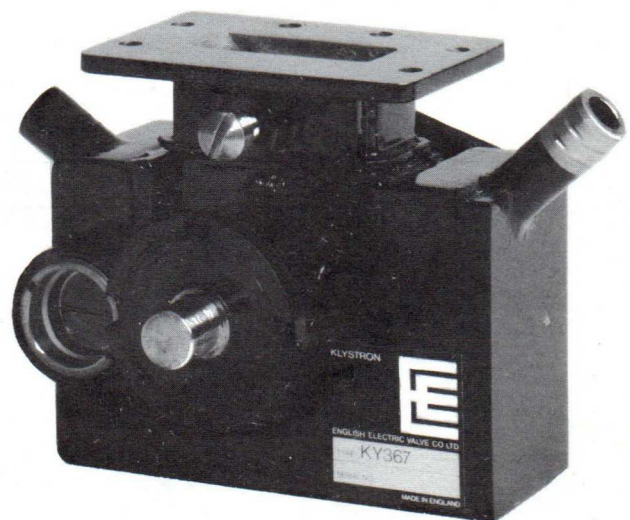
Output power (peak) (kW)	Type	Mechanical tuning range (MHz)	Gain (dB)	Pulse duration (μ s)	Pulse repetition rate (p.p.s.)	Beam voltage (peak) (kV)	Beam current (peak) (A)	Cooling (see page A20)	Focus
11.5	K3099☆	960–1215	26 min	3.5	7200	12.5	4.2	1	Space charge

EEV Oscillator Klystrons

Mechanical tuning range (GHz)	Type	Output power (W)	Electronic tuning range (MHz)	Beam voltage (V)	Base	Application
6.125–7.90	KY366T series★	1.2	38	750	Octal	Communications relay
6.125–7.90	KY367T series★	1.2	38	750	Octal	Communications relay
5.9–8.5	K3114 series	1.5	55	750	Octal	Communications relay

EEV Floating Drift Tube Klystrons

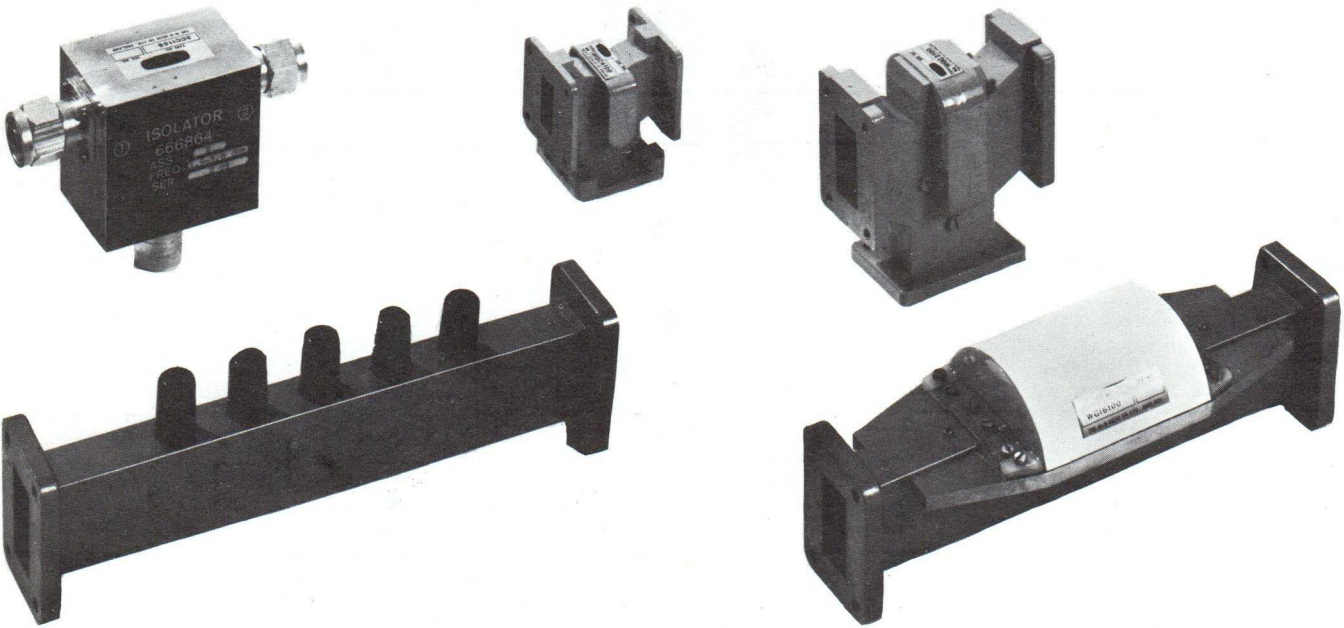
Designs for Floating Drift Tube Klystrons cover mechanical tuning ranges centred around 23GHz and 35GHz and provide output powers of 10 to 20W. Customers' enquiries for tubes to suit particular applications are invited. These tubes are made to special order only.



Oscillator Klystrons KY366T (left), KY367T (right)

M-OV Mixers

Operating frequency range (MHz)	Type	Description	Local oscillator power (mW)	I.F. output impedance	Power output (mW)	Noise* factor (dB)	Diodes
5925-6425	HMC1	Transmitter	30-40	—	—	—	CV2154/5
5925-6425	HMC2	Receiver	1-2	20pF	—	10	GEM1/2
5925-6175	HMC3	Receiver	1.0	150Ω 15pF	—	8.5	AAV39
6175-6425	HMC4	Receiver	1.0	150Ω 15pF	—	8.5	AAV39
7300-7800	HMC5	Receiver	1.0	—	—	11	GEM4
7300-7800	HMC6	Receiver	1.0	—	—	11	GEM3
7300-7800	HMC7	Transmitter	500 at 7GHz 280 at 105MHz	—	250	—	ZC70C Group G
6000	HMC8	Transmitter	500	I.F. input to varactor 3 volts	150	—	ZC70C Group G



Selection of Microwave Components

M-OV Filters

M-OV has extensive facilities for the production of bandpass filters in waveguide from S-band through X-band. Filters can be constructed in Invar for maximum temperature stability and lowest possible losses in the pass-band are ensured by special plating methods. The following is a typical example.

Operating frequency range (MHz)	Type	Bandwidth (MHz)	Mid-band insertion loss (dB)	Ripple in band (dB)	Insertion loss (dB)		V.S.W.R.	R.F. connection
					±45MHz	±75MHz		
7418-7732	BPF1	±10	0.75	0.1	22	45	1.09	WG14

■ Made to special order only

* With 3dB I.F. noise factor

M-OV Broadband Isolators

Operating frequency range (GHz)	Type	Forward loss max (dB)	Reverse loss min (dB)	V.S.W.R.	Power max (W) †		Connectors
					Forward	Reverse	
5.0–10.0	2CI8501	1.0	20	1.25	5	1	SMA
8.0–12.4	2CI8502	1.0	20	1.25	5	1	SMA

M-OV Waveguide Isolators

Frequency range (GHz)	Type	Bandwidth	Insertion loss (dB)		V.S.W.R.	Waveguide ‡	Length (in)
			Forward (max)	Reverse (max)			
3.8–4.8	WGI8050/fo	5%	0.60	30	1.07	WG12	6.0
5.9–6.45	WGI6100	as range	0.35	35	1.02	WG14	8.0
5.9–6.5	WGI9050/fo	5%	0.50	25	1.07	WG14	4.0
6.3–7.9	WGI9020/fo	2%	0.50	25	1.07	WG14	4.0
6.4–7.1	WGI7100	as range	0.30	30	1.05	WG14	8.0

M-OV 3-Port Coaxial Circulators and Isocirculators

Configuration: T-form with either plugs or sockets on each port. Connections may also be in WG14, 15 or 16 at relevant frequencies to special order.

Temperature Performance: This is normally 0°–40°C for full bandwidth performance but can be extended by temperature compensation.

Isocirculators 3CI Series: The full range of circulators may be supplied with a built-in matched load on any specified port. This load is normally of low power (0.25 watts) but higher power loads can be fitted to special order.

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Power max (W)	Connectors
Standard Range							
1.3–3.0	3CC1100/fo	10%	30	1.07	0.25	25	Type N or APC7
1.3–3.0	3CC1200/fo	20%	27	1.10	0.25	25	Type N or APC7
3.0–5.0	3CC2100/fo	10%	30	1.07	0.20	15	Type N or APC7
3.0–5.0	3CC2200/fo	20%	27	1.10	0.20	15	Type N or APC7
6.0–8.0	3CC3100/fo	10%	30	1.07	0.15	10	Type N or APC7
6.0–8.0	3CC3101/fo	10%	24	1.15	0.20	10	SMA
8.0–12.4	3CC4100/fo	10%	24	1.15	0.20	5	SMA
Special Range							
1.7–2.0	3CC115S	–	30	1.07	0.20	50	Type N
1.9–2.3	3CC120S	–	30	1.07	0.20	50	Type N
3.7–4.2	3CC210S††	–	30	1.07	0.20	15	Type N
7.2–7.8	3CC310S††	–	30	1.07	0.12	10	Type N

† Provisional

‡ Rectangular flange

†† Temperature range $\pm 20^\circ\text{C}$ about any operating temperature from 0°C to 60°C

M-OV 3-Port Miniature Microstripline Circulators and Isocirculators

These devices may either be supplied as separate (5 micron gold) 50 ohm circuits on high quality alumina substrates together with magnets or as miniature devices encased in aluminium boxes with SMA connectors. They are usually T-form but other configurations are available. The isolators have integrated thin film matched loads which will withstand up to 0.1W reverse power. Temperature range is 0–60°C.

Frequency range (GHz)	Type	Bandwidth★	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Substrate size (in)
2.0–4.0	3MC1200/fo §	20%	20	1.23	0.35	2 x 2 (50 x 50mm)
4.0–8.0	3MC2200/fo §	20%	20	1.23	0.35	1 x 1 (25 x 25mm)
8.0–12.0	3MC3200/fo §	20%	20	1.23	0.40	0.8 x 0.8 (20 x 20mm)
12.0–18.0	3MC4100/fo §	10%	20	1.23	0.50	0.6 x 0.6 (15 x 15mm)

M-OV 4-Port Circulators

All the 3-port circulators on page A23 may be supplied in 4 and 5-port configurations, with built-in loads on specified ports if required. The following are typical examples of these.

Operating frequency range (GHz)	Type	Isolation min (dB)		V.S.W.R.	Insertion loss max (dB)		Power max (W)	Connectors
		1-4 3-2	1-3, 3-1 2-1, 2-4 4-2, 4-3		1-2 3-4	2-3 4-1		
3.7–4.2	4CC1100	55	30	1.07	0.15	0.3	15	Type N or APC7
7.2–7.8	4CC2100	55	30	1.07	0.12	0.23	10	Type N or APC7

M-OV 5-Port Circulators

Operating frequency range (GHz)	Type	Description	Insertion loss		V.S.W.R.	Connectors
			Forward (dB)	Reverse (dB)		
1.7–2.0	5CC1151	Two ports terminated in matched loads	0.7	45	1.07	Type N
1.9–2.3	5CC1152	Two ports terminated in matched loads	0.7	45	1.07	Type N

M-OV High Peak Power Circulators

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R.	Insertion loss max (dB)	Mean power (W)	Peak power (kW)	Connectors
8.2–12.4	WGC4050/fo	5%	27	1.10	0.15	50	5	WG16
8.2–12.4	WGC405H/fo	5%	20	1.22	0.5	55	50	WG16

§ Four and five port configurations can be supplied to special order

★ Broader bandwidths are available in certain frequency bands

M-OV Waveguide Circulators and Isocirculators

This range of devices uses a special form of construction avoiding the use of adhesives for holding the ferrite in position to give excellent thermal and mechanical shock resistance.

Configuration: T-form. **Temperature range:** 0–50°C.

Isocirculators WGI Series: The full range of circulators may be supplied with a built-in matched load (within the circulator housing) on any specified port. This load is of low power (2 watts) but larger loads can be fitted to special order.

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Power max (W)	Connectors
3.7–5.85	WGC1100/fo	10%	30	1.07	0.15	200	WG12
5.85–8.0	WGC2100/fo	10%	30	1.07	0.15	100	WG14
5.85–8.0	WGC2200/fo	20%	20	1.22	0.15	100	WG14
7.0–10.0	WGC3100/fo	10%	30	1.07	0.15	50	WG15
8.2–12.4	WGC4100/fo	10%	30	1.07	0.15	50	WG16
8.2–12.4	WGC4200/fo	20%	20	1.22	0.20	50	WG16
8.2–12.4	WGC4300/fo	30%	17	1.33	0.20	50	WG16

M-OV Transitions

Operating frequency range (GHz)	Type	Description	V.S.W.R.	R.F. connections	
				Waveguide	Coaxial
2.5–4.1	WTS4■	Rear entry	0.85 (1.18)	WG10	N50 ohms
4.1–7.0	WTC5■	Rear entry	0.8 (1.25)	WG13	N50 ohms
7.0–11.5	WTX6■	Rear entry	0.85 (1.18)	WG16	N50 ohms
8.0–12.4	WTX8■	Rear entry	0.8 (1.25)	WG16	SMA 50 ohms
12.4–18.0	WTJ9■	Rear entry	0.8 (1.25)	WG18	SMA 50 ohms

M-OV Barretters

Twin filament resistance lamps primarily intended for use in telephone exchanges for feeding transmitter current to subscribers' lines.

Voltage each filament (V)	Type	Voltage between filaments (V)	Nominal filament current (mA)	Bulb temperature (°C)
25	RL2G (P.O. No. 1)	250	95	250
25	RL2GA (P.O. No. 1S)*■	250	95	250
86	RL16 (P.O. No. 16)	250	120	250

*The RL2GA is a selected version of the RL2G with close control of the current/voltage characteristics in the region between 5 and 10V (filaments in series).

■ Made to special order only

M-OV Surge Arresters and Protectors

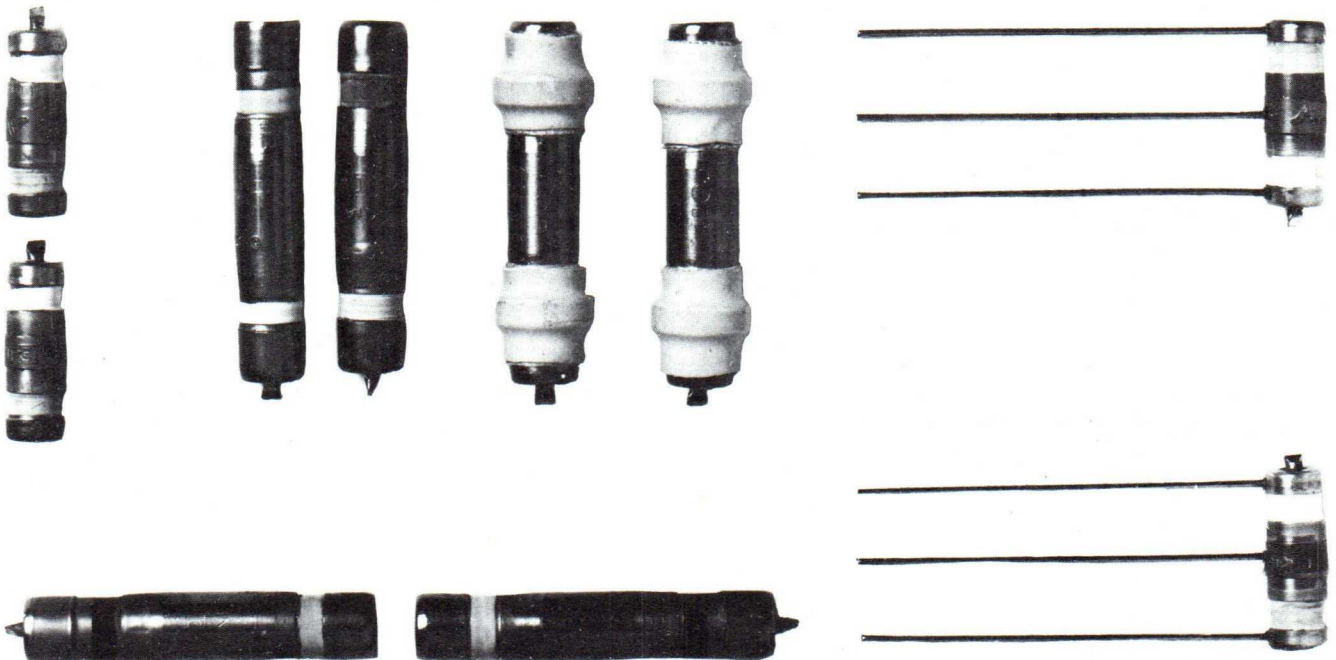
Description	Type	D.C. striking voltage (V)	D.C. glow voltage (V)	Colour marking
2-electrode metal-ceramic replacement for Type 13	5A	240–360	155–215	–
2-electrode moulded air gap	13B ■	600–900	–	Black
2-electrode moulded air gap	13D ■	1100–1700	–	Blue
2-electrode moulded air gap	13E ■	1050–1350	–	Blue
2-electrode glass envelope	15A △	150–250	100–200	–
2-electrode glass envelope	15B △	250–350	–	–
2-electrode glass envelope	15C △	350–450	–	–
2-electrode glass envelope	15D △	600–900	–	–
2-electrode glass envelope	15E △	200–350	150–250	–
2-electrode glass envelope	15F △	100–150	50–100	–
2-electrode glass envelope	15G △	450–600	–	–
Standard 2-electrode metal-ceramic envelope	28	240–360	155–215	Yellow
Wire ended version of Type 28	29			
Miniature 2-electrode metal-ceramic envelope	18	285–395	145–195	Yellow
Type 18 in a plastic sleeve with eyelet protecting the pinch-off seal	101			
Wire ended version of Type 18	105			
Standard 3-electrode metal-ceramic envelope	16A	150–350	150–260	Black
Standard 3-electrode metal-ceramic envelope	16B	300–500	155–215	Yellow
Standard 3-electrode metal-ceramic envelope	16C	500–900	165–225	Red
Standard 3-electrode metal-ceramic envelope	16E	800–1400	165–235	Purple
Fail-safe version of Type 16A	160A			
Fail-safe version of Type 16B	160B			
Fail-safe version of Type 16C	160C			
Fail-safe version of Type 16E	160E			
High power 3-electrode metal-ceramic envelope	26A	150–350	150–260	Black
High power 3-electrode metal-ceramic envelope	26B	300–500	155–215	Yellow
High power 3-electrode metal-ceramic envelope	26C	500–900	165–225	Red
Wire ended version of Type 26	27			
Fail-safe version of Type 26A	260A			
Fail-safe version of Type 26B	260B			
Fail-safe version of Type 26C	260C			
Miniature 3-electrode metal-ceramic envelope	21A	150–350	150–260	Black
Miniature 3-electrode metal-ceramic envelope	21B	300–500	155–215	Yellow
Miniature 3-electrode metal-ceramic envelope	21C	500–900	165–225	Red
Wire ended version of Type 21	22			

■ Made to special order only

△ Maintenance type, not recommended for use in new equipment

M-OV Arrester Mounts

Type	Description
6■	A unit for surge arrester type 15 incorporating an adjustable air gap in parallel with the arrester.
53	A unit for surge arrester type 16 incorporating two gaps. The base is of glazed ceramic providing high insulation resistance and dimensional stability in humid conditions.
54	A composite mounting for surge arrester type 16 incorporating mount type 53 with connections for type 34 fuses in twin line protection.
55	An enclosed composite mounting for surge arrester type 16 and two type 34 fuses, primarily designed for subscribers' instrument protection.
56A	A strip mounting to accommodate 10 type 53, 54 or 59 arrester mounts.
56B	Similar to 56A but with accommodation for 20 type 53, 54 or 59 arrester mounts.
57	A pole mounted weatherproofed enclosure incorporating a type 53 arrester mount. The earth connection is connected to the mounting spindle. The unit may be used either as a terminal or a 'T' junction.
59■	A unit designed for two arresters type 13 and two fuses type 34; designed for strip mounting on mounts 56A or 56B.
60■	Open-sided ceramic sleeve between two end caps to take a surge arrester type 16. This is a replacement unit for special applications such as those which originally used the earlier types Drg. 36 and Drg. 36/2.
61■	A unit for surge arrester type 16. Similar to the type 53 but with provision for rear mounting.
63	A simple slide-in mount incorporating a surge arrester type 16. Suitable for mounting in banks on distribution frames.
66■	A mount suitable for the type 21 arrester. The mounting forms part of an existing range of interlocking parts which can be built up into terminal banks sized to suit the end user.
67■	A block of 10 mounts similar to the 53 but without spark gap. The block is designed to be split into two sets of 5 if required.



Selection of Surge Arresters

M-OV Fuses

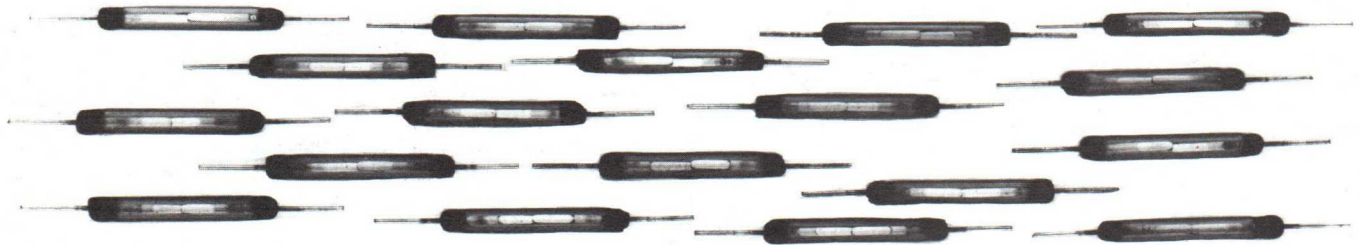
Standard procelain body fuse with knife type contacts for use in mount types 54, 55 and 59. Available as type 34A 2.5 amp, 34B 0.5 amp, 34C 1.0 amp, 34D■ 1.5 amp. Type 2B fuse dummies are available. These are interchangeable solid connectors to replace type 34 fuse.

■ Made to special order only

M-OV Switching Devices — Dry Reed Capsules

A range of high quality contacts with various sensitivities, suitable for fast low level telephone exchange and industrial switching applications. Single contact, normally open.

Operate sensitivity min (A turns)	Type	Switched power max (W)	Switched voltage max (V)	Switched current max (mA)	Contact resistance max (m Ω)	Operate time max (ms)	Length overall max (mm)	Diameter max (mm)
40	RCH	5.0	75	100	150	—	48	4
58	RC1	5.0	75	100	150	2.0	46.1	4
70	RCZ	5.0	75	100	150	—	48	4
100	RCY	5.0	75	100	150	—	48	4
—	RCX	5.0	75	100	150	—	48	4



Dry Reed Capsules

M-OV Switching Devices — Solenoids

Coil voltage nominal (V)	Type	Coil voltage max (V)	Coil temperature max ($^{\circ}$ C)	Resistance nominal (Ω)	Amp turns at nominal voltage	Voltage to operate RC1 min (V)
1.5	IS1.5V■	3.0	70	28	91 \pm 4.5	1.1
6.0	IS6V■	12	70	500	84 \pm 8.4	4.6
12	IS12V■	24	70	1750	89 \pm 8.9	8.7
24	IS24V■	48	70	4050	113 \pm 11.3	13.7

M-OV Switching Devices — Solenoids

Flat 4 coil assemblies for dry reed capsules. Performance when fitted with 2 or 4 reeds.

Coil voltage nominal (V)	Type	Turns*	Nominal resistance at 20 $^{\circ}$ C*	Minimum operate voltage at 55 $^{\circ}$ C (V)	Minimum hold voltage at 55 $^{\circ}$ C (V)	Maximum (non operate) voltage at 5 $^{\circ}$ C (V)	Maximum release voltage at 5 $^{\circ}$ C (V)
6	210-0402-001■	2440	156	5.2	3.5	0.96	0.4
12	210-0404-001■	4750	635	10.8	7.3	2.0	0.84
24	210-0405-001■	9140	2340	20.4	13.9	3.7	1.6
36	210-0406-001■	14000	6000	34.3	23.8	6.5	2.6

The above type numbers are for coil assemblies without reeds.

Temperatures quoted above are local component ambient.

Maximum power dissipation for continuous operation at 55 $^{\circ}$ C is 0.8 watts

■ Made to special order only

Limited circuit ampere turns

Operate	65
Non-operate	18
Hold	44
Release	7.5

* Standard resistance tolerance \pm 10%; turns are wound exact.

RADAR

The following pages give abridged data for the current range of EEV/M-OV tubes, devices and accessories used in Radar Equipment.

They comprise entries for:-

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NOISE TUBES AND MOUNTS	B14
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MAGNETRONS	B20
TRAVELLING WAVE TUBES	B28
MICROWAVE COMPONENTS	B31
STORAGE TUBES	B33
CATHODE RAY TUBES	B34

Comprehensive data sheets giving operating conditions, characteristic curves, and outline drawings are available on request.

Certain types listed in this catalogue may not be available from current production and their supply may be subject to a minimum order quantity.

Enquiries for special tubes not included in the catalogue are also welcome.

Colour Code

Throughout the data the following colour code is used:-

Brown indicates manufacture by English Electric Valve Company Ltd.

Blue indicates manufacture by The M-O Valve Company Ltd.

CARACTERISTIQUES ABREGÉES

Dans les pages suivantes sont données les caractéristiques abrégées pour la gamme courante de tubes, dispositifs et accessoires EEV/M-OV.

Des fiches de caractéristiques établissant les conditions de fonctionnement, les courbes et les schémas d'ensemble sont disponibles sur demande.

Certains types mentionnés dans ce catalogue peuvent ne pas être disponibles parmi les produits de production courante et leur livraison peut être sujette à la commande d'une quantité minimum.

Nous répondons également aux demandes de renseignements pour les tubes spéciaux non mentionnés dans ce catalogue.

Code des Couleurs

Pour toutes les indications nous utilisons le code de couleur suivant:

Marron: produits fabriqués par English Electric Valve Co Ltd

Bleu: produits fabriqués par M-O Valve Co Ltd

KURZGEFASSTE DATEN

Auf den folgenden Seiten finden Sie kurzgefaßte Daten für das gegenwertige Herstellungsprogramm von EEV/M-OV-Röhren, Geräten und Zubehör.

Ausführliche Datenblätter mit Betriebsbedingungen, Leistungskurven und Maßzeichnungen sind auf Anfrage erhältlich.

Es ist möglich, daß sich einige der in diesem Katalog angeführten Positionen nicht im gegenwertigen Produktionsprogramm befinden und daß daher deren Lieferung von einer Bestellung von Mindeststückzahlen abhängig gemacht werden muß. Anfragen wegen Spezialröhren, die nicht in diesem Katalog enthalten sind, bearbeiten wir gerne.

Farbkennzeichnung

Die folgende Farbkennzeichnung wird für die Daten verwendet:

Braun: Produkt der English Electric Valve Co Ltd

Blau: Produkt der M-O Valve Co Ltd

RESUMEN INFORMATIVO DE DATOS

En las páginas siguientes aparece un resumen informativo de datos correspondientes a la nueva gama de lámparas, dispositivos y accesorios EEV/M-OV.

Tendremos sumo gusto en facilitar, a solicitud de las partes interesadas, hojas con los datos completos, incluyendo condiciones de funcionamiento, curvas de característica y planos acotados.

Es posible que ciertos tipos detallados en este Catálogo no puedan obtenerse dentro de la línea normal de producción actual y su suministro puede estar sujeto a un pedido mínimo. Sírvanse solicitar información relativa a lámparas especiales, no incluidas en este Catálogo.

Clave de Colores

En todo lugar se ha utilizado la siguiente clave de colores:

Marrón indica fabricado por la English Electric Valve Co Ltd

Azul indica fabricado por la M-O Valve Co Ltd

DATI ABBREVIATI

Alle pagine seguenti figurano dati abbreviati inerenti la presente serie di valvole, dispositivi ed accessori EEV/M-OV.

Le pubblicazioni tecniche più approfondite, contenenti le condizioni di funzionamento, curve delle caratteristiche e disegni del contorno, vengono fornite su richiesta.

Alcuni modelli elencati nel presente catalogo non sono disponibili nella normale produzione e la relativa fornitura può essere subordinata all'ordinazione di un quantitativo minimo.

Nel caso di valvole speciali non incluse nel presente testo, il cliente è pregato di interpellarci.

Colore Codice

Nel presente opuscolo, si usa il seguente codice:-

il marrone indica che la valvola è costruita dalla English Electric Valve Co Ltd

il blu indica che la valvola è costruita dalla M-O Valve Co Ltd

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CX1530	B7	K3118	B18	M5048	B21	MAG22	B23	TWS7	B29
CX1530D	B7	M503A	B23	M5051	B20	MAG23A	B23	TWS17	B28
E702A	B33	M504	B26	M5052	B20	MAG23B	B23	TWS26	B28
E702E	B33	M505	B24	M5053	B27	MAG23C	B23	TWX8	B29
E712A	B33	M506A	B24	M5054	B27	MAG23D	B23	TWX16	B29
E713B	B33	M513A	B24	M5055	B27	MF31-55	B34	TWX19	B28
E722A	B33	M513B	B24	M5057	B27	MF41-10	B35	TWX22	B29
F13-110GR	B35	M515	B24	M5059	B27	N1010A	B19	TWX28	B28
F16-10LB	B34	M521	B24	M5060	B27	N1010S	B19	TWX34	B29
F16-10LC	B34	M523	B26	M5061	B24	N1016M	B28	WGC405H	B32
F16-10LD	B34	M525	B21	M5062	B24	N1017M	B28	WGC1100	B32
F21-10LB	B34	M529	B26	M5063/2J70B	B20	N1034A	B19	WGC2100	B32
F21-10LC	B34	M537A	B23	M5064H	B23	N1034S	B19	WGC2200	B32
F21-10LD	B34	M538A	B26	M5065	B23	N1042M	B28	WGC3100	B32
FX227	B6	M539	B26	M5067	B23	N1045M	B28	WGC4050	B32
FX297	B6	M540B	B24	M5067H	B23	N1047M	B28	WGC4100	B32
FX2503	B6	M549	B26	M5068	B24	N1061	B29	WGC4200	B32
FX2505	B6	M554	B20	M5075	B24	N1065	B30	WGC4300	B32
FX2517	B6	M561	B20	M5076	B24	N1075	B30	WTC5	B32
FX2519A/5949A	B6	M565	B20	M5077	B24	N1077	B30	WTJ9	B32
FX2530/6777	B6	M566	B21	M5079A	B20	N1078	B30	WTS4	B32
GHT8	B7	M569	B21	M5080	B26	N1079	B30	WTX6	B32
GHT9	B7	M570	B21	M5081	B26	N1080	B30	WTX8	B32

Whilst the company has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice.

The company accepts no liability beyond that set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein.

EEV High Vacuum Rectifier

Peak inverse voltage max (kV)	Type	Average anode current max (mA)	Peak anode current max (A)	Heater		Base
				Voltage (V)	Current (A)	
40	A292 (CV5998)	1500**	75††	12	14	Coaxial

M-OV Power Triodes — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW)	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
0.4	ACT25 (CV436)△	0.256§	1.0	500/1000	75	13.5	2.8
1.5	ACT28 (CV2163)	0.75§	11†	600	45	16	7.3
1.5	ACT28A (CV5326)	300†	13†	600	45	16	7.3

M-OV Pulse Tetrodes and Pentodes

Anode dissipation max (W)	Type	Anode voltage max (kV)	Anode current pulse (A)	Amplification factor	Filament ratings		Base
					(V)	(A)	
12	A2226 (CV2231)■	10	3.0	8.5	6.3	1.2	B9A
12	A3042■	5.0	4.0	8.5	6.3	1.2	B9A
15	(CV4082)‡ A2426 (CV8978)	8.0	7.5	7.5	6.3	1.3	B8.0

EEV Pulse Amplifier Tetrodes

Pulse output power (kW)	Type	Anode dissipation max (W)	Anode voltage max D.C. (kV)	Pulse anode current max (A)	Heater ratings		Base
					(V)	(A)	
130	C1148	40	14	12	6.3	5.0	B5F
205	C1150/1 (CV427)	60	17.5	15	26	2.15	B4A
205	C1166 (CV10404)	60	17.5	15	6.3	9.0	B5F
330	C1149/1 (CV6131)	60	20	18	26	2.15	B4A

★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

■ Made to special order only.

‡ Special quality.

** In charging diode service.

†† In overswing diode service.

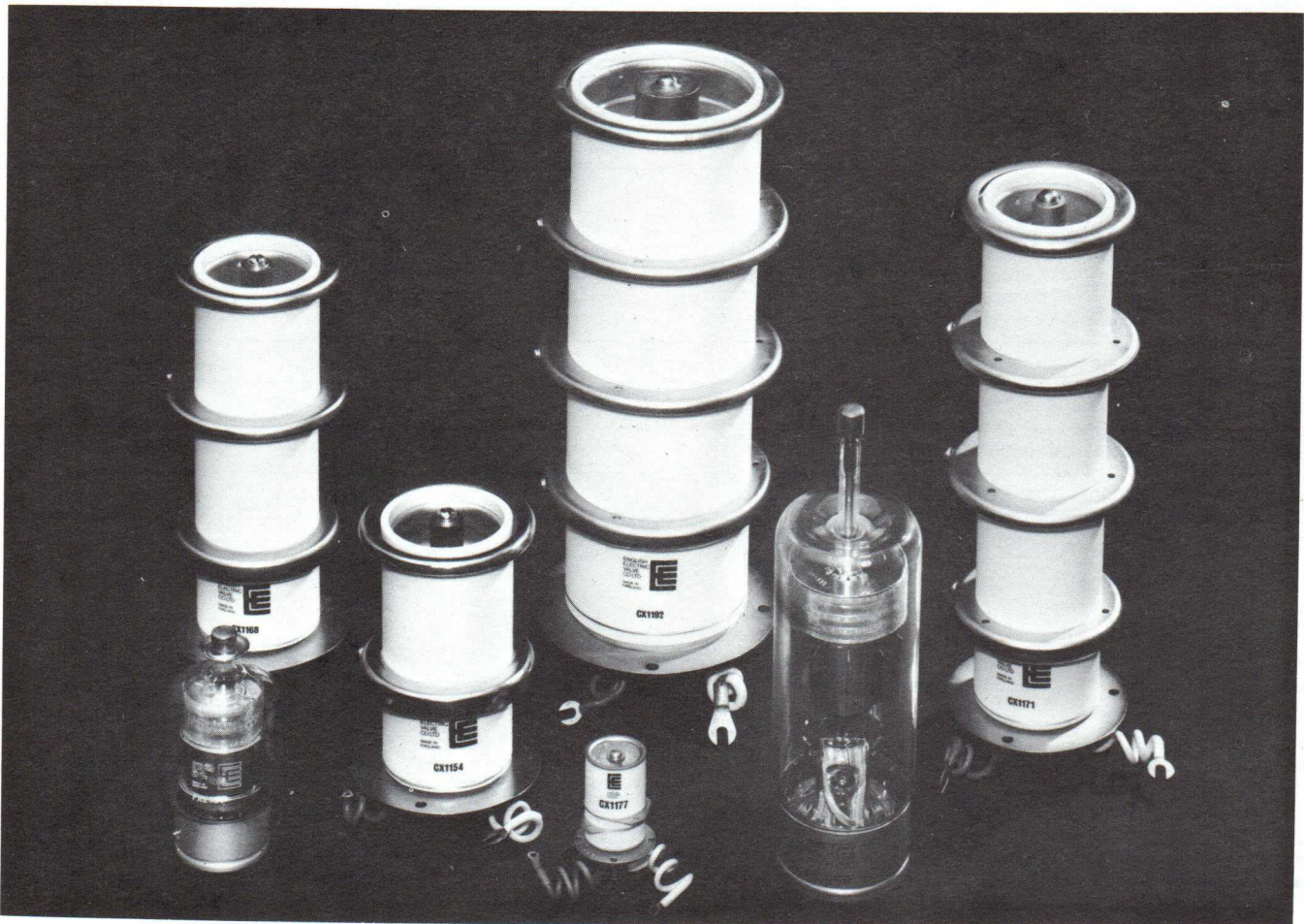
§ Under Class C unmodulated conditions.

△ Maintenance type, not recommended for use in new equipment.

† Pulse only.

EEV Hydrogen Thyratrons — Glass Envelope — Pulse Modulator Service

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (P _b) factor x 10 ⁹ max†	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
	(CV372)								
40	FX227 (CV3629*)	Triode	3.0	0.05	0.06	0.36	20	‡	6.3/2.7
85	FX2530/6777	Triode	8.0	0.1	0.34	2.5	5.0	‡	6.3/3.0
100	FX2517§	Triode	10	0.1	0.5	2.8	5.0	‡	6.3/6.1
	(CV1787)								
100	FX2505 (CV5247)	Triode	10	0.125	0.5	2.8	5.0	‡	6.3/6.1
325	6587	Triode	16	0.225	2.0	3.9	5.0	‡	6.3/10.6
325	8503 (CV6022) §	Triode	16	0.25	2.6	3.9	5.0	‡	6.3/10.6
400	CX1191 §	Tetrode	16	0.4	3.2	5.0	5.0	‡	6.3/12.5
500	CX1191A §	Tetrode	25	0.5	6.25	6.25	5.0	‡	6.3/12.5
500	FX2519A/5949A	Triode	25	0.5	6.25	6.25	5.0	4.5/3.0	6.3/18.5
500	CX1191D §●	Tetrode	35	0.5	8.0	8.0	5.0	‡	6.3/12.5
500	FX297	Triggered diode, 25kV P.I.V., 1.25A average current						‡	6.3/21.5
500	FX2503●	Triggered diode, 33kV P.I.V., 1.25A average current						‡	6.3/21.5
1000	CX1140 (CV8563)	Tetrode	25	1.25	12.5	9.0	5.0	‡	6.3/22
1000	CX1159 (CV9080)●	Tetrode	33	1.25	16.5	14	5.0	‡	6.3/22



Selection of Hydrogen Thyratrons

EEV Hydrogen Thyratrons — Ceramic Envelope — Pulse Modulator Service

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (Pb) factor $\times 10^9$ max†	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
150	CX1177 §	Tetrode	12	0.2	0.9	4.0	5.0	6.3/2.0	6.3/4.5
350	CX1157 (CV6241) §	Tetrode	20	0.5	3.5	7.0	5.0	6.3/1.5	6.3/7.5
500	CX1530	Tetrode	25	0.5	6.25	12	5.0	6.3/2.0	6.3/11
500	CX1530D ●	Tetrode	35	0.5	8.75	12	5.0	6.3/2.0	6.3/11
1000	CX1180	Tetrode	25	1.25	12.5	12.5	5.0	6.3/6.0	6.3/11
3000	CX1154 ●	Tetrode	40	3.0	50	30	5.0	5.0/7.0	6.3/21.5
3000	CX1168 ●	Two gap tetrode	80	3.0	100	70	5.0	5.0/7.0	6.3/21.5
3000	CX1171 ●	Three gap tetrode	120	3.0	150	70	5.0	5.0/7.0	6.3/21.5
3000	CX1199 ●	Four gap tetrode	160	3.0	200	70	5.0	5.0/7.0	6.3/21.5
6000	CX1174 ●	Tetrode	40	6.0	120	60	5.0	5.0/10	6.3/40
6000	CX1175 ●	Two gap tetrode	80	6.0	200	140	5.0	5.0/10	6.3/40
6000	CX1192 ●	Three gap tetrode	120	6.0	300	140	5.0	5.0/10	6.3/40
6000	CX1193 ●	Four gap tetrode	160	6.0	400	140	5.0	5.0/10	6.3/40

EEV Hydrogen Thyratrons — Metal Envelope — Pulse Modulator Service

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (Pb) factor $\times 10^9$ max†	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
3500	GHT8 ●	Tetrode	40	5.0	50	60	5.0	6.3/5.0	6.3/36
7500	GHT9 ●	Tetrode	40	15	150	150	5.0	6.3/8.0	6.3/90

† Product of peak forward voltage, peak current and pulse repetition rate.

* Near equivalent.

‡ Reservoir operates from cathode heater supply.

§ Rugged.

● Deuterium filled.

EEV Plug-in TR Tubes

Broad-band, low loss, plug-in tubes requiring no external connections

Frequency range (MHz)	Type	Maximum peak power (MW)	Maximum mean power (kW)	Maximum breakdown power (kW)	Maximum recovery period to -3dB (μ s)
100-500	BS708 ϕ	0.225	0.45	1.0	300 \dagger \blacktriangle
S-Band	BS702 (CV2285)	2.5	—	10	30 \dagger
2755-2915	BS718 (CV2378)	0.005	—	—	25 \dagger
2755-2915	BS720 (CV2379)	3W	—	—	25 \dagger
2000-4000	(CV294) BS710 (CV2157)	2.0	—	—	10 \dagger
2000-4000	BS840 (CV6110)	10	25	20	200
2500-4000	BS730	2.5	3.75	—	250
2600-3950	BS714 (CV6129)	0.005	5W	—	30
2600-3950	BS732 (CV5398)	0.005	—	—	16 \dagger
2600-3950	BS716 (CV2430)	0.5	0.5	—	15 \dagger
2600-4100	BS724* BS726* BS728* (CV2488)	15W	15mW	500mW	70 \dagger
2000-5500	BS940	1.25	1.5	10	100
2000-5500	BS986	2.0	1.5	5.0	150
2000-12 000	BS836 (CV6086)	0.25	0.25	20	8.0
2000-12 000	BS838 (CV2482)	0.5	0.5	20	8.0
2000-12 000	BS138	1.0	1.0	20	25
2000-12 000	BS834 (CV6028)	2.5	3.0	20	25
2000-12 000	BS880	3.0	3.0	20	25

EEV Primerless Pre-TR and Protector Tubes — L-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)	Waveguide size
			Spike (nJ/pulse)	Total (W)				
1230-1365	BS876	10	2300	—	1.25	0.7	10	Coaxial
1250-1350	BS128	2500	2000	20	1.25	0.4	20	\star
1250-1350	BS910 $\dagger\dagger$	2500	100	0.3	1.3	0.5	20	WG6
1250-1350	BS912 $\dagger\dagger$	5000	5000	0.2	1.3	0.5	20	WG6
1240-1365	BS872	10	700	1.0	1.25	0.3	20	WG6
1240-1370	BS870	2500	—	—	1.25	0.4	20	WG6

\dagger To -6dB.

ϕ For use in coaxial waveguide.

* Supplied as matched set of 3 tubes.

\blacktriangle With sweep voltage of 50V min.

\blacklozenge Tunable marine radar.

$\dagger\dagger$ Twin tube.

\star Half height of WG6.

\ddagger Tunable, double cavity, TR tube-filter.

\bullet Primerless.

\blacksquare Any 10% tuning range.

EEV Primerless Pre-TR and Protector Tubes — S-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)	Waveguide size
			Spike (nJ/pulse)	Total (W)				
2700-3100	BS824	250	600	0.9	1.25	0.4	15	WG10
2700-3100	BS832	250	600	0.9	1.25	0.4	15	WG10
2700-3100	BS846	250	600	0.9	1.25	0.4	15	WG10
2700-3100	BS904	10	4000	—	1.25	0.7	10	Coaxial
2700-3100	BS916^{††}	2000	10	0.02	1.25	0.4	20	WG10
2700-3200	BS172	250	600	0.9	1.25	0.4	15	WG10
2700-3200	BS848	250	600	0.9	1.25	0.4	15	WG10
2900-3230	BS990^{††}	1300	—	—	—	0.6	90	WG10

EEV TR Tubes — S-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
2700-2900	BS324	1250	25	100	1.2	1.0	25
2750-2860	BS104 (CV2181)	1250	25	100	1.2	1.0	25
2670-2960	BS58	500	30	130	1.3	0.8	15
2850-3050	BS456	1250	25	100	1.2	0.8	15
2840-3100	BS800	1250	25	100	1.2	0.8	15
2825-3125	BS170	750	—	70	1.3	1.0	15
2925-3075	BS390 (CV9442)	1250	25	100	1.33	1.0	25
3000-3050	BS204 (CV5990)	1250	25	100	1.2	1.0	25
2900-3200	BS110	100	30	130	1.25	1.0	5.0
3020-3080	BS894^{◆●}	1000	15	60	1.2	0.5	10
3055-3105	BS286 (CV5991)	1250	25	100	1.2	1.0	25
2600-3960 [■]	BS852^{‡●}	1000	—	50	—	1.5	10
3275-3325	BS924 (CV2303)	250	—	—	1.1	1.0	3.0 [†]
3230-3380	BS430 (CV9444)	1250	25	100	1.33	1.0	25
3450-3620	BS946	1250	25	100	1.33	1.0	25
3490-3770	BS932 (CV2481)	30	25	—	1.2	0.8	10 [†]
3600-3780	BS426 (CV9443)	1250	25	100	1.33	1.0	25

EEV Primerless TR Limiter Tube — S-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
3030-3070	BS194	1000	2.0	20	1.3	0.8	10

EEV Primerless Pre-TR and Protector Tubes — C-Band

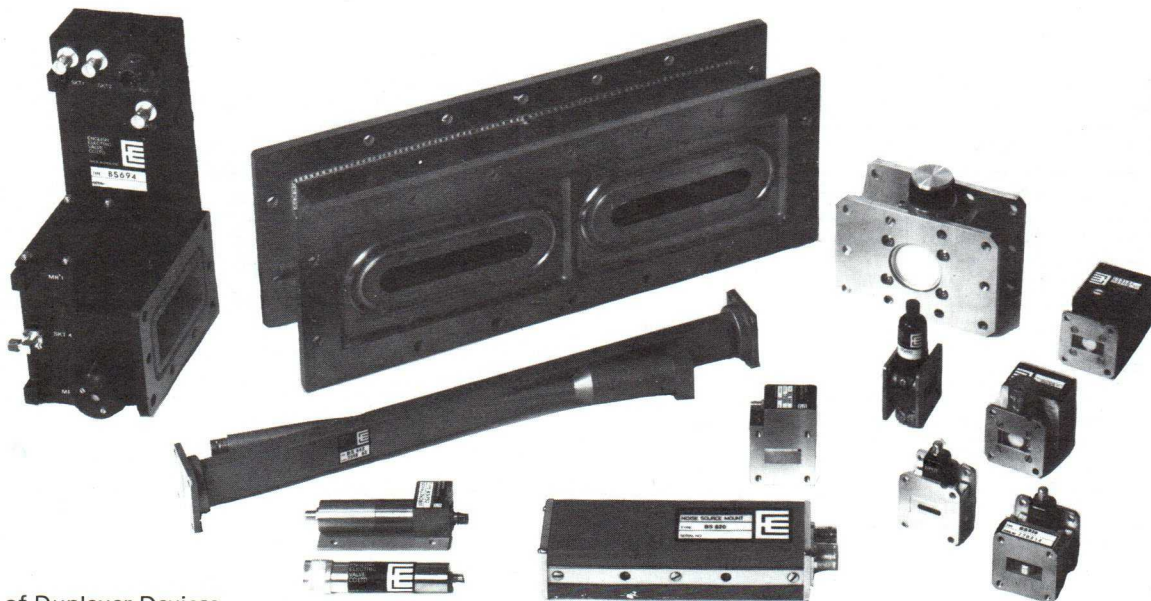
Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)	Waveguide size
			Spike (nJ/pulse)	Total (W)				
5250–5710	BS858††	1000	25	—	1.3	0.5	15	WG12
5300–5700	BS856	250	400	—	1.25	0.5	15	WG12
5450–5850	BS220	250	400	—	1.25	0.5	15	WG12
5450–5850	BS180††	1000	25	—	1.3	0.5	15	WG12
5450–5850	BS224††	1000	25	—	1.3	0.5	15	WG12

EEV TR Tube — C-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
5250–5750	BS966	500	30	110	1.25	0.8	10

EEV Primerless TR Limiter Tube — C-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
5350–5500	BS190	250	40	—	1.2	0.6	15



Selection of Duplexer Devices

EEV Primerless Pre-TR and Protector Tubes — X-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)	Waveguide size
			Spike (nJ/pulse)	Total (W)				
8950-9350	BS228	250	600	1.0	1.4	0.5	2.0	WG16
7000-11 500	BS956	0.1	—	0.3	—	0.5	70	WG16
8500-10 000	BS928	200	600	1.0	1.4	0.8	2.0	WG16
8500-10 000	BS930 ††	200	5.0	0.02	1.4	0.8	2.0	WG16
8500-10 000	BS970 ‡‡	150	5.0	0.03	1.4	0.8	2.0	WG16

EEV TR Tubes — X-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
8500-9100	BS158 (CV2307)	200	20	100	1.2	0.8	3.0
8500-9100	BS440 (CV6132)	200	20	100	1.2	0.8	2.0
8500-9300	BS202 (CV2312)**	200	30	100	1.3	0.8	3.0
8825-9225	BS860	100	15	100	1.3	0.8	4.0
8490-9578	BS914	200	20	70	1.4	0.7	4.0
8500-9600	BS314*	250	20	—	1.4	1.0	2.0
8500-9600	BS316 ††*	250	10	15	1.3	1.0	3.0
8500-9600	BS918 ††	250	10	15	1.3	1.0	3.0
8400-9800	BS842	200	20	100	1.5	1.0	4.0
9000-9300	BS462 (CV3840) ◆	75	8.0	30	1.4	1.0	6.0
9000-9600	BS156 (CV2306)	200	20	100	1.2	0.8	3.0
9340-9420	BS892	50	15	100	1.4	1.0	3.0
9300-9500	BS192	200	—	—	1.3	0.7	3.0
9300-9500	BS196	200	20	70	1.4	0.7	4.0
9300-9500	BS450	100	15	100	1.3	0.8	3.0
9200-9600	BS466 ◆	75	8.0	30	1.4	1.0	6.0
9320-9500	BS52 (CV1841)	200	25	100	1.2	0.7	3.0
9320-9500	BS52A	200	25	100	1.2	0.7	3.0
9310-9510	BS452	100	15	100	1.3	0.8	4.0
9245-9575	BS810 (CV1923) ◆	75	8.0	30	1.4	0.8	1.5†
9405-9690	BS822 ◆	75	8.0	30	1.4	0.8	1.5†
9180-10 000	BS200 (CV2311)**	200	30	100	1.3	0.8	3.0

† To -6dB.

†† Twin tube.

‡‡ Twin tube, E-plane.

* Controlled phase recovery.

** Two primers.

◆ Tunable marine radar.

EEV Primerless TR Limiter Tubes — X-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
8900-9100	BS162	40	5.0	30	1.4	0.8	3.0
8980-9180	BS500	100	5.0	30	1.4	1.0	3.0
9000-9500	BS968	50	5.0	30	1.3	1.0	3.0
9000-9500	BS974 $\ddagger\ddagger$	150	5.0	30	1.3	1.0	3.0
9240-9340	BS254	110	5.0	30	1.4	0.8	3.0
9000-9600	BS264	100	5.0	30	1.4	1.0	3.0
9000-9600	BS258	100	5.0	30	1.4	1.0	3.0
9250-9350	BS122	40	5.0	30	1.4	0.8	5.0
9305-9405	BS952	60	10	50	1.3	0.7	3.0
9325-9425	BS108	60	20	50	1.4	0.8	3.0
9300-9500	BS206	100	10	30	1.4	1.0	3.0
9300-9500	BS256	40	5.0	30	1.4	0.8	3.0
9300-9500	BS958	40	5.0	30	1.4	0.8	3.0
9400-9700	BS132	40	5.0	30	1.4	0.8	3.0

EEV TR Limiter Tubes — X-Band

Frequency range (MHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μ s)
			Spike (nJ/pulse)	Total (mW)			
8500-9100	BS816 (CV6178)	200	2.0	30	1.3	0.8	3.0
8750-8850	BS960	200	10	30	1.2	0.8	0.25
8600-9150	BS950	50	2.0	30	1.4	1.0	6.0
8500-9300	BS820	200	2.0	30	1.3	0.8	3.0
8500-9500	BS828	200	2.0	30	1.3	1.0	1.0
8800-9250	BS886	200	2.0	40	1.4	1.0	3.0
8700-9500	BS216	50	2.0	25	1.5	1.0	2.0 \ddagger
9300-9390	BS882	20	5.0	50	1.4	0.8	4.0
9000-9700	BS814 (CV6192)	200	2.0	30	1.3	0.8	3.0
9300-9500	BS130	200	2.0	30	1.3	0.8	3.0
9300-9500	BS830	200	2.0	30	1.3	0.7	3.0
9250-9550	BS908 \blacklozenge	75	2.0	20	1.4	1.0	6.0
9320-9500	BS812	200	2.0	30	1.3	0.8	3.0
9310-9510	BS844	100	2.0	30	1.3	1.0	3.0
9300-9900	BS826 (CV6207)	200	2.0	30	1.3	0.8	3.0
9500-9700	BS896	200	1.0	30	1.3	0.8	3.0
9400-10 000	BS818 (CV6206)	200	2.0	30	1.3	0.8	3.0

$\ddagger\ddagger$ Twin tube, E-plane.

\ddagger To -6dB.

\blacklozenge Tunable marine radar.

EEV ATR(TB) Tubes — X-Band

Resonant frequency (MHz)	Type	Operating power (kW)	Maximum loaded Q	Maximum V.S.W.R.	Maximum equivalent conductance	Maximum recovery loss at 2.0μs (dB)
8775	BS118 (CV2309)	4–50	6.5	1.11	0.1	2.0
9025	BS248	4–50	6.5	1.1	0.1	2.0
9080	BS82 (CV463)	4–50	6.5	1.15	0.1	2.0
9240	BS84 (CV462)	4–50	6.5	1.1	0.1	2.0
9300	BS412	4–250	6.5	1.1	0.1	2.0
9325	BS116 (CV2308)	4–50	6.5	1.11	0.1	2.0
9375	BS92 (CV461)	4–50	6.5	1.1	0.1	2.0
9375	BS310 (CV6070)	4–250	6.5	1.1	0.1	2.0
9410	BS48 (CV460)	4–50	6.0	1.1	0.045	2.0
9600	BS114 (CV2274)	4–50	6.5	1.1	0.05	2.0
9850	BS148	4–50	6.5	1.1	0.1	2.0

EEV TR Tubes — Q(Ka)-Band

Frequency range (GHz)	Type	Peak power (kW)	Maximum leakage		Maximum V.S.W.R.	Maximum insertion loss (dB)	Maximum recovery period to -3dB (μs) □
			Spike (nJ/pulse)	Total (mW)			
30–33◇	BS78	75	20	50	1.3	1.0	6.0
30–36◇	BS60☆	75	2.0	40	1.3	1.5	6.0
30–36◇	BS70★	75	2.0	40	1.3	1.5	6.0
33–36◇	BS80	75	20	50	1.3	1.0	6.0

EEV Solid State Microwave Switches

Frequency range (MHz)	Type	Bandwidth (MHz)	Attenuation at centre frequency (dB)	Maximum peak pulsed line power (kW)	Typical operating voltage (V)	Maximum operating current (mA)
S-Band*	BS338	200	1–25	0.5	0.85	30
2925–3075	BS392	150	0.25–25	0.5	0.85	30
2940–3060	BS864	120	0.25–8.0	0.5	0.85	50
3230–3380	BS804	150	0.25–25	0.5	0.85	30
3600–3770	BS802	170	0.25–25	0.5	0.85	30
X-Band*	BS460	100	1–25	0.5	0.85	30
X-Band*	BS120	300	1–25	0.5	0.85	30
9500–9800	BS208	300	1–40	0.5	‡	‡
9600–9900	BS166	300	0.75–30	0.1	‡	‡

Note A pulse generator type BS402 for use with the waveguide switches listed above is available.

- ◇ 10% bandwidth.
- Dependent on power level.
- ☆ Primerless TR limiter.

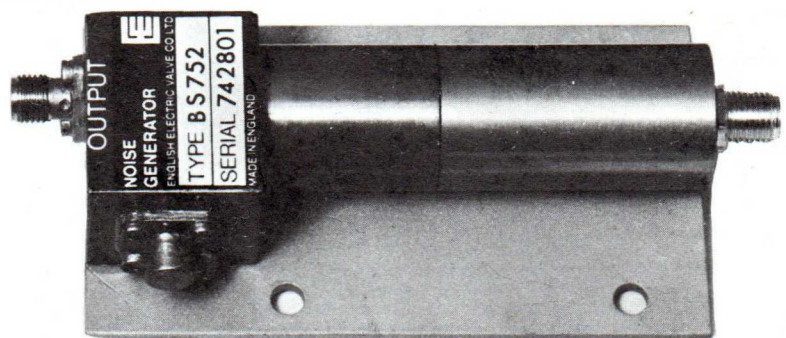
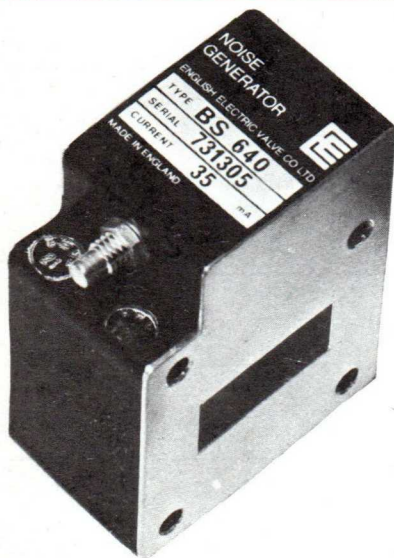
- ★ Primed TR limiter.
- * Preset to customers' requirements.
- ‡ Self biasing.

EEV Varactor Limiters

Centre frequency (GHz)	Type	Bandwidth to V.S.W.R. 1.4:1 (MHz)	Peak input power (W)	Attenuation range (dB)	Maximum insertion loss (dB)
S-Band*	BS168	150	50	0-16	0.3
C-Band*	BS306	200	50	0-16	0.4
X-Band*	BS806	500	50	0-16	0.5
Q-Band*	BS66	1000	50	0-12	0.8

EEV Tunable Filter Cavities

Frequency range (MHz)	Type	Waveguide size	Q factor	Used with tube type
S-Band	BS652	WG10	-	Any
2000-4000	BS854	WG10	180	BS902
9255-9565	BS888	WG16	240	BS810



Solid State Noise Generators BS640 (left), BS752 (top right) and BS646 (bottom right)

EEV Noise Tubes and Mounts

Frequency range (GHz)	Mount type	Tube type	Excess noise ratio (dB)	Waveguide size 153 IEC-	Operating current (mA)	Typical voltage (V)	Power supply type
1.2-1.4	BS684	BS344	15.0	R14	200	120	BS650
2.6-4.0	BS632	BS340	15.2	R32	200	100	BS610C, BS650
5.2-5.8	BS628	BS340	15.4	R48	200	100	BS610C, BS650
5.9-8.2	BS636	BS340	15.5	R70	200	100	BS610C, BS650
7.0-10	BS638	BS342	15.6	R84	125	79	BS610B, BS650
8.5-10	BS604	BS384 (CV1881)	15.5	R100	180	55	BS610, BS650
8.5-10	BS642	BS342	15.7	R100	125	79	BS610B, BS650
12.4-18	BS696	BS342	15.7	R140	125	79	BS610B, BS650
33-36	BS606	BS386	16.4	R320	100	48	BS610A, BS650
33-36	BS620●	-	16.4	R320	100	48	BS610A, BS650

EEV Solid State Noise Generators — Waveguide

Frequency range (GHz)	Type	Excess noise ratio (dB)	Waveguide size 153 IEC—	Transmission or terminated	Operating current (mA)	Typical voltage (V)	Power supply type
3.1–3.5	BS676	16.0	R32	Transmission	10	23	BS690, BS692
8.5–9.1	BS660	16.0	R100	Transmission	30	21	BS690, BS692
8.8–9.2	BS658	16.0	R100	Transmission	30	21	BS690, BS692
9.0–9.6	BS662	16.0	R100	Transmission	30	21	BS690, BS692
9.0–9.6	BS750	20.0	R100	Transmission	40	23	BS690, BS692
9.3–9.7	BS640	16.0	R100	Transmission	30	21	BS690, BS692
9.4–9.7	BS678	13.2	R100	Transmission	30	23	BS690, BS692
9.5–10.0	BS764	15.5	R100	Terminated	35	23	BS690, BS692
13.4–14.0‡	BS674	13.0	R140	Transmission	35	23	BS690, BS692
33–36†	BS648	25.0	R320	Terminated	32	–34	—
34.75–35.25	BS758	25.0	R320	Terminated	35	–34	—

EEV Solid State Noise Generators — Coaxial

Frequency range (GHz)	Type	Excess noise ratio (dB)	Output connector	Transmission or terminated	Operating current (mA)	Typical voltage (V)	Power supply type
1.0–4.0	BS644	27.0	Type N	Terminated	15	21	BS690, BS692
2.7–3.5	BS762	32.0	Type N	Terminated	10	21	BS690, BS692
3.0–3.5	BS698	27.0	Type N	Terminated	15	21	BS690, BS692
1.0–10	BS646	16.0	Type N	Terminated	20	22	BS690, BS692
9.5–10	BS752	36.0	SMA	Terminated	30	22	BS690, BS692

EEV Noise Generator Power Supplies

Type	Description
BS610 series	Solid state, current stabilized power supply units for use with EEV gas discharge noise tubes. An output current meter is incorporated and automatic filament pre-heat and starting circuits are built-in.
BS650	Power supply unit for use with EEV gas discharge noise tubes. The output current is stabilized over a wide adjustment range and may be monitored by a front panel meter. Automatic filament pre-heat and an advanced tube striker are built-in.
BS690	Power supply unit for use with the EEV range of solid state noise generators and similar devices. The stabilized output current is adjustable over a wide range with the front panel meter and a lockable ten turn potentiometer.
BS692	Power supply unit for use with the EEV range of solid state noise generators and similar devices. It can be used in either a continuous or switched mode, clocked by an internally generated signal or by an external trigger signal. The fast switching times and accurate timing facilities enable rapid inter-pulse noise measurements to be made on a radar system without modulating incoming signals. The slower speed ranges and longer pulses allow it to drive the noise source in conventional switch radiometer applications.

• BS620 is supplied with noise tube BS386, but calibrated to an accuracy of ± 0.1 dB.

* Preset to customers' requirements.

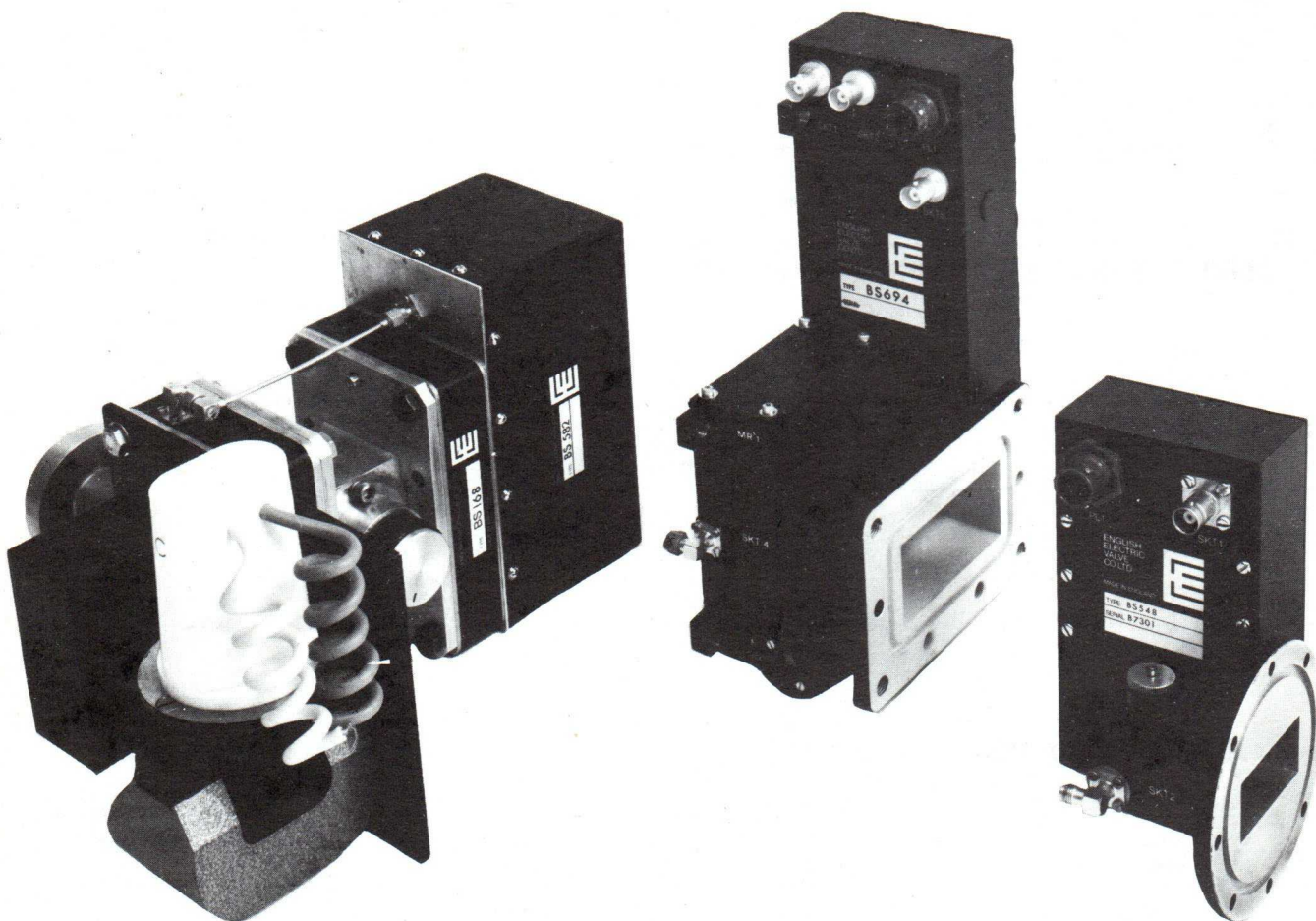
† 3% bandwidth.

‡ 5% bandwidth.

EEV Balanced Duplexers

EEV manufactures a range of balanced duplexers designed to meet customers' individual requirements at frequencies from 1.0 to 17GHz. The basic balanced duplexer consists of two 3dB hybrid couplers, with a twin pre-TR tube and a high power load. The couplers can be supplied in various configurations e.g. E-plane, H-plane etc. In addition, TR tubes, protector tubes, TR limiters, PIN switches or other devices can be supplied for receiver protection. Typical balanced duplexer configurations are given below; enquiries are invited regarding the best arrangement of devices for particular applications.

Frequency range (MHz)	Type	Dual pre-TR tube	Peak power (MW)	V.S.W.R.	Recovery period (μ s)	Insertion loss (dB)
1215-1365	BS624	BS910	0.15	1.3	12	0.5
		BS912	6.0	1.3	20	0.5
2700-3100	BS608	BS916	2.0	1.25	20	0.4
5250-5710	BS630	BS858	1.0	1.3	15	0.5
8500-10 000	BS616	BS930	0.2	1.4	2.0	0.8



S-Band R.F. Head BS598 (left), Mixer Receivers BS694 (centre) and BS548 (right)

EEV R.F. Heads

The Company has developed a range of compact, low noise r.f. heads suitable for use in a variety of applications ranging from marine radar to sophisticated military systems. Typical noise figures for the complete r.f. head of an S-band marine system up to the first stage i.f. output are around 5.5dB.

The components for a typical 25kW r.f. head type BS598 are given below; the peak power may be substantially increased by using a higher power magnetron.

Magnetron (25kW)
Duplexer
TR tube

M5020
BS748
BS894

Varactor limiter
Mixer receiver
Local oscillator

BS168
BS582
BS742

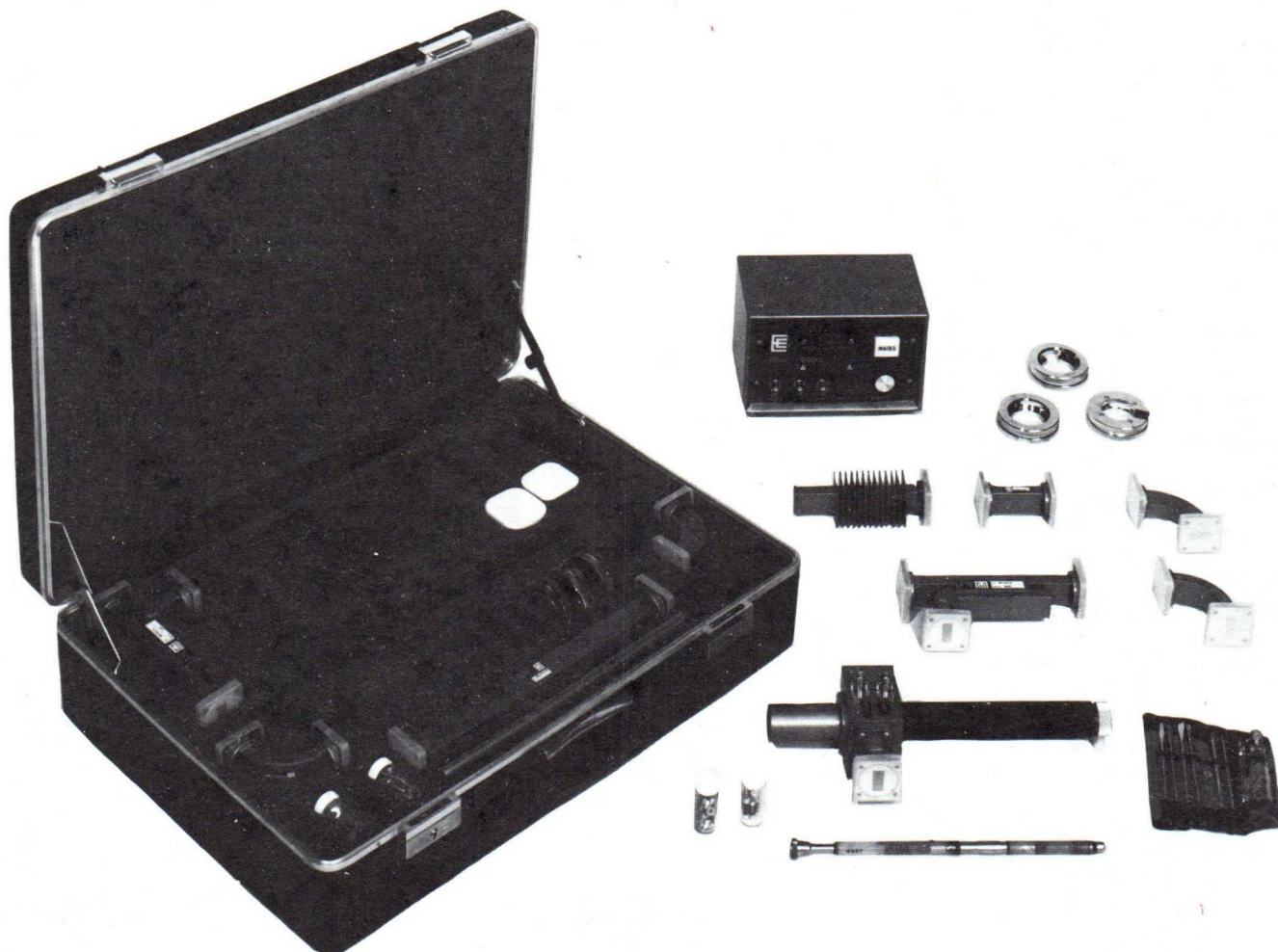
Although it is intended primarily for marine use, the low noise figure of the BS598 suits it to a wide range of other applications. R.F. heads can be produced to meet individual customer requirements at S-band and other frequencies between 1.0 and 10GHz.

EEV Monitor Diodes

Typical applications include the continuous monitoring of r.f. power, the direct viewing of r.f. power pulse envelopes and the detection of irregularities in magnetron or modulator performance.

Frequency range (GHz)	Type	Peak input power (max) (kW)	Mean input power (max) (W)	Pulse duration (max) (μ s)	Diode load (Ω)	V.S.W.R. (max)	Mount
2.5–6.5	BS510 (CV6107)	20	18	15	68	1.5	BS514 BS516 BS524 BS534
5.2–5.5	BS540	20	18	15	68	1.3	BS538
8.5–9.0	BS536	20	20	15	47	1.3	BS528
8.5–10	BS502 (CV6005)	20	18	2.0	68	1.3	BS512 BS546

Note: A monitor diode power supply type BS602 or power supply and indicator unit type BS600 is available for use with the above types.



Monitor Diode Kit BS614

EEV Monitor Diode Kit

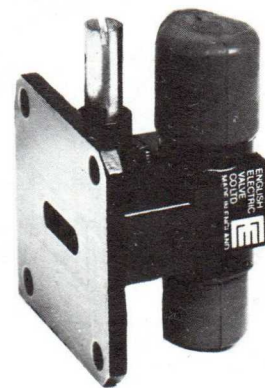
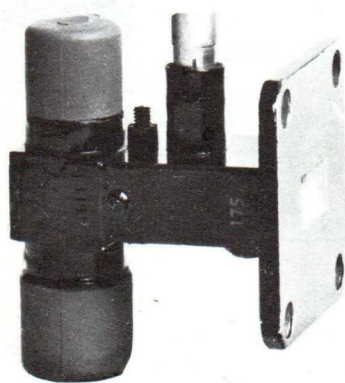
Type	Description
BS614	The kit is intended for field tests of X-band radar transmitter performance. It is based on a monitor diode and permits measurement of peak output power, pulse parameters and irregularities in the transmitter performance. The kit includes a calibrated monitor diode and mount assembly, power supply, directional couplers and accessories to suit the users' requirements, all packed in a fitted carrying case. An oscilloscope and mains power source are the only additional facilities needed.

EEV Amplifier Klystron — Pulse Operation

Output power (peak) (kW)	Type	Mechanical tuning range (MHz)	Gain (dB)	Pulse duration (μ s)	Pulse repetition rate (p.p.s.)	Beam voltage (peak) (kV)	Beam current (peak) (A)	Cooling	Focus
600	K347A	580–615	33	6.0	400	75	20	Forced-air	Electro-magnet

EEV Oscillator Klystrons

Mechanical tuning range (GHz)	Type	Output power (mW)	Electronic tuning range (MHz)	Beam voltage (V)	Base	Application
2.95–3.225	K3067	60	20	300	Octal	Local oscillator
2.65–3.70	K3033	100	30	300	Octal	Local oscillator
8.05–8.80	K3079 §	90	35	300	Leads	Paramp pump
8.10–8.75	K359 (CV5985) §	90	55	350	Leads	Local oscillator
8.50–9.00	K342 (CV6003) § Δ	45	35	350	Tags	Local oscillator
8.80 \dagger	K3071 ‡	1500	15	740	Leads	Aircraft doppler
8.80 \dagger	K3090 ‡	1500	15	730	Leads	Aircraft doppler
8.80–8.885	K391A (CV6142) §	60	40	350	Leads	Local oscillator
8.80–8.885	K3098 §	60	40	350	Leads	Local oscillator
8.74–9.26	K3097 §	50	40	300	Leads	Local oscillator
8.50–9.50	K311 (CV9492) Δ	45	30	350	Octal	Local oscillator
8.50–9.60	K3078/6975 § \star	35	37	300	B3A	Local oscillator
8.50–9.60	K3111 § \star	35	37	300	Leads	Local oscillator
8.50–9.655	K351 (CV2494) §	90	45	300	Leads	Local oscillator
9.00–9.40	K3118	80	32	375	Leads	Local oscillator
9.16–9.34	K391 (CV6194) §	40	30	275	Leads	Local oscillator
9.295–9.395	K3007 (CV9423) §	40	35	350	Leads	Local oscillator
9.295–9.395	K3094 §	40	35	350	Leads	Local oscillator
9.32–9.50	K300 Δ	30	30	350	Octal	Local oscillator
9.32–9.50	K302 (CV2164) Δ	30	30	350	Octal	Local oscillator



Oscillator Klystrons K3079 (left), K3067 (centre) and K3098 (right)

EEV Oscillator Klystrons continued

Mechanical tuning range (GHz)	Type	Output power (mW)	Electronic tuning range (MHz)	Beam voltage (V)	Base	Application
9.35–9.55	K3077 §	60	45	300	Octal	Low power doppler
9.35–9.55	K3081 §	55	40	300	Octal	Local oscillator
9.35–9.55	K3091 §	50	40	300	Leads	Local oscillator
9.00–10.00	K324 (CV2304)△	45	30	350	Octal	Local oscillator
9.00–10.00	(CV5130) K337 (CV4515) §△	45	24	350	Tags	Local oscillator
9.555–9.685	K335 (CV2343)△	25	30	350	Octal	Local oscillator
10.325–10.335	K3073	60	40	300	Leads	Low power doppler
10.525*	K3069	100	—	300	B3A	Low power doppler
10.50–10.55	K3074	27	20	300	Leads	Low power doppler
10.50–10.70	K3076 §	60	30	300	Octal	Low power doppler
10.66–10.72	K357△	12	35	250	Octal	Low power doppler
10.66–10.72	K3066△	15	45	300	Octal	Low power doppler
10.70–10.725	K361△	27	20	300	Leads	Low power doppler
16.50–17.50	K3080 §☆	65	70	330	Leads	Paramp pump
33.5–36.0 †	K3038 ■	350	50	2500	Leads	Instrumentation
33.5–36.0 †	K3039 ■	75	50	2000	Leads	Local oscillator
34.1–35.6	K3035 ■	75	60	2000	BA7P	Local oscillator

EEV Backward Wave Oscillators — O Type

Frequency range (GHz)	Type	Typical output power (mW)★	Delay line voltage range (V)	Delay line current max (mA)	Integral focusing	Coaxial output connections	Base
2.4–4.5	N1034A (CV2381) N1034S (CV6023)	90–400	150–1170	50	Magnet Solenoid	Type N	B7D
7.0–11.5	N1010A (CV2393) N1010S (CV6024)	40–130	300–1500	40	Magnet Solenoid	Type N	USM7

M-OV Backward Wave Oscillators — M Type

Operating frequency range (GHz)	Type	Typical output power (W)	Tuning (line) voltage range (kV)	Tuning sensitivity (MHz/V)	Beam current (mA)	Sole voltage (V)	Sole voltage tuning range (MHz)
2.5–3.1	BWS1	400	2.5–4.8	0.31	350	–700	—
3.0–4.0	BWS2	250	2.2–4.7	0.46	350	–700	—
7.6–10.4	BWX5	200	2.5–5.1	1.0	350	–1800	500

§ Rugged.

‡ Two resonator type, fixed tuned.

† Other frequencies available to special order.

△ Maintenance type, not recommended for use in new equipment.

■ Made to special order only.

* Preset to this frequency.

☆ Reflector voltage precision tuned within $\pm 5V$.

★ Variation of typical output power over the band.

EEV Pulse Magnetrons — L-Band

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
1300	M5086■ M5087■	1250–1310† 1305–1365†	36	90	4.0	0.0012	SAG
2300	M5084■ M5085■	1250–1310† 1305–1365†	39	150	5.0	0.0015	SWAG
2300	M5051 M5052	1250–1310† 1305–1365†	39	150	5.0	0.0015	SVAG
2600	M554★ M586★	1295–1365 1260–1300	39	150	5.0	0.00125	SWX
5000	M565■	1215–1365	48	240	10	0.0025	EWAZ

EEV Pulse Magnetrons — S-Band

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
25	2J70A	3025–3075	7.0	8.0	1.0	0.001	PANC
25	M5020	3040–3060	8.0	8.0	0.07	0.00028	PANG
50	M5063/2J70B	3025–3075	9.0	15	0.3	0.0006	PANC
80	M561	3040–3060	13	15	1.0	0.001	SAC
750	M5094	2700–2900	30	64	1.5	0.0006	SAC
900	4J43	2992–3019	28	70	1.0	0.0005	SAC
900	4J44	2965–2992					
900	M577B (CV10210)	3000–3040	28	70	1.0	0.0005	SAC
900	M578B	3060–3100					
900	M5079A	3100–3300†	32	70	1.0	0.0005	SAC
900	M5126A	3100–3300†☆					
1000	4J31 (CV1914)	2860–2900	28	70	1.0	0.0005	SAC
1000	4J32	2820–2860					
1000	4J33 (CV1916)	2780–2820					
1000	4J34 (CV1897)	2740–2780					
1000	4J35 (CV1898)	2700–2740					
1000	4J53 (CV513)■	2793–2813					
1000	CV2744	2740–2765					
1000	M595B (CV8905)	2860–2900					
1000	5586 (CV3611)	2700–2900†					
1000	5657 (CV3958)	2900–3100†					
1000	M5035 (CV11154)	2900–3100†	30	70	1.0	0.0005	SAC
1000	M5083A	2700–2900†☆					
1000	M5091A	2900–3100†☆					
1000	M5113	2900–3100†					
1000	M5030A	2900–3050†	31.5	70	2.0	0.002	PAG
1000	M5034A	3050–3200†					

† Mechanically tuned over the specified frequency range.

☆ Improved tuner mechanism.

■ Made to special order only.

△ Maintenance type, not recommended for use in new equipment.

★ Circular to rectangular waveguide transition section M4016 available.

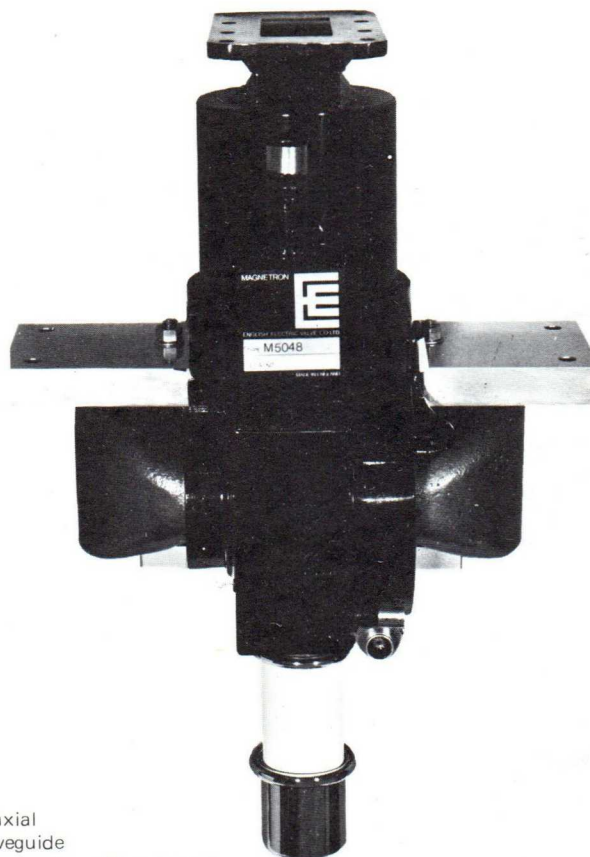
‡ Water-cooled electro-magnet assembly M4011, including launching section M4017, available.

⊕ Encapsulated to reduce stray radiation.

EEV Pulse Magnetrons — S-Band continued

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
1150	M525 (CV2362)	2750–2765					
1150	M525 (CV2363)	2765–2780					
1150	M525 (CV2364)	2780–2795					
1150	M525 (CV2365)	2795–2810					
1150	M525 (CV2366)	2810–2825					
1150	M525 (CV2367)	2825–2840					
1150	M525 (CV2368)	2840–2855	36	70	1.0	0.001	SWG
1200	M5048	2900–3000†	33	70	5.0	0.0015	PVAG
1250	BM1006 (CV2319)	2980–3020	35	70	5.0	0.0015	SWX
2000	BM1003■	3034–3052					
2000	BM1004■	2989–3007					
2000	BM1005■	2944–2962	43	90	2.0	0.001	SWX
2500	7182 Δ	2750–2860	35	157	5.0	0.0015	EWAZ
2500	M566‡	2750–2860					
2500	M5133‡⊕	2750–2860	38.5	145	5.0	0.0015	EWAZ
2500	M569‡	2850–2960					
2500	M5134‡⊕	2850–2960	40	140	5.0	0.0015	EWAZ
2500	M570‡	2950–3060					
2500	M5135‡⊕	2950–3060	40	140	5.0	0.0015	EWAZ
2500	M573 Δ	2850–2960	38	144	5.0	0.0015	EWAZ
2500	M574 Δ	2950–3060	41	132	5.0	0.0015	EWAZ
2500	M579 (CV8002)‡	3050–3160					
2500	M5136‡⊕	3050–3160	38.5	145	5.0	0.0015	EWAZ



Tunable S-Band Magnetrons M5083A (left) and M5048 (right)

CLASS

Magnetic Field

- E Electro-magnet
- P Packaged integral magnet
- S Separate magnet

Cooling

- A Forced-air
- B Conduction
- N Natural
- W Water
- V Vapour

Output

- C Coaxial
- G Waveguide
- X Requires transition section
- Z Requires electro-magnet with launching section

M-OV Pulse Magnetrons — S-Band

Fixed frequency types

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
425	CV1483 Δ	3570-3614	27	40	0.5	0.00025	SAX
	CV1484 Δ	3530-3570					
	CV1485 Δ	3490-3530					
	CV1486 Δ	3450-3490					
450	CV1475 Δ	3340-3380	26	40	0.5	0.00025	SAX
	CV1476 Δ	3305-3340					
	CV1477 Δ	3270-3305					
	CV1478 Δ	3230-3270					
450	CV1479 Δ	3030-3060	27	35	2.0	0.001	SAX
	CV1480 Δ	3005-3030					
	CV1481 Δ	2980-3005					
	CV1482 Δ	2950-2980					

EEV Pulse Magnetrons — C-Band

Fixed frequency types

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
840	M5032	5250-5350	34	60	5.0	0.0015	EWAZ
	M5033	5430-5530					



Magnetrons MAG17 (left) and MAG22 (right)

Δ Maintenance type, not recommended for use in new equipment.

* Required frequency to be specified.

\S Rugged.

ϕ Quick heat cathode.

\dagger Mechanically tuned over the specified frequency range.

■ Made to special order only.

\ddagger Low thermal coefficient of frequency.

\square Preset tuning.

M-OV Pulse Magnetrons — X-Band

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
0.05	MAG22*	8790-8830	0.8	0.15	4.0	0.4	PAG
0.3	MAG17* §φ	9000-11000	0.85	1.5	0.35	0.0014	PBC
0.3	MAG20* † §φ	9000-11000	0.85	1.5	0.35	0.0014	PBC
1.5	MAG23A † §φ	9620-9675	2.25	3.0	0.25	0.001	PBG
	MAG23B † §φ	9675-9750					
	MAG23C † §φ	9750-9825					
	MAG23D † §φ	9825-9880					
2.0	MAG12* §φ	9000-11000	2.25	3.0	0.25	0.001	PBG
8.0	MAG15* §φ	9000-11000	5.80	5.0	0.12	0.0015	PBG
50	2J51A (CV5134) †	8500-9600	13.5	14	1.00	0.001	PAG
130	MAG21A §	9500-9590	17	20	0.25	0.001	PAG
	MAG21B §	9555-9645					
	MAG21C §	9610-9700					

EEV Pulse Magnetrons — X-Band

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
1.4	M5021	9380-9440	2.0	2.25	0.1	0.00015	PNG
4.0	M5064H	9345-9405	3.6	3.0	0.1	0.0002	PNG
4.0	M599A	9415-9475	3.6	3.0	0.1	0.0002	PNG
	M599B (CV10758)						
5.0	M5115	9380-9440	4.9	4.0	1.0	0.002	PANG
6.0	M5065	9345-9405	4.6	4.5	1.0	0.002	PANG
6.75	M5097	9200-9600 □	4.35	5.0	0.8	0.0008	PNG
7.5	M5043	9380-9440	4.35	5.0	0.8	0.0008	PNG
	M5044	9415-9475					
8.0	M5019	9345-9405	5.4	4.5	0.25	0.00037	PANG
8.3	2J42 (CV3676)	9345-9405	5.5	4.5	1.0	0.002	PANG
8.3	2J42H	9345-9405	5.5	4.5	0.45	0.00036	PANG
9.0	M537A (CV6108)	8770-8830	5.5	4.5	1.0	0.001	PAG
9.0	M5067	9345-9405	5.5	4.5	1.0	0.002	PANG
9.0	M5067H	9345-9405	5.5	4.5	2.5	0.001	PANG
9.0	M5117	9400-9720 †	5.6	5.0	0.5	0.0005	PANG
9.5	M503A	9345-9405	5.6	4.5	0.5	0.0005	PANG

CLASS

Magnetic Field

E	Electro-magnet
P	Packaged integral magnet
S	Separate magnet

Cooling

A	Forced-air
B	Conduction
N	Natural
W	Water
V	Vapour

Output

C	Coaxial
G	Waveguide
X	Requires transition section
Z	Requires electro-magnet with launching section

EEV Pulse Magnetrons — X-Band continued

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
9.5	M5108	9380–9440	5.8	5.0	1.0	0.002	PANG
10.5	M597	9380–9440	5.7	5.0	0.5	0.0005	PANG
10.5	M5031	9345–9405	5.7	5.0	0.5	0.00062	PANG
20	6027 (CV5135)	9345–9405	6.9	7.0	1.0	0.001	PAG
20	6027H	9345–9405	7.2	7.5	2.5	0.001	PAG
20	8356 (CV8505)	9345–9405	7.2	7.5	2.5	0.001	PANG
20	M5023	9345–9405	7.8	7.5	0.5	0.0005	PANG
20	M5024	9415–9475					
20	M5025	9380–9440					
21	BM1002	9415–9475	7.8	8.0	0.1	0.0002	PAG
22	M513A (CV3528)	9345–9405	7.6	7.5	1.0	0.0005	PANG
22	M513B (CV3997)	9345–9405	7.6	7.5	1.0	0.0005	PANG
22	M540B	9345–9405	7.6	7.5	1.0	0.0005	PANG
22	M598B	9380–9440	7.6	7.5	1.0	0.0005	PANG
25	M515	9380–9440	8.2	8.0	1.0	0.0005	PANG
25	M5039	9345–9405	8.2	8.0	1.0	0.0005	PANG
25	M5068	9620–9680	8.2	8.0	1.0	0.0005	PANG
25	M5111	9350–9400	8.2	8.0	1.0	0.0005	PANG
30	M5022	9415–9475	8.3	9.0	1.0	0.0005	PANG
30	M5089	9415–9460	8.3	9.0	1.0	0.0005	PANG
30	M5105	9455–9495	8.3	9.0	1.0	0.0005	PANG
40	BM1031 (CV2186)	9420–9500	13	10	1.0	0.001	SAG
45	M505 (CV1747)	9360–9460	11.1	12	1.0	0.001	SAG
45	M521 (CV2376)	9600–9700	11.1	12	1.0	0.001	SAG
50	2J55	9345–9405	12.5	12	1.0	0.001	PAG
50	M506A (CV3982)	9360–9460	11.5	12	1.0	0.001	SAG
50	M5061	9300–9340	11.5	12	1.0	0.001	SAG
50	M5062	9440–9480					
50	M5075	9005–9035	11.5	12	1.0	0.001	SAG
50	M5076	9135–9165					
50	M5077	9165–9195					
53	M5005 (CV9424)	9345–9405	13	12	4.0	0.0016	PAG
60	BM1026	9505–9540	14	11	0.5	0.001	SAG
60	BM1027	9540–9580					
60	BM1028	9580–9620					
60	BM1029	9620–9660					
60	BM1030	9660–9695					

■ Made to special order only.

† Mechanically tuned over the specified frequency range.

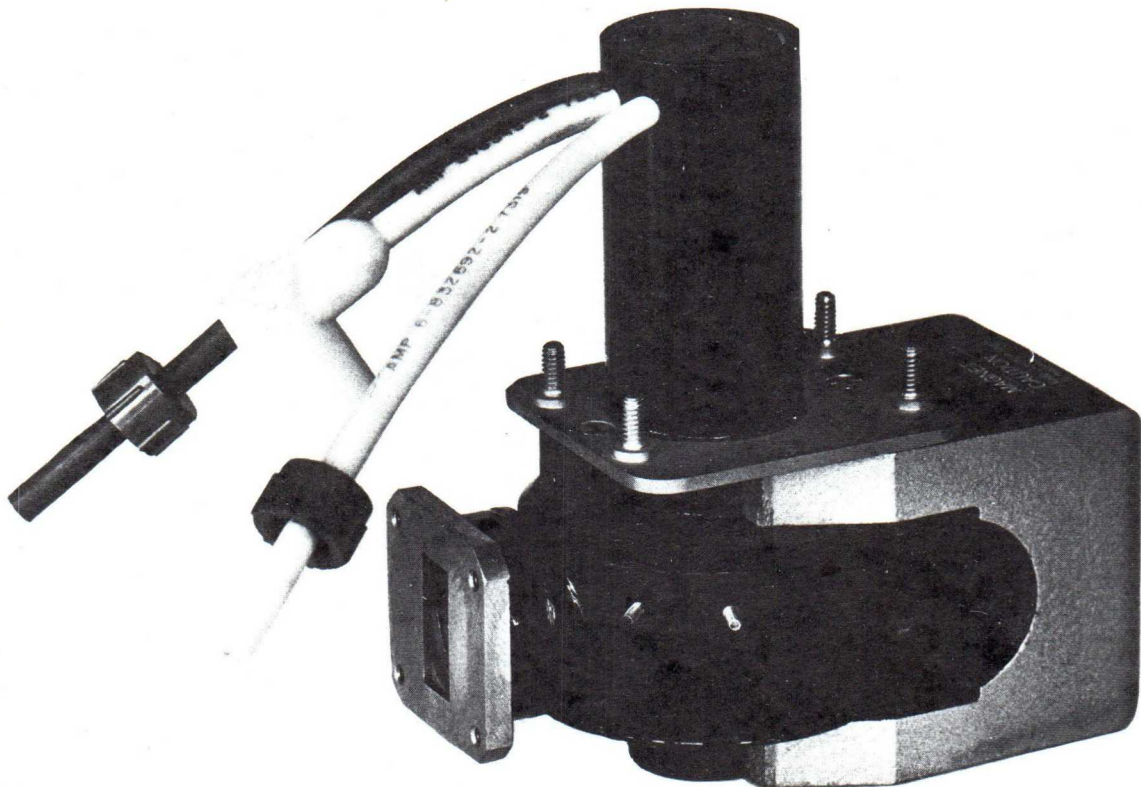
□ Preset tuning.

☆ Coaxial magnetron.

EEV Pulse Magnetrons — X-Band continued

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
60	BM1038 (CV2261) ■	9050–9600†	14	15	0.1	0.0003	PAG
60	BM1039 (CV2262) ■	8500–9050†					
65	M581	9415–9475	14	14	0.5	0.0006	PAG
70	BM1032	9440–9510†	17	12	0.5	0.00091	SAG
70	BM1033	9800–9860†					
70	BM1034	9620–9680†					
70	BM1035	9520–9580†					
70	BM1036	9245–9305†					
70	BM1037	9145–9205†					
70	M5101	8500–9600□					
70	M5119	8500–9600	15	15	0.5	0.001	PNG
70	M5119	8500–9600	15	15	0.5	0.001	PNG
75	BM1040 (CV5167)	9040–9120†	15	11	0.5	0.00072	SAG
75	M5109 ☆	9345–9405	13	12	5.0	0.001	PBAG
75	M5138 ☆	9325–9365	13	12	5.0	0.001	PBAG
80	4J52A (CV5018)	9350–9400	15.5	15	1.0	0.001	PAG
80	M575	9345–9405	15	15	1.0	0.001	PAG
80	M592	8925–8995	15.5	15	1.0	0.001	PAG
80	M596	9370–9430	14.8	15	1.0	0.001	PAG



X-Band Coaxial Magnetron M5109

CLASS

Magnetic Field

E Electro-magnet
P Packaged integral magnet
S Separate magnet

Cooling

A Forced-air
B Conduction
N Natural
W Water
V Vapour

Output

C Coaxial
G Waveguide
X Requires transition section
Z Requires electro-magnet with launching section

EEV Pulse Magnetrons — X-Band continued

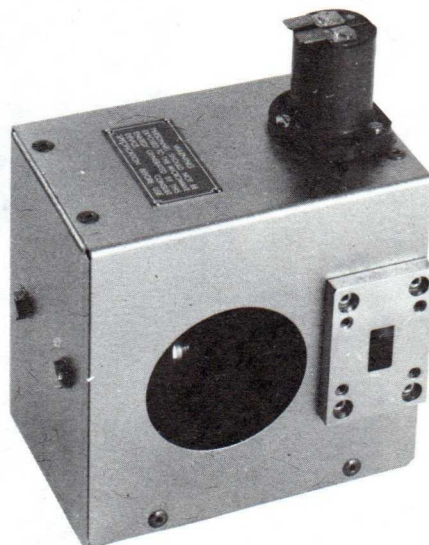
Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
80	M5080	9210–9270					
80	M5081	9345–9405	15.5	15	1.5	0.0012	PAG
85	M5118	9315–9375	15	15	0.2	0.0004	PAG
100	M5042S	9315–9375	15	17.5	6.0	0.0012	PAG
135	M5041	9345–9405	20	16	1.0	0.001	PAG
225	4J50A (CV2284)	9345–9405	22	25	1.0	0.001	PAG
225	M523 (CV2412)	9580–9705	22	25	1.0	0.001	PAG
225	M529 (CV2426)	8830–8995	22	25	1.0	0.001	PAG
225	M538A (CV2473)	9210–9270	22	25	1.0	0.001	PAG
225	M539 (CV2425)	8665–8830	22	25	1.0	0.001	PAG
225	M549 (CV2424)	8500–8665	22	25	1.0	0.001	PAG
750	M504■	9325–9425	35	50	0.6	0.0006	EAG

M-OV Pulse Magnetron — J-Band

Fixed frequency type

Peak output power (kW)	Type	Frequency range (GHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μ s)	Duty cycle	
35	MAG19ϕ	16.36-16.64	11	11	0.5	0.001	PANG



J-Band Magnetron MAG19

■ Made to special order only.
 ϕ Quick heat cathode.

◆ Frequency agile.
 \dagger Mechanically tuned over the specified frequency range.

EEV Pulse Magnetrons — Q-Band

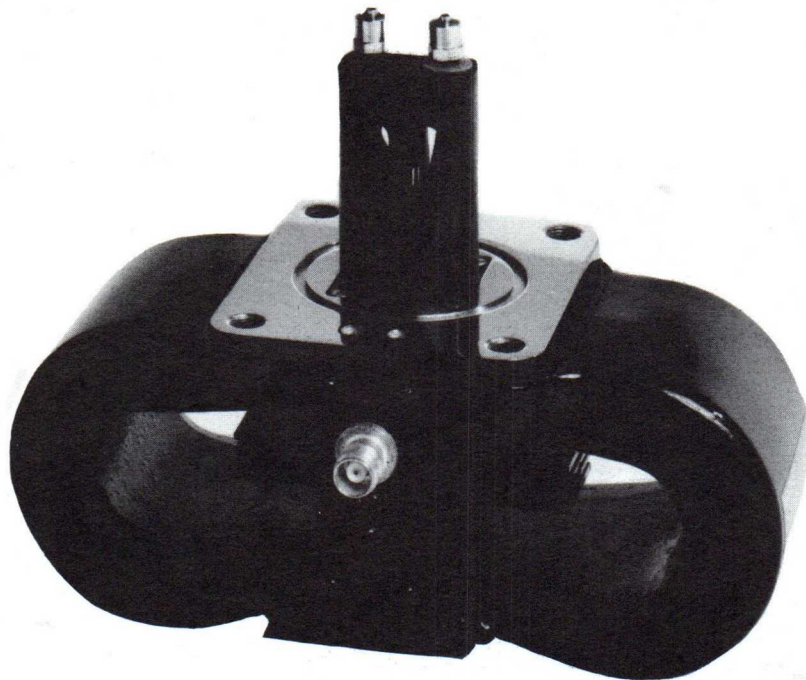
Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Centre frequency range (GHz)	Typical operation					Class (see foot-notes)
			Tuning range (MHz)	Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (ns)	Duty cycle	
18	M5055	34.4–35.4	—	12	9.0	30	0.00045	PAG
20	M5123	34.7–35.2	500†	12	9.0	30	0.00045	PAG
45	M5060	34.7–35.2	500†	14	15	100	0.0004	PAG
50	M5053	34.3–35.3	—	14	15	100	0.0004	PAG
50	M5054	34.3–35.3	—	14	15	100	0.0004	PAG
50	M5059	34.5–38.0	320♦	14.5	15.5	200	0.0004	PAG
50	M5100	33.0–36.0	—	13.5	15.5	100	0.0004	PAG

EEV Pulse Magnetrons — O-Band

Fixed frequency types except where otherwise indicated

Peak output power (kW)	Type	Centre frequency range (GHz)	Typical operation					Class (see foot-notes)
			Tuning range (MHz)	Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (ns)	Duty cycle	
4.0	M5137	79.0–81.0	1000†	12	5.0	50	0.0002	PAG
5.0	M5124	80.5–81.5	600♦	12	5.0	50	0.0002	PAG
6.0	M5057	78.0–82.0	—	11	5.0	50	0.0002	PAG



Q-Band Magnetron M5059

CLASS

Magnetic Field

E	Electro-magnet
P	Packaged integral magnet
S	Separate magnet

Cooling

A	Forced-air
B	Conduction
N	Natural
W	Water
V	Vapour

Output

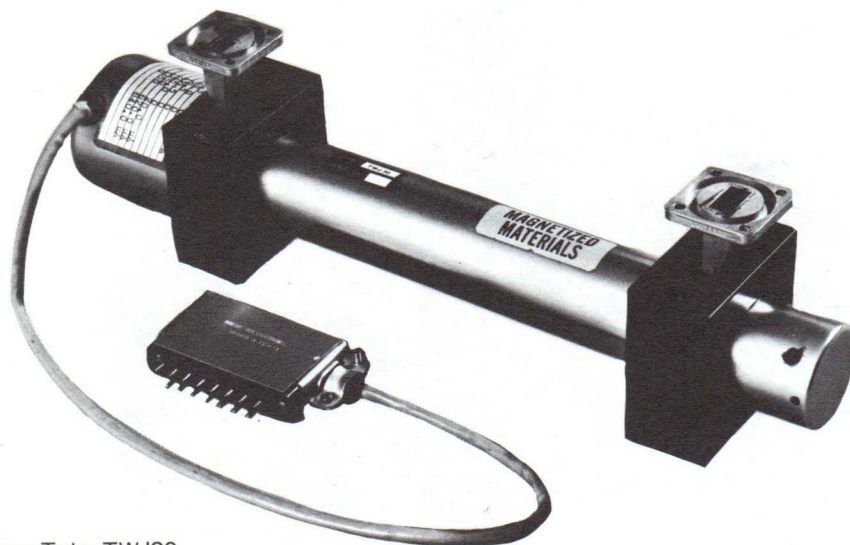
C	Coaxial
G	Waveguide
X	Requires transition section
Z	Requires electro-magnet with launching section

M-OV Travelling Wave Tubes — Low Noise

Frequency range (GHz)	Type	Saturated output power (mW)	Noise factor (dB)	Low level gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
2.0–4.1	TWS17 §	20	11	38.5	0.435	0.7	0.8	Coaxial	PPM
2.0–4.1	TWS26 § ■	20	11	38.5	—	—	—	Coaxial	PPM◇
4.0–8.0	TWC18 §	20	11	38.5	0.75	1.05	1.0	Coaxial	PPM
4.0–8.0	TWC27 § ■	20	11	38.5	—	—	—	Coaxial	PPM◇
7.0–12.0	TWX19 §	10	11	37	1.2	1.5	1.0	Coaxial	PPM
7.0–12.0	TWX28 § ■	10	11	37	—	—	—	Coaxial	PPM◇
12.0–18.0	TWJ20 §	7	14.5	30	1.2	1.5	1.2	Waveguide	PPM
12.0–18.0	TWJ29 § ■	7	14.5	30	—	—	—	Waveguide	PPM◇
12.0–18.5	TWJ30 §	3	13.5	35	1.2	1.5	0.6	Waveguide	PPM
12.0–18.5	TWJ33 § ■	3	13.5	35	—	—	—	Waveguide	PPM◇

EEV Travelling Wave Tubes — Low Noise

Frequency range (GHz)	Type	Saturated output power (mW)	Noise factor (dB)	Low level gain (dB)	Helix voltage (V)	Collector		R.F. connectors	Focus system
						Voltage (V)	Current (μA)		
1.2–1.4	N1017M (CV6106) ■	2.0	6.5	26	260	450	150	Coaxial	N4003⊕ ■
2.7–3.2	N1047M (CV8908)	1.5	4.0	24	375	800	130	Coaxial	N4041⊕
2.7–3.5	6861 (CV5362)	1.0	6.5	25	375	400	150	Coaxial	N4004⊕
2.7–3.5	N1042M (CV8131)	1.0	6.5	25	375	400	150	Coaxial	N4004⊕
2.5–4.1	N1045M (CV5386)	3.0	8.0	28	365	400	225	Coaxial	N4004⊕
4.1–7.0	N1016M (CV6098) ■	3.5	9.5	37	585	720	350	Coaxial	N4001⊕ ■



Low Noise Travelling Wave Tube TWJ30

- ¶ Gain at 3dB below saturation output power level.
- § Rugged.
- ◇ Integral power supply.
- High μ grid modulated.
- ▲ Convection cooled periodic permanent magnet.

- △ Maintenance type, not recommended for use in new equipment.
- Made to special order only.
- ⊕ Solenoid.
- * Tubes covering 450MHz bands centred on various frequencies in X-band can be supplied.

M-OV Travelling Wave Tubes — S-Band

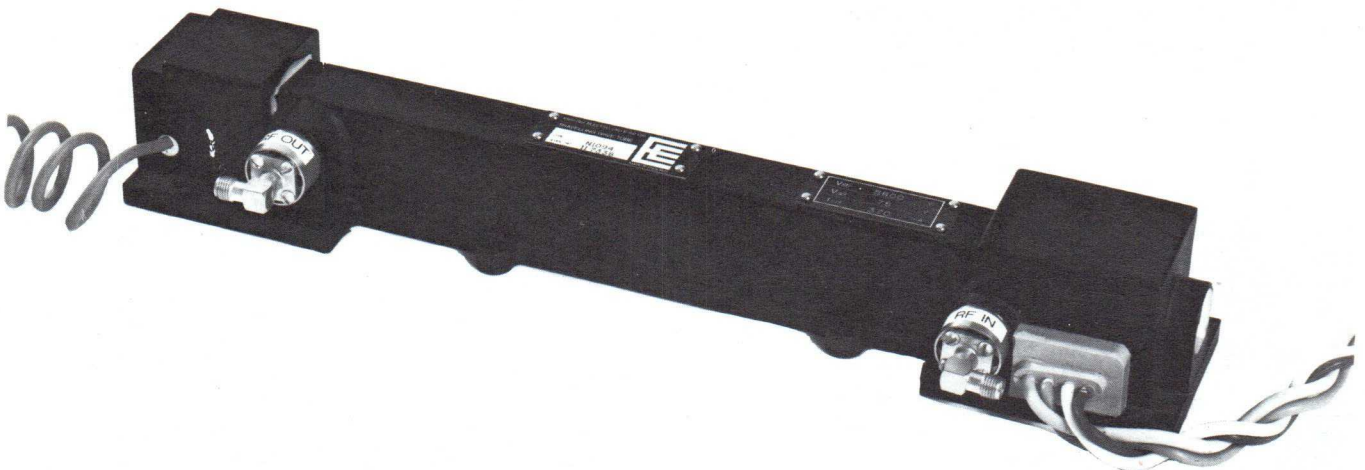
Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
2.5–4.1	(CV6085)△ TWS6 (CV6157)△	1	21	20	2.15	2.4	15	Coaxial	SMS6⊕
2.7–3.25	TWS7 (CV6117)△	3	24	23	2.25	2.4	22	Coaxial	SMS7⊕

EEV Pulsed Travelling Wave Tubes — C-Band

Frequency range (GHz)	Type	Peak output power (W)	Duty cycle	Gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Net weight (kg)
						Voltage (kV)	Current (mA)		
4.4–5.8	N10007	130	0.1●	40	5.4	3.3	220	SMA	0.9
4.4–5.8	N1094	250	0.05●	40	5.4	3.3	350	SMA	1.4

M-OV Travelling Wave Tubes — X-Band

Frequency range (GHz)	Type	Saturated output power (W)	Noise factor (dB)	Low level gain (dB)	Helix voltage (kV)	Collector		R.F. connectors	Focus system
						Voltage (kV)	Current (mA)		
7.0–11.5	TWX8	0.5	30	35¶	2.4	2.7	8.0	Waveguide	PPM▲
7.0–11.5	TWX22§	0.5	30	35¶	2.3	2.6	8.0	Waveguide	PPM▲
7.0–11.5	TWX34§	0.5	30	35¶	2.3	2.6	8.0	Waveguide	PPM▲
8.0–9.3	TWX16	5.0–20kW (peak)	—	47–53	20	15–23	3–6A (peak)	Waveguide	SMX16⊕



C-Band Travelling Wave Tube N1094

EEV Pulsed Travelling Wave Tube — X-Band

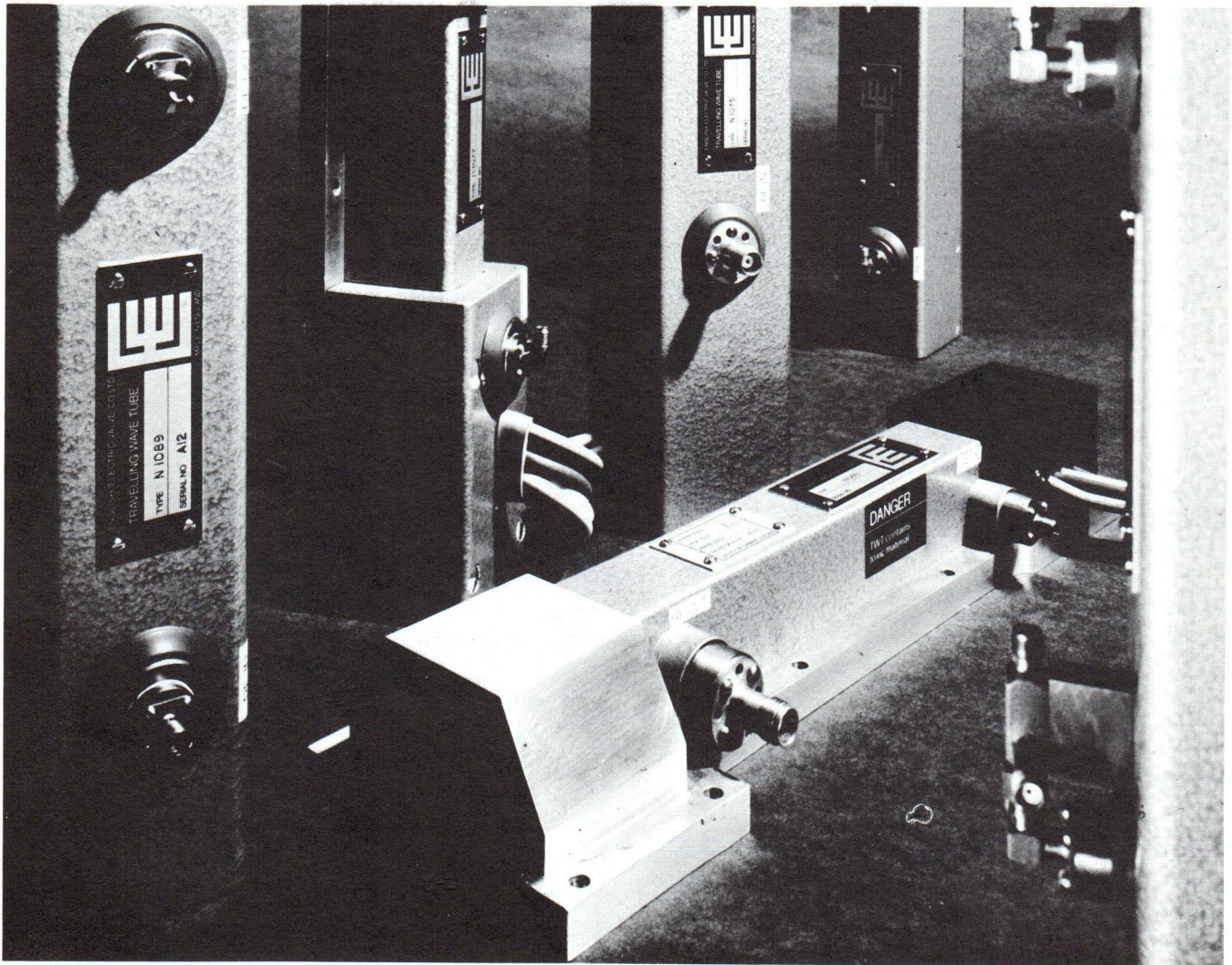
Frequency range (GHz)	Type	Peak output power (kW)	Duty cycle	Gain (dB)	Beam voltage (kV)	Beam current (A)	Solenoid
X-Band*	N1061■	900–500	0.005	35–25	100	31	N4115

EEV Travelling Wave Tubes — Broadband, Rugged

The range consists of tubes of rugged metal/ceramic construction, designed to meet severe environmental requirements and suitable for military communications, ECM systems etc. The tubes are integral with their periodic permanent magnet focusing mounts and are conduction cooled. Related tubes at other frequencies and power levels or in alternative physical designs, for use under pulse, c.w. or phase modulated conditions, are available and enquiries are invited.

EEV can supply complete travelling wave tube amplifier chains, including gain equalizers, where higher gain and efficiency than similar single tube systems is required.

Frequency range (GHz)	Type	Saturation output power (min) (W)	Gain at saturation (min) (dB)	Mid-band efficiency (%)	Helix voltage (kV)	Collector		Output connections†	Weight (kg)
						Voltage (kV)	Current (mA)		
4.8–9.6	N1083	25	43	20	3.3	2.0	88	SMA	1.7
5.0–10	N1078	2.0	36	—	2.0‡	2.0	25	SMA	0.9
5.0–10	N1077	100	30	20	5.8	3.2	200	TNC	3.4
7.0–11	N1079	2.0	36	—	2.0‡	2.0	25	SMA	0.9
7.0–11	N1080	200	31	20	8.0	4.0	280	TNC	3.9
8.0–12	N1075	100	30	20	5.75	3.25	175	TNC	2.7
9.5–12.4	N1065	35	40	26	4.83	2.0	64	OSM224	2.6
8.0–16	N1082	1.0	36	—	2.0‡	2.0	20	SMA	0.7
9.0–16	N1081	100	30	20	7.1	4.2	180	Waveguide	2.8



Selection of Broadband, Rugged Travelling Wave Tubes

- † Alternative input connections available.
‡ Internally connected to collector.

- †† Temperature range $\pm 20^{\circ}\text{C}$ about any operating temperature from 0°C to 60°C .

M-OV 3-Port Coaxial Circulators and Isocirculators

Configuration: T-form with either plugs or sockets on each port. Connections may also be in WG14, 15 or 16 at relevant frequencies to special order.

Temperature Performance: This is normally 0°–40°C for full bandwidth performance but can be extended by temperature compensation.

Isocirculators 3CI Series: The full range of circulators may be supplied with a built-in matched load on any specified port. This load is normally of low power (0.25 watts) but higher power loads can be fitted to special order.

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Power max (W)	Connectors
Standard Range							
1.3–3.0	3CC1100/fo	10%	30	1.07	0.25	25	Type N or APC7
1.3–3.0	3CC1200/fo	20%	27	1.10	0.25	25	Type N or APC7
3.0–5.0	3CC2100/fo	10%	30	1.07	0.20	15	Type N or APC7
3.0–5.0	3CC2200/fo	20%	27	1.10	0.20	15	Type N or APC7
6.0–8.0	3CC3100/fo	10%	30	1.07	0.15	10	Type N or APC7
6.0–8.0	3CC3101/fo	10%	24	1.15	0.20	10	SMA
8.0–12.4	3CC4100/fo	10%	24	1.15	0.20	5	SMA
Special Range							
1.7–2.0	3CC115S	–	30	1.07	0.20	50	Type N
1.9–2.3	3CC120S	–	30	1.07	0.20	50	Type N
3.7–4.2	3CC210S††	–	30	1.07	0.20	15	Type N
7.2–7.8	3CC310S††	–	30	1.07	0.12	10	Type N

M-OV 3-Port Miniature Microstripline Circulators and Isocirculators

These devices may either be supplied as separate (5 micron gold) 50 ohm circuits on high quality alumina substrates together with magnets or as miniature devices encased in aluminium boxes with SMA connectors. They are usually T-form but other configurations are available.

The isolators have integrated thin film matched loads which will withstand up to 0.1W reverse power.

Temperature range is 0–60°C.

Frequency range (GHz)	Type	Bandwidth*	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Substrate size (in)
2.0–4.0	3MC1200/fo §	20%	20	1.23	0.35	2 x 2 (50 x 50mm)
4.0–8.0	3MC2200/fo §	20%	20	1.23	0.35	1 x 1 (25 x 25mm)
8.0–12.0	3MC3200/fo §	20%	20	1.23	0.40	0.8 x 0.8 (20 x 20mm)
12.0–18.0	3MC4100/fo §	10%	20	1.23	0.50	0.6 x 0.6 (15 x 15mm)

M-OV 4-Port Circulators

All the 3-port circulators above may be supplied in 4 and 5-port configurations, with built-in loads on specified ports if required. The following are typical examples of these.

Operating frequency range (GHz)	Type	Isolation min (dB)		V.S.W.R.	Insertion loss max (dB)		Power max (W)	Connectors
		1-4 3-2	1-3, 3-1 2-1, 2-4 4-2, 4-3		1-2 3-4	2-3 4-1		
3.7–4.2	4CC1100	55	30	1.07	0.15	0.3	15	Type N or APC7
7.2–7.8	4CC2100	55	30	1.07	0.12	0.23	10	Type N or APC7

§ Four and five port configurations can be supplied to special order.

★ Broader bandwidths are available in certain frequency bands.

M-OV 5-Port Circulators

Operating frequency range (GHz)	Type	Description	Insertion loss		V.S.W.R.	Connectors
			Forward (dB)	Reverse (dB)		
1.7–2.0	5CC1151	Two ports terminated in matched loads	0.7	45	1.07	Type N
1.9–2.3	5CC1152	Two ports terminated in matched loads	0.7	45	1.07	Type N

M-OV High Peak Power Circulators

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R.	Insertion loss max (dB)	Mean power (W)	Peak power (kW)	Connectors
8.2–12.4	WGC4050/fo	5%	27	1.10	0.15	50	5	WG16
8.2–12.4	WGC405H/fo	5%	20	1.22	0.5	55	50	WG16

M-OV Waveguide Circulators and Isocirculators

This range of devices uses a special form of construction avoiding the use of adhesives for holding the ferrite in position to give excellent thermal and mechanical shock resistance.

Configuration: T-form. **Temperature range:** 0–50°C.

Isocirculators WGI Series: The full range of circulators may be supplied with a built-in matched load (within the circulator housing) on any specified port. This load is of low power (2 watts) but larger loads can be fitted to special order.

Frequency range (GHz)	Type	Bandwidth	Isolation min (dB)	V.S.W.R. max	Insertion loss max (dB)	Power max (W)	Connectors
3.7–5.85	WGC1100/fo	10%	30	1.07	0.15	200	WG12
5.85–8.0	WGC2100/fo	10%	30	1.07	0.15	100	WG14
5.85–8.0	WGC2200/fo	20%	20	1.22	0.15	100	WG14
7.0–10.0	WGC3100/fo	10%	30	1.07	0.15	50	WG15
8.2–12.4	WGC4100/fo	10%	30	1.07	0.15	50	WG16
8.2–12.4	WGC4200/fo	20%	20	1.22	0.20	50	WG16
8.2–12.4	WGC4300/fo	30%	17	1.33	0.20	50	WG16

M-OV Transitions

Operating frequency range (GHz)	Type	Description	V.S.W.R.	R.F. connections	
				Waveguide	Coaxial
2.5–4.1	WTS4■	Rear entry	0.85 (1.18)	WG10	N50 ohms
4.1–7.0	WTC5■	Rear entry	0.8 (1.25)	WG13	N50 ohms
7.0–11.5	WTX6■	Rear entry	0.85 (1.18)	WG16	N50 ohms
8.0–12.4	WTX8■	Rear entry	0.8 (1.25)	WG16	SMA 50 ohms
12.4–18.0	WTJ9■	Rear entry	0.8 (1.25)	WG18	SMA 50 ohms

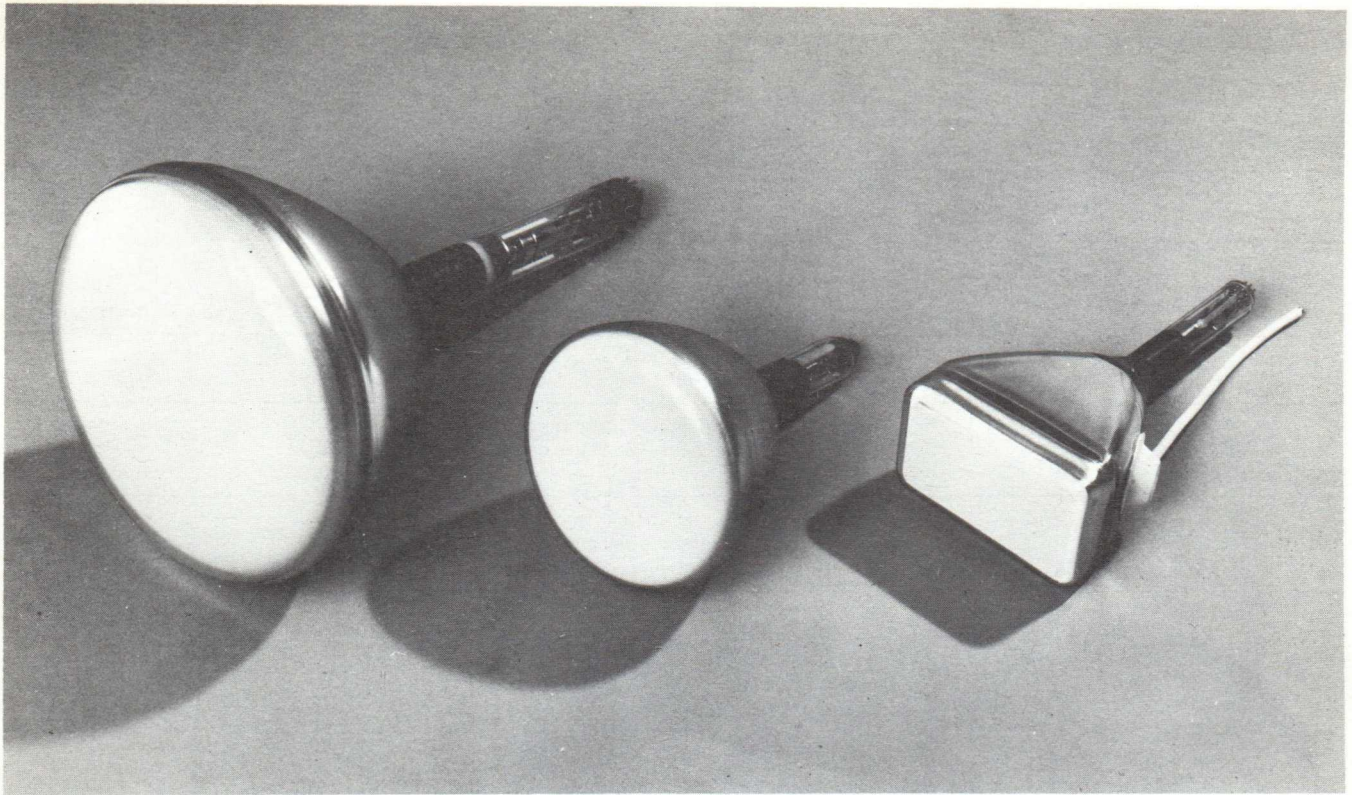
■ Made to special order only.

EEV Storage Tubes

Useful screen size	Type	Description	Typical brightness (ft-lamberts)	Deflection
4.0 inches (10.2cm) dia.	E702A (CV5877)	Direct view storage tube recommended for radar applications.	900	Electrostatic
4.0 inches (10.2cm) dia.	E702E	Direct view storage tube recommended for radar, medical and picture storage applications. Similar to E702A but gives improved uniformity of erasure.	900	Electrostatic
4.0 inches (10.2cm) dia.	E713B (CV9422)	Direct view storage tube recommended for radar applications under limited vibration conditions.	1800	Magnetic
9.0 inches (22.9cm) dia.	E712A	Direct view storage tube recommended for radar and data terminal applications. Selective erasure is possible by voltage switching.	1000	Magnetic
14 inches (35.6cm) dia.	E722A	Direct view storage tube recommended for radar and data terminal applications. Selective erasure is possible by voltage switching.	400	Magnetic



Storage Tubes E712A (top) and E702E (bottom)



Radar Tubes 2273D (left), 1578B (centre) and 1478E (right)

M-OV Radar and Data Display Tubes (Magnetically Deflected)

Screen size (cm)	Type	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Focus voltage (V)	Anode 1 voltage (V)	Cut-off voltage max (V)	Base
13.2 x 8.0	1478E (CV6229)	268	44	17.5	-330 to 0	-330 [†] to -60	V _k 20	B9A/D
15.2	1578A 1578B	241	53	9	0 to -400	400	-70	B8H
16	F16-10LB ■ F16-10LC ■ F16-10LD	370	37	12	0 to 400	500	-44	B8H
18.2	7ABP7A (CV8114) ■ 7ABP33A	342.5	52	7	-100 to 150	300	-77	B12A
19 x 16	T9017W	290	70	14	-50 to 400	400	-75	Flying lead
21.4	F21-10LB ■ F21-10LC ■ F21-10LD (CV10757)	460	41	14	0 to 400	600	V _k 30-45	B8H
22.8	2273D	408	58	12	±200	300	-70	B12A
22.8	2269Y (CV2463)	477	40	15	magnetic	-	-100	B12A
31	3069M △	520	50	15	magnetic	-	-90	B12A
31	3069Q (CV9335) * ■ 3073Q (CV5819) 3096Q	485	50	12	±200	300	-70	B12A
31	3069R 3077R ■ 3079R ■ 3096R ■	572	40	16	-150 to 300	550	-65	B8H
31	MF31-55 (CV429) ■ (Tet)	520	50	15	magnetic	300	-90	B12A

[†] Adjusted for cut-off.

■ Made to special order only.

* Near equivalent.

△ Maintenance type, not recommended for use in new equipment.

M-OV Radar and Data Display Tubes (Magnetically Deflected) continued

Screen size (cm)	Type	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Focus voltage (V)	Anode 1 voltage (V)	Cut-off voltage max (V)	Base
31	T957Y (CV5819) T957Z (CV9335)	494	50	12	±200	300	-70	B12A
31	T963D (CV6113)■ T963S (CV10888)■ T963Z (CV6167)△	640	50	15	magnetic	300	-150	B12A
31	T988D (CV10952)■ T988S■ T988Y■ T988Z (CV10951)■	540	50	15	0 to 400	300	-70	B12A
31	T989D (CV6130)■ T989S■ T989Z (CV6172) (CV10949)■	520	50	15	magnetic	300	-90	B12A
31	T990Z (CV10948)△	320	50	15	magnetic	300	-90	B12A
41	4169B■ 4196B■	612.5	50	18	±200	300	-85	B12A
41	MF41-10△	518	70	12	magnetic	300	-70	B12A
41	T983D■ T983S■ T983Z■	650	50	15	0 to 400	300	-70	B12A



Avionic Tube F13-110GR

M-OV Avionic Tubes (Magnetically Deflected)

Screen size (cm)	Type	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Focus voltage (V)	Cut-off voltage max (V)	Base
7	769H (CV6217)	259	35	30	magnetic	-100	B9A
7	751J	195	45	15	magnetic	-50	Flying lead
11.5 x 8.5	F13-110GR	230	60	10	1000 to 1500	-70	Flying lead
13.2 x 8.0	1478E (CV6229)	268	44	17.5	-330 to 0	V _k 20	B9A/D

M-OV Cathode Ray Tube Phosphors

GEC	EEV	EIA	European	Old GEC	Old European	Fluorescence	Phosphorescence (Afterglow)	Persistence (approx)	Typical use
01	G	P1	GJ	B	G	Yellowish-green	Yellowish-green	Medium	Projection and oscilloscope
02	V	P28	—	C	—	Yellowish-green	Yellowish-green	Long	Short range radar
08	P	P11	BE	E	B	Blue	Blue	Medium-short	Photographic recording
15	A	P24	GE	U	K	Green	Green	Short	Flying spot scanners
18	W	P4	W	G	W	White	White	Medium-short	Television monitors
19	Z	P26	LC	T	F	Orange†	Orange	Very long	Long range radar
22	C	P16	BA	—	C	Violet and U.V.	Violet and U.V.	Very short	Flying spot scanners
23	Y	P33	LD	J	L	Orange†	Orange	Very long	Medium and short range radar
24	H	P31	GH	—	H	Green	Green	Medium-short	General purpose oscilloscopes
25	N	P2	GL	—	N	Yellowish-green	Yellowish-green	Medium	Wide speed range oscilloscopes
26	T	—	LA	—	D	Orange	Orange	Medium	Anti-flicker displays
27	S	—	LB	—	E	Orange†	Orange	Long	Medium and short range radar
28‡	—	—	—	—	—	Orange	Orange	Long	Medium range radar
29	E	P39	GR	—	—	Green	Green	Long	Medium and short range radar. Anti-flicker displays
30	B	—	—	—	U	Blue	Blue	Medium-short	Projection
31	D	—	—	—	—	Yellow-orange	Yellow-orange	Long	Short range radar and alpha-numeric
33	U	P12	—	—	—	Orange†	Orange	Long	Short range radar
34	R	—	—	—	—	Red	Red	Medium	Projection
44	—	P32	GB	—	M	Purplish-blue	Yellowish-green	Long	Medium and short range radar
46	X	P7	GM	M	P	White	Yellowish-green	Med. short/long*	Radar and slow speed oscilloscopes
47	F	P40	—	—	—	White	Yellowish-green	Med. short/long*	Anti-flicker displays
+50	The addition of this number to the GEC code indicates an aluminized screen, i.e. GEC phosphor No. 25 with aluminized screen becomes 75.								

‡ Reduced burn type phosphor.

* White: Medium-short
Yellowish-green: Long.

† This screen is readily damaged by slow-moving traces of high brightness, and should not be used with a stationary trace. It is normally used for radar PPI display.

ELECTRO- OPTICAL/TV

The following pages give abridged data for the current range of EEV/M-OV tubes, devices and accessories used in Electro-Optical/TV Equipment.

They comprise entries for:-

LEDDICONS	Page C5
VIDICONS	C6
IMAGE ORTHICONS	C10
IMAGE ISOCONS	C11
IMAGE INTENSIFIERS	C12
SHUTTER TUBES	C13
STORAGE TUBE	C13
PROJECTION TUBES	C14
VIEWFINDER TUBES	C14
PHOSPHORS	C15
STABILIZER TUBES	C16

Comprehensive data sheets giving operating conditions, characteristic curves, and outline drawings are available on request.

Certain types listed in this catalogue may not be available from current production and their supply may be subject to a minimum order quantity.

Enquiries for special tubes not included in the catalogue are also welcome.

Colour Code

Throughout the data the following colour code is used:-

Brown indicates manufacture by English Electric Valve Company Ltd.

Blue indicates manufacture by The M-O Valve Company Ltd.

CARACTERISTIQUES ABREGÉES

Dans les pages suivantes sont données les caractéristiques abrégées pour la gamme courante de tubes, dispositifs et accessoires EEV/M-OV.

Des fiches de caractéristiques établissant les conditions de fonctionnement, les courbes et les schémas d'ensemble sont disponibles sur demande.

Certains types mentionnés dans ce catalogue peuvent ne pas être disponibles parmi les produits de production courante et leur livraison peut être sujette à la commande d'une quantité minimum.

Nous répondons également aux demandes de renseignements pour les tubes spéciaux non mentionnés dans ce catalogue.

Code des Couleurs

Pour toutes les indications nous utilisons le code de couleur suivant:

Marron: produits fabriqués par English Electric Valve Co Ltd

Bleu: produits fabriqués par M-O Valve Co Ltd

KURZGEFASSTE DATEN

Auf den folgenden Seiten finden Sie kurzgefaßte Daten für das gegenwertige Herstellungsprogramm von EEV/M-OV-Röhren, Geräten und Zubehör.

Ausführliche Datenblätter mit Betriebsbedingungen, Leistungskurven und Maßzeichnungen sind auf Anfrage erhältlich.

Es ist möglich, daß sich einige der in diesem Katalog angeführten Positionen nicht im gegenwertigen Produktionsprogramm befinden und daß daher deren Lieferung von einer Bestellung von Mindeststückzahlen abhängig gemacht werden muß. Anfragen wegen Spezialröhren, die nicht in diesem Katalog enthalten sind, bearbeiten wir gerne.

Farbkennzeichnung

Die folgende Farbkennzeichnung wird für die Daten verwendet:

Braun: Produkt der English Electric Valve Co Ltd

Blau: Produkt der M-O Valve Co Ltd

RESUMEN INFORMATIVO DE DATOS

En las páginas siguientes aparece un resumen informativo de datos correspondientes a la nueva gama de lámparas, dispositivos y accesorios EEV/M-OV.

Tendremos sumo gusto en facilitar, a solicitud de las partes interesadas, hojas con los datos completos, incluyendo condiciones de funcionamiento, curvas de característica y planos acotados.

Es posible que ciertos tipos detallados en este Catálogo no puedan obtenerse dentro de la línea normal de producción actual y su suministro puede estar sujeto a un pedido mínimo. Sírvanse solicitar información relativa a lámparas especiales, no incluidas en este Catálogo.

Clave de Colores

En todo lugar se ha utilizado la siguiente clave de colores:

Marrón indica fabricado por la English Electric Valve Co Ltd

Azul indica fabricado por la M-O Valve Co Ltd

DATI ABBREVIATI

Alle pagine seguenti figurano dati abbreviati inerenti la presente serie di valvole, dispositivi ed accessori EEV/M-OV.

Le pubblicazioni tecniche più approfondite, contenenti le condizioni di funzionamento, curve delle caratteristiche e disegni del contorno, vengono fornite su richiesta.

Alcuni modelli elencati nel presente catalogo non sono disponibili nella normale produzione e la relativa fornitura può essere subordinata all'ordinazione di un quantitativo minimo.

Nel caso di valvole speciali non incluse nel presente testo, il cliente è pregato di interpellarci.

Colore Codice

Nel presente opuscolo, si usa il seguente codice:-

il marrone indica che la valvola è costruita dalla English Electric Valve Co Ltd

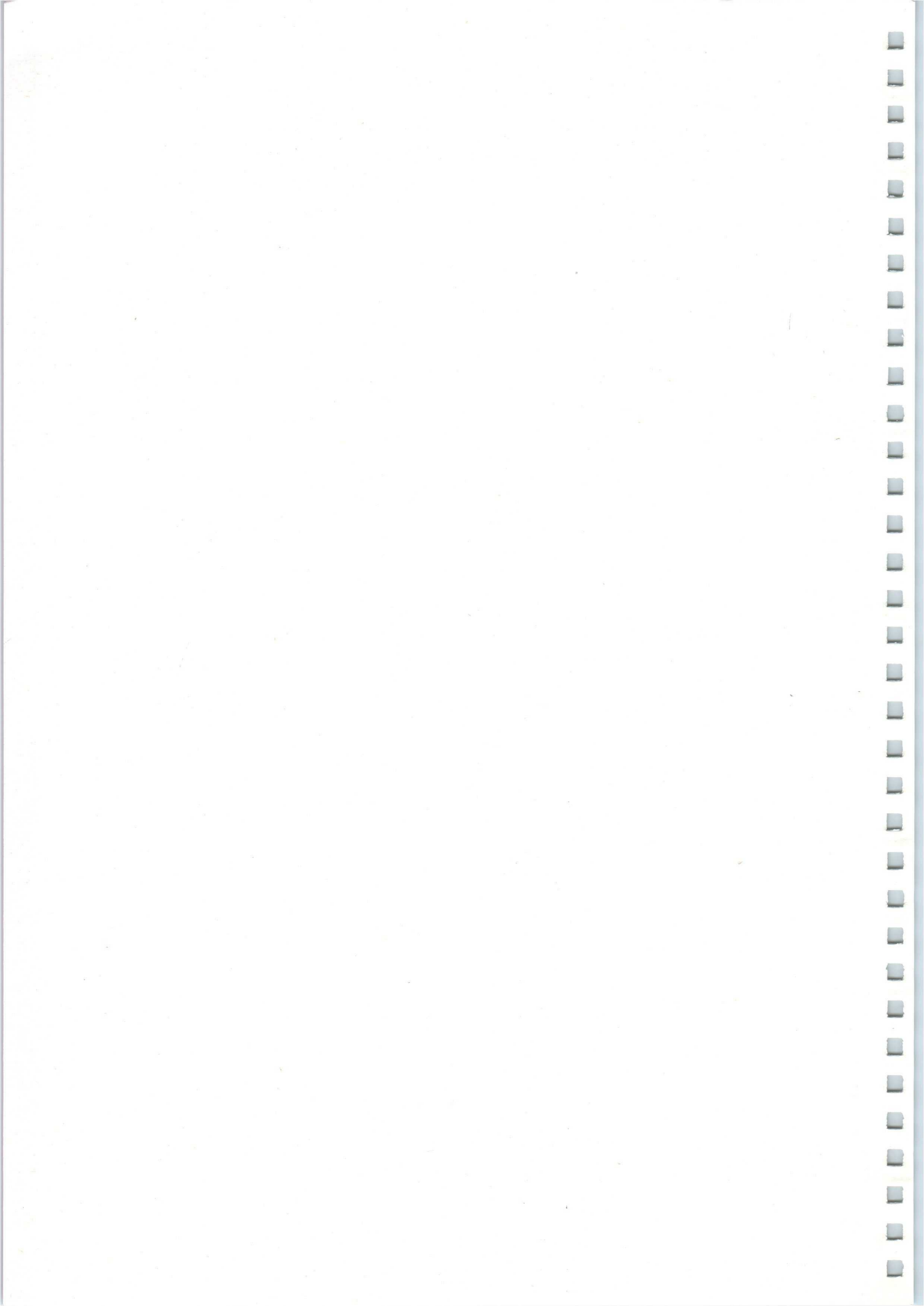
il blu indica che la valvola è costruita dalla M-O Valve Co Ltd

INDEX

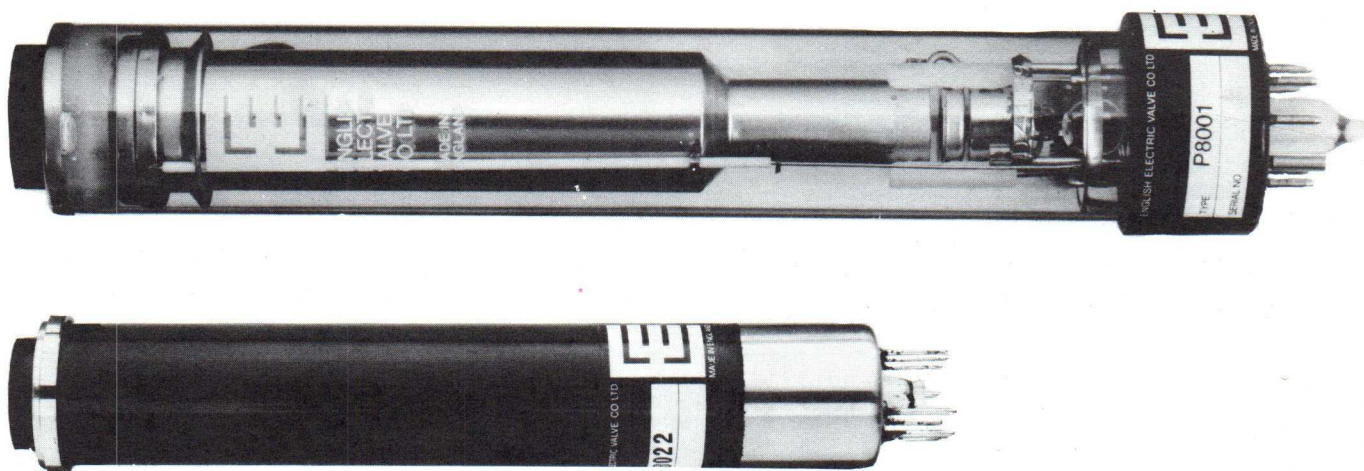
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1351U	C14	P850	C11	P8003G	C5	SC1/400	C16
1368U	C14	P855	C13	P8003L	C5	SC1/500	C16
1380U	C14	P856	C13	P8003R	C5	SC1/600	C16
1384U	C14	P858	C10	P8005	C5	SC1/800	C16
7038	C7	P863	C7	P8005B	C5	SC1/1000	C16
7262A	C7	P866	C6	P8005G	C5	SC1/1200	C16
7295C	C10	P872	C10	P8005L	C5	SC1/1400	C16
7389C	C10	P873	C10	P8005R	C5	SC1/1600	C16
7735	C7	P874	C10	P8008L	C5	SC1/1800	C16
7735A	C7	P875	C10	P8018A	C7	SC1/2000	C16
7735B	C7	P880	C11	P8018B	C7	SC2/2500	C16
7735BX	C7	P882	C10	P8021	C5	SC2/3000	C16
8051	C9	P883	C10	P8021B	C5	SC2/3500	C16
8134	C8	P887	C11	P8021G	C5	SC2/4000	C16
8134V1/4811	C8	P893/4493	C8	P8021L	C5	SC5/5000	C16
8480	C8	P894/4494	C8	P8021R	C5	SC5/6000	C16
8480V1/4810	C8	P895/4495	C8	P8022	C5	SC5/6800	C16
8507	C6	P896	C12	P8022B	C5	SC6/5000	C16
8507A	C6	P4150	C11	P8022G	C5	SC6/7000	C16
8521	C9	P8000	C5	P8022L	C5	SC6/10000	C16
8541	C6	P8000B	C5	P8022R	C5	SC6/14000	C16
8541A	C6	P8000G	C5	P8034	C7	SC7/12000	C16
8572A	C6	P8000L	C5	P8034A	C6	SC7/14000	C16
8625	C6	P8000R	C5	P8040	C11	SC7/15000	C16
8626	C6	P8001	C5	P8041	C11	SC7/16000	C16
AW17-20	C14	P8001B	C5	P8090	C9	SC7/E	C16
EP751	C13	P8001G	C5	P8095	C12	T940B	C14
P826/4478	C7	P8001L	C5	P8096	C12	T940G	C14
P831	C7	P8001R	C5	P8101	C13	T940R	C14
P841X	C6	P8003	C5	P8102	C13	T940W	C14
P842X	C6	P8003A	C5	P8103	C13	T960W	C14
P844	C6	P8003AG	C5	P8104	C13		
P848D	C6	P8003AL	C5	QSC5	C16		
P849D	C6	P8003AR	C5	SC1/350	C16		

Whilst the company has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice.

The company accepts no liability beyond that set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein.



Development is proceeding on a wide range of electro-optical devices and enquiries are invited for specific applications. Most of the television camera tubes can be supplied in alternative forms (radiation resistant and fibre-optic faceplates, vidicons with faceplate reticles, etc.).



Leddicons P8001 (top) and P8022 (bottom)

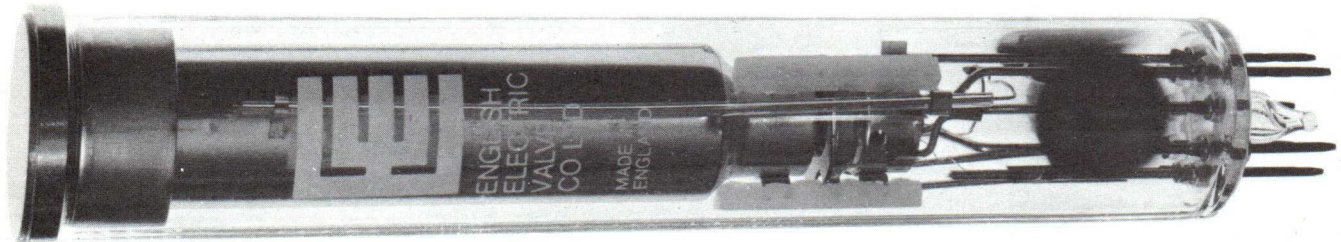
EEV Television Camera Tubes — Leddicons

Photoconductive camera tubes with high sensitivity lead oxide target, for high definition pick-up in monochrome and colour broadcast cameras. Features of these tubes include very short lag, low dark current and unity gamma.

Type	Application	Construction
P8000 P8000B P8000G P8000L P8000R	Monochrome Blue channel Green channel Luminance channel Red channel	30mm diameter, integral mesh
P8001 P8001B P8001G P8001L P8001R	Monochrome Blue channel Green channel Luminance channel Red channel	30mm diameter, separate mesh
P8003 P8003G P8003L P8003R	Monochrome Green channel Luminance channel Red channel	30mm diameter, separate mesh with extended red response and infrared filter
P8003A P8003AG P8003AL P8003AR	Monochrome Green channel Luminance channel Red channel	P8003 without infrared filter
P8005 P8005B P8005G P8005L P8005R	Monochrome Blue channel Green channel Luminance channel Red channel	30mm diameter, separate mesh with light bias
P8008L	Luminance channel	30mm diameter, separate mesh with light bias and highlight overload protection
P8021 P8021B P8021G P8021L P8021R	Monochrome Blue channel Green channel Luminance channel Red channel	1-inch diameter, separate mesh, mechanically interchangeable with comparable vidicons
P8022 P8022B P8022G P8022L P8022R	Monochrome Blue channel Green channel Luminance channel Red channel	1-inch diameter, separate mesh, with light bias; mechanically interchangeable with 1-inch vidicons.

EEV Television Camera Tubes — 1-inch Vidicons Separate Mesh, Magnetic Focus and Deflection

Type	Derivative	Application	Characteristics	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see page C9)
8507A (P841)		Broadcast, educational and high quality industrial.	Colour response similar to human eye. High sensitivity at all light levels. Moderate sensitivity to red up to 900nm. Short lag.	1st Grade	600	ii
	8507 (P848)	Industrial and educational.	High sensitivity and short lag, relaxed blemish specification.	Commercial	600	ii
	P848D	Industrial and surveillance.	P848 with relaxed specification.	Industrial	600	ii
	P841X	Medical use in conjunction with X-ray sensitive image intensifier.	Photosurface developed to match intensifiers with P20 phosphor output.	†	600	v
8541A (P842)		Broadcast, educational and high quality industrial.	Colour response similar to human eye. High sensitivity at all light levels. Moderate sensitivity to red up to 900nm. Short lag.	1st Grade	95	ii
	8541 (P849)	Industrial and educational. Replacement for P864 (near equivalent).	High sensitivity and short lag, relaxed blemish specification.	Commercial	95	ii
	P849D	Industrial and surveillance. Replacement for P862 (near equivalent).	P849 with relaxed specification.	Industrial	95	ii
	P866■	Broadcast, educational, industrial and surveillance where camera design necessitates a tube of reduced length.	Short version of the 8541A group, with the same characteristics.	†	95	ii
	P842X	Medical use in conjunction with X-ray sensitive image intensifier.	Photosurface developed to match intensifiers with P20 phosphor output.	†	95	v
8572A (P843)		Colour or monochrome telecine and caption scanning. Can be selected for use in PE24 and PE240 cameras. Available with anti-halation faceplate stud.	High sensitivity but very short lag at high light levels. Resistant to image retention.	1st Grade	600	vi
	P844	Colour or monochrome telecine and caption scanning.	Low power heater version of 8572A (P843).	1st Grade	95	vi
8625 (P846)		Monochrome broadcast, studio and educational.	High sensitivity with very short lag at studio light levels. Improved colour rendition when used with tungsten lighting.	1st Grade	600	iii
8626 (P847)		Monochrome broadcast, studio and educational.	Low power heater version of 8625 (P846).	1st Grade	95	iii
P8034A		Radar screen viewing. Low light level surveillance where scene motion is limited.	Very high sensitivity, long lag photo-cathode for normal and slow scan operation at low light levels.	†	95	iv



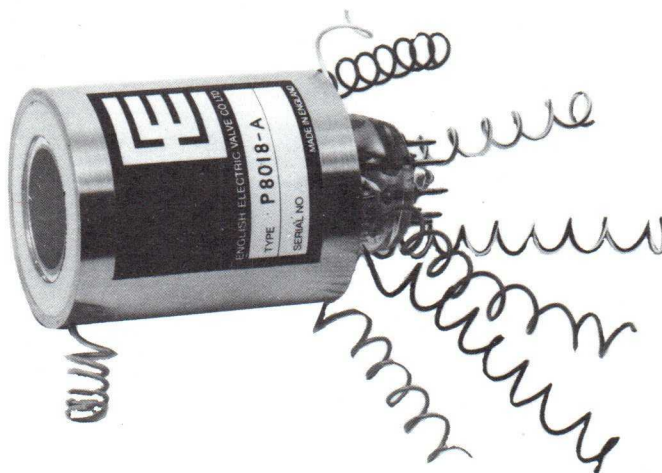
Vidicon 8541A

- Made to special order only.
- † Specific tube grades and electrical parameters can be negotiated.

- ‡ Can be purchased with scanning/focus/alignment coil assembly.

EEV Television Camera Tubes — 1-inch Rugged Vidicons Separate Mesh, Magnetic Focus and Deflection

Type	Derivative	Application	Characteristics	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see page C9)
P831 (CV8797)		Military and industrial involving shock and vibration.	Short tube of robust construction, with electrical characteristics similar to 8541A.	†	95	ii
P863 ‡ (CV6243)		Military and industrial involving shock and vibration.	Developed from P831, with mesh connected to ring contact adjacent to target connection to eliminate pick-up from these leads.	1st Grade	95	ii
P8018A ■		Military and industrial involving shock and vibration.	Ultra short, with integral focus and deflection coils. Robust construction.	1st Grade	95	ii
P8018B ■		Military and industrial involving shock and vibration.	Identical with P8018A but with signal lead brought out at base end.	1st Grade	95	ii



Vidicon P8018A

EEV Television Camera Tubes — 1-inch Vidicons Integral Mesh, Magnetic Focus and Deflection

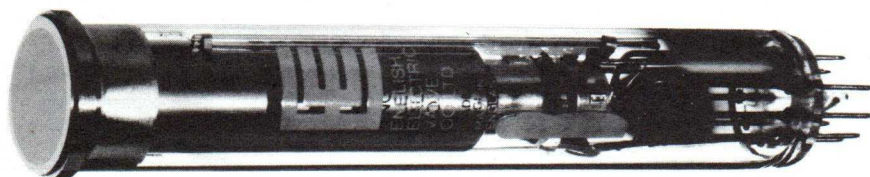
Type	Derivative	Application	Characteristics	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see page C9)
7735B		High quality broadcast, educational, telecine and industrial.	Very high sensitivity with colour response similar to the human eye. Short lag.	Premium	600	ii
7735A		General purpose closed circuit systems.	High sensitivity and short lag.	1st Grade	600	ii
7735		Industrial closed circuit systems.	Version of 7735A with relaxed blemish and electrical specification.	Commercial	600	ii
P826/4478		Low cost industrial and surveillance.	Similar to 7735 series but with relaxed blemish specification.	Industrial	600	ii
7262A		Monochrome broadcast, educational, industrial and surveillance where camera design necessitates a tube of reduced length.	Short version of the 7735B series with the same characteristics.	†	95	ii
7735BX		Medical use in conjunction with X-ray sensitive image intensifier.	Photosurface developed to match intensifiers with P20 phosphor.	Premium	600	v
7038		Colour or monochrome telecine and caption scanning. Can be selected for use in PE24 camera.	Medium/high sensitivity but short lag at high light levels. Resistant to image retention.	1st Grade	600	i
P8034 ■		Radar screen viewing. Low light level surveillance where scene motion is limited.	Very high sensitivity, long lag photosurface for normal and slow scan operation at low light levels.	†	600	iv

EEV Television Camera Tubes — 1-inch Vidicons Electrostatic Focus and Magnetic Deflection

Type	Application	Features	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see page C9)
8134	Broadcast and industrial, compact monochrome.	7735B colour response and blemish specification.	1st Grade	95	ii
8134V1/4811	Broadcast, colour, telecine. Can be supplied in matched sets for RCA TK27 camera.	Uniform sensitivity and geometry for multi-tube colour cameras. It can be selected for use in the red, blue or green channels.	Premium	95	ii
P893/4493	Red channel of RCA TK42 and TK43.	Reduced picture area of uniform sensitivity and geometry.	1st Grade	95	ii
P894/4494	Green channel of RCA TK42 and TK43.	Reduced picture area of uniform sensitivity and geometry.	1st Grade	95	ii
P895/4495	Blue channel of RCA TK42 and TK43.	Reduced picture area of uniform sensitivity and geometry.	1st Grade	95	ii

EEV Television Camera Tubes — 1½-inch Vidicons Electrostatic Focus and Magnetic Deflection

Type	Application	Features	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see page C9)
8480	Colour or monochrome cameras, telecine and high grade industrial.	Low deflection power, negligible electrostatic focusing power. Reduced camera size by elimination of focus coil. High resolution.	1st Grade	95	i
8480V1/4810	High quality colour cameras such as RCA TK27.	Similar to 8480 but tested to stringent limits for signal uniformity, beam astigmatism and other characteristics.	Selected	95	i



Vidicons 8480V1 (top) and P8090 (bottom)

EEV Television Camera Tubes — 1½-inch Vidicons

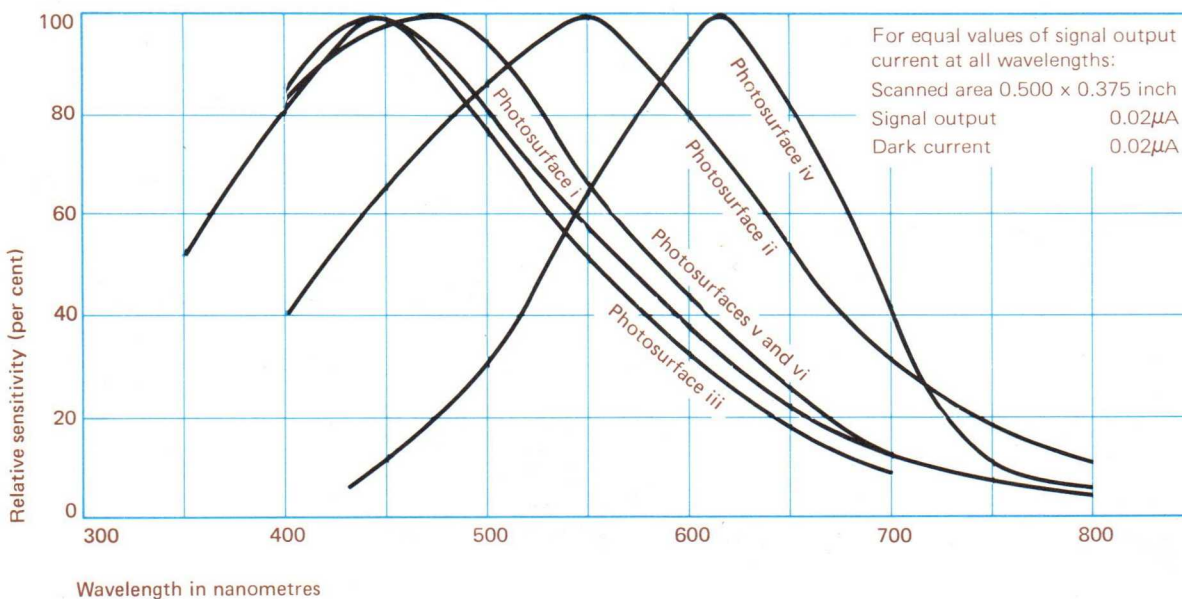
Separate Mesh, Magnetic Focus and Deflection

Type	Application	Features	Blemish standard	Heater current at 6.3V (mA)	Photo-surface (see below)
8051■	Broadcast telecine or high resolution data transmission.	Limiting resolution in the region of 2000 TV lines. Very short lag at high light levels.	1st Grade	600	i
8521■	High grade industrial.	Colour response similar to human eye.	1st Grade	600	ii

EEV Television Camera Tube — Pyroelectric Vidicon

Type	Application	Description
P8090	Infrared imaging	Maximum sensitivity in the 8 to 14 micron band, with thermal resolution better than 0.3°C. Mechanically similar to 1-inch separate mesh vidicons. Operates at ambient temperatures in standard vidicon yoke.

EEV Vidicon Photosurfaces



Photosurface i	The colour response peaks at the blue end of the spectrum providing panchromatic response when used with tungsten lighting. This layer has a very rapid decay time (short lag) when used at high light levels.
Photosurface ii	The colour response peaks in the green region and extends into the near infrared; near panchromatic response is obtained in daylight. This photosurface provides higher sensitivity than type i and has high sensitivity at both high and low light levels. It must not be exposed to bright lights for long periods.
Photosurface iii	This photosurface is similar in sensitivity to type ii but its colour response peaks in the blue region. It provides improved colour rendition with tungsten illumination. It has extremely short lag when used at light levels of 1–10 ft-candles incident on the faceplate.
Photosurface iv	This photosurface has been specially designed with long lag characteristics. It is intended for integrating repetitive light inputs of low level such as from X-ray image intensifier screens or c.r.t. displays.
Photosurface v	High sensitivity, medium lag photosurface developed for use with X-ray image intensifiers. The spectral response is very similar to photosurface iii and is well matched to a P20 phosphor.
Photosurface vi	High sensitivity photosurface with very short lag at high light levels. Resistant to image retention and intended for colour or monochrome telecine and caption scanning.

■ Made to special order only.

EEV Television Camera Tubes — Image Orthicons

Size	Nominal image diagonal	Type	Application	Description
3-inch	1.60 inch	P874 †	High quality studio and outdoor broadcast, monochrome or colour.	High target capacitance and signal to noise ratio.
3-inch	1.60 inch	P875 †	High quality studio and outdoor broadcast, monochrome or colour.	Similar to P874 but with lower target capacitance.
3-inch	1.60 inch	P882 †	High quality studio and outdoor broadcast.	Similar to P874, with bialkali photocathode giving increased sensitivity.
3-inch	1.60 inch	P883 †	High quality studio and outdoor broadcast.	Similar to P875, with bialkali photocathode giving increased sensitivity. Lower target capacitance than P882.
4½-inch	1.60 inch	7295C (P811/E)	High quality studio and outdoor broadcast.	Medium target capacitance producing approximately half power law gamma when operated one stop above the 'knee'. Unilateral replacement for 7295B. Higher signal to noise ratio and resolution than 3-inch tubes with similar target spacing.
4½-inch	1.60 inch	7389C (P822/E)	For use in studios under controlled lighting conditions. Recommended for use in cameras containing gamma correction circuits.	Tube with higher target capacitance than the 7295C. Minimal spurious signals, enabling pictures of photographic quality to be produced. The higher target capacitance gives improved signal to noise ratio and extended linear transfer characteristics. Unilateral replacement for 7389B.
4½-inch	1.60 inch	P858	For use as the luminance tube in colour cameras such as TK42/43. Equally suitable for monochrome cameras.	Tube tested for operation at target voltage up to 4 volts.
4½-inch	1.60 inch	P872	For use in studios under controlled lighting conditions. Recommended for use in cameras containing gamma correction circuits.	Similar to 7389C, with bialkali photocathode giving increased sensitivity.
4½-inch	1.60 inch	P873	High quality studio and outdoor broadcast.	Similar to 7295C, with bialkali photocathode giving increased sensitivity.

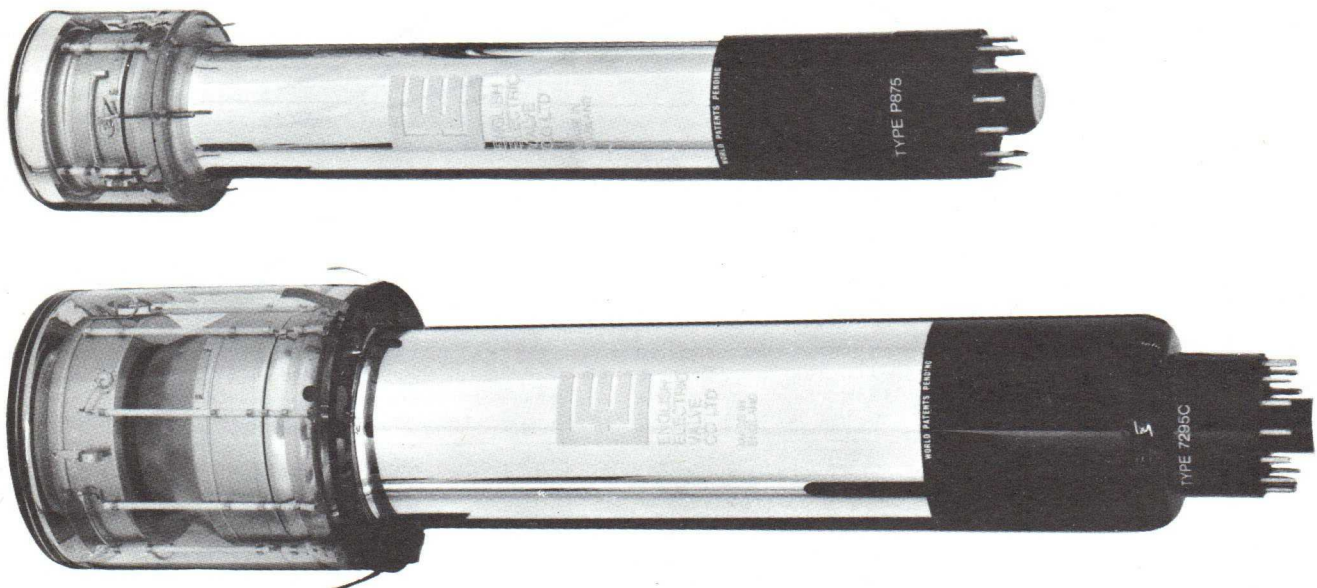
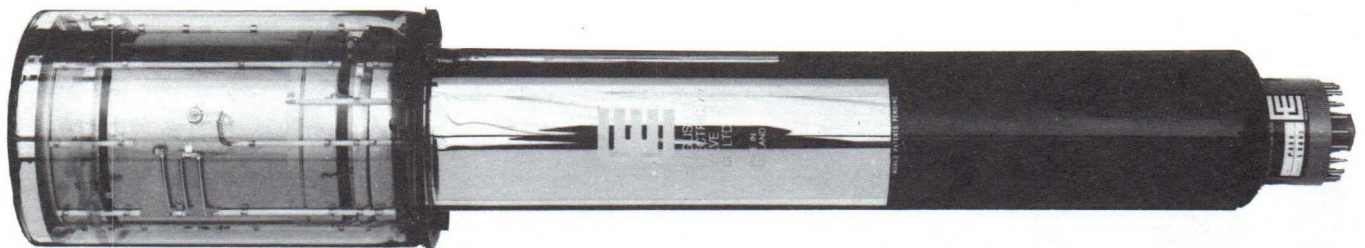
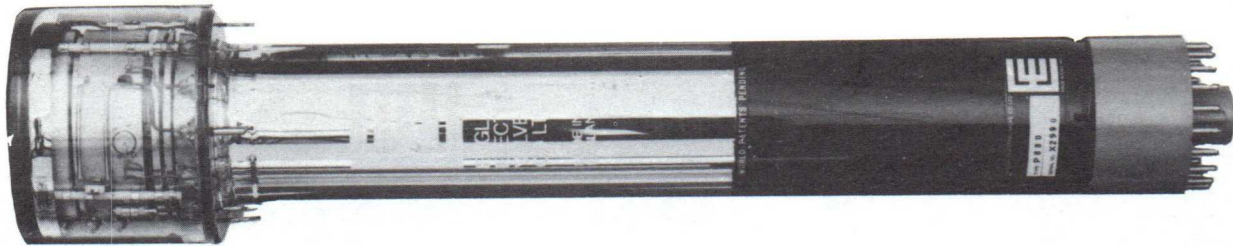
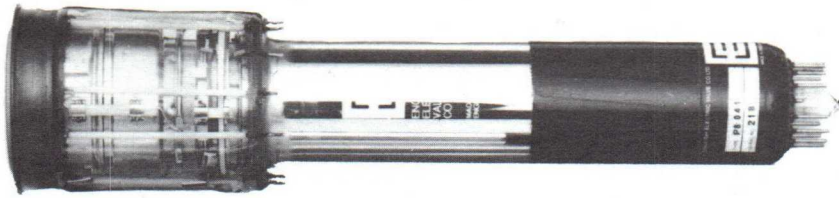


Image Orthicons P875 (top) and 7295C (bottom)

Note: All the Image Orthicons listed incorporate the ELCON target, (Brit. pat. no. 1048390). The use of ELCON targets results in the virtual elimination of image retention (sticking) and gives stability of sensitivity throughout tube life.

† Incorporates an anti-ghost image section, field mesh and suppressor electrode. Features resulting from the design include the elimination of dynode background in the picture and improved signal to noise ratio.



55mm Image Isocon P8041 (top), 3-inch type P880 (centre) and 4½-inch type P850 (bottom)

EEV Television Camera Tubes — Image Isocons

With a fixed beam current, image isocons will reproduce scenes having a wide dynamic range, with good tonal response and without the beam noise associated with image orthicons.

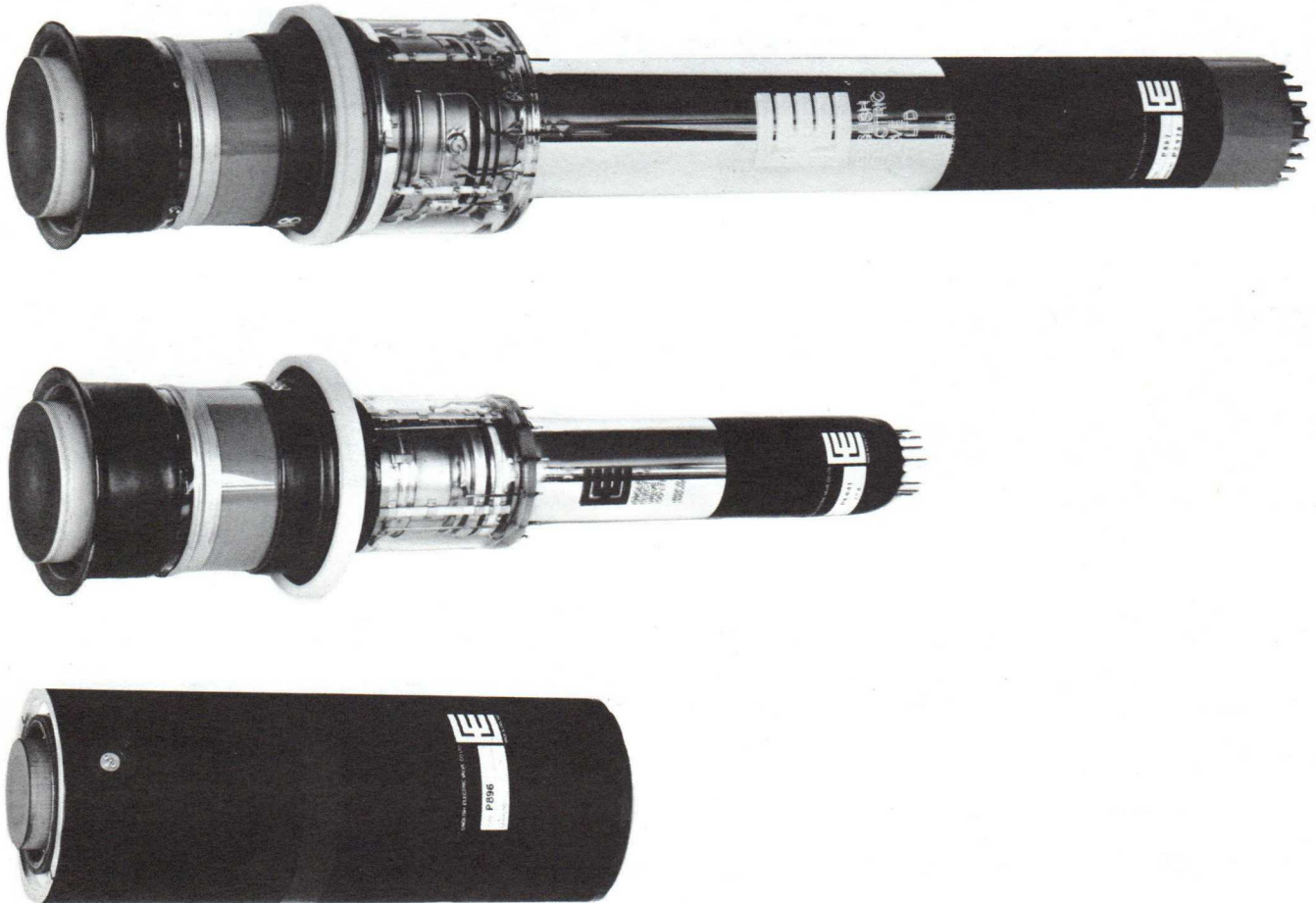
Size	Nominal image diagonal	Type	Application	Description
55mm	40mm	P8040 ■	Television pick-up at very low light levels (moonlight conditions)	High sensitivity tube with plain glass faceplate. It is particularly suitable where high performance from a small camera is required. The tube can be supplied fitted with a deflection yoke.
55mm	40mm	P8041 ■	Television pick-up at very low light levels (moonlight conditions)	High sensitivity tube, identical with P8040 but with fibre-optic faceplate.
3-inch	1.60 inch	P880 ■	Television pick-up at very low light levels. It can also be used in X-ray applications.	High sensitivity tube, externally similar to image orthicon; most image orthicon cameras can readily be modified to accept it.
3-inch	40mm	P887 ■	Television pick-up at very low light levels (moonlight conditions).	Similar to P880 with fibre-optic faceplate for coupling to image intensifiers.
4½-inch	3.25 inch	P850 ■	Television pick-up from very low intensity images of X-ray fluoroscopic screens, and similar applications at very low light levels.	High sensitivity tube with curved faceplate.

Note: Test camera P4150 can be supplied to special order, for test and evaluation of 3-inch and 55mm tubes.

- Made to special order only.

EEV Television Camera Tubes — Intensifier Image Isocons

Isocon size	Nominal image diagonal	Type	Application	Description
55mm	40mm	P8096 ■	Television pick-up at very low light levels (starlight conditions).	Combination of 55mm image isocon and a single stage intensifier with fibre-optic coupling. It operates with a scene illumination of 10^{-4} ft-candle.
3-inch	40mm	P8095 ■	Television pick-up at very low light levels (starlight conditions).	Combination of 3-inch image isocon and a single stage intensifier with fibre-optic coupling. It operates with a scene illumination of 10^{-4} ft-candle.



Intensifier Image Isocons P8095 (top), P8096 (centre) and Image intensifier P896 (bottom)

EEV Image Intensifier

3-stage, fibre-optic coupled image intensifier assembly for night vision applications, encapsulated in silicone rubber complete with e.h.t. multiplier. The input is S20 with enhanced red response, and a P20 phosphor is used.

Useful diameter (mm)	Type	Magnification (approx)	Luminous gain (apostilb/lux) (min)	Equivalent (background) light input (lux) (max)	Resolution at centre (min) (line pairs/mm)
23	P896	0.82 to 1.0	1.1×10^4	2×10^{-7}	28

Note: Test camera P4150 can be supplied to special order, for test and evaluation of 3-inch and 55mm tubes.

■ Made to special order only.

EEV Proximity Focused Image Intensifiers

This series of high gain proximity focused image intensifiers is available for applications where size, weight and image uniformity are of importance. The standard versions have an S25 photocathode on a fibre-optic faceplate, with P20 phosphor and fibre-optic output window. An anti-halation phosphor screen backing which ensures good low spatial frequency contrast at the operating voltage of 8kV is incorporated as standard. Other photocathodes and input faceplate materials are available.

Image diameter (mm)	Type	Photocathode luminous sensitivity ($\mu\text{A}/\text{lm}$)	Photocathode radiant sensitivity at 850nm (mA/W)	Limiting resolution (line pairs/mm)	Luminous gain (ft-L/ft-candle)	Magnification	Noise-equivalent input (μlux)
18	P8101	350	10	40	50	1.0	0.2
25	P8102	350	10	40	50	1.0	0.2
40	P8103	350	10	40	50	1.0	0.2
75	P8104	350	10	40	50	1.0	0.2

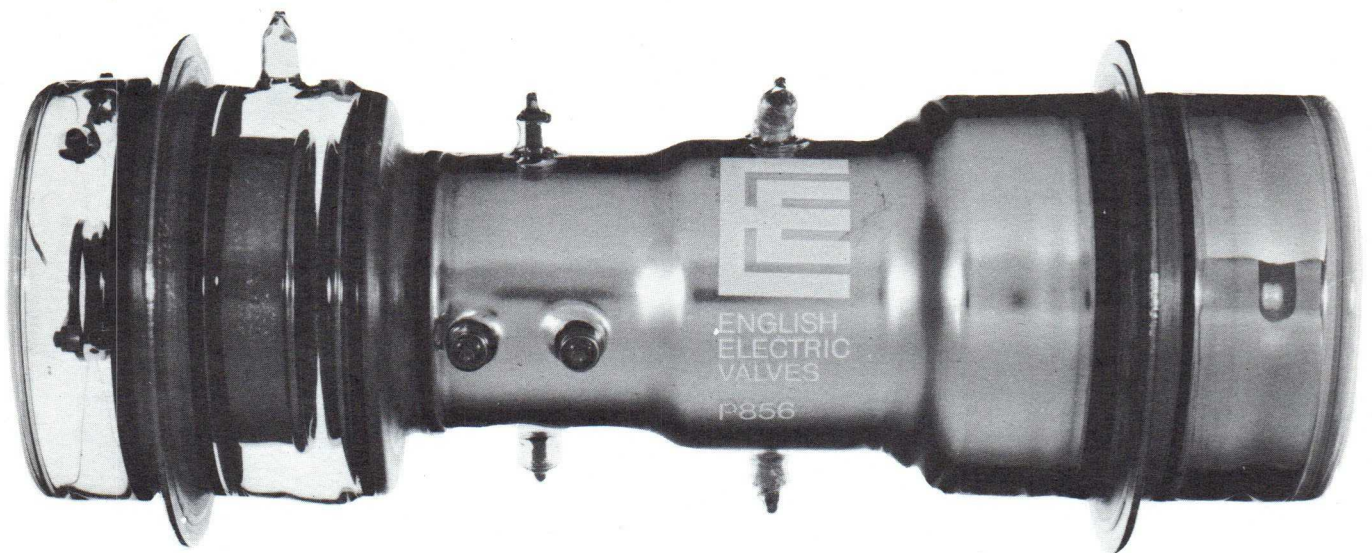
EEV Shutter Tubes

Electrostatically focused image converters with electrostatic deflectors, for both pulse and sweep operation; the deflection system enables the tubes to function as an electronic shutter.

When used in a suitable camera* the tubes can display a sequence of frames showing the development of a high speed event.

The tubes are available with an output faceplate of either plain glass or fibre-optic of 33mm, 45mm, 75mm, or 90mm diameter.

Useful screen area (mm)	Type	Structure	Photocathode†	Screen	Operating voltage (kV)	Equivalent light input (max) (ft-candle)	Static resolution (min) (line pairs/mm)
75 x 40	P855	Tetrode	S20	P11	16	10^{-6}	13
75 x 40	P856	Triode	S20	P11	18	10^{-6}	13



Shutter Tube P856

EEV Storage Tube

Type	Description
EP751	Single gun storage tube, electrical input and output, with a silicon target and a modified short vidicon envelope. Used for video information storage, scan conversion, image integration. Magnetic focus and deflection is employed.

* Available from John Hadland Ltd., Newhouse Laboratories, Bovingdon, Herts.

† Also available to special order with S1, S9, S11 or S25 photocathode.

M-OV Projection TV Tubes (Magnetically Focused and Deflected)

Screen size (cm)	Type	Face radius (mm)	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Cut-off voltage max (V)	Base
14	1351U (Green) 1368U (White) 1380U (Blue) 1384U (Red)	210	374	47	50	-170	B12A
14	T940B (CV10704) T940G (CV10705) T940R (CV10703) T940W	210	434	47	50	-170	B12A



Projection TV Tube T940 (top) and Viewfinder Tube AW17-20 (bottom)

M-OV Viewfinder Tubes (Electrostatic Focus and Magnetic Deflection)

Screen size (cm)	Type	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Focus voltage (V)	Anode 1 voltage (V)	Cut-off voltage max (V)	Base
14.2 x 10.9	AW17-20	345	44	12	±200	300	-80	B12A
15 x 12	T960W	236	65	14	0 to 400	400	-80	B8H

Other phosphors available subject to negotiation

M-OV Cathode Ray Tube Phosphors

GEC	EEV	EIA	European	Old GEC	Old European	Fluorescence	Phosphorescence (Afterglow)	Persistence (approx)	Typical use
01	G	P1	GJ	B	G	Yellowish-green	Yellowish-green	Medium	Projection and oscilloscope
02	V	P28	—	C	—	Yellowish-green	Yellowish-green	Long	Short range radar
08	P	P11	BE	E	B	Blue	Blue	Medium-short	Photographic recording
15	A	P24	GE	U	K	Green	Green	Short	Flying spot scanners
18	W	P4	W	G	W	White	White	Medium-short	Television monitors
19	Z	P26	LC	T	F	Orange†	Orange	Very long	Long range radar
22	C	P16	BA	—	C	Violet and U.V.	Violet and U.V.	Very short	Flying spot scanners
23	Y	P33	LD	J	L	Orange†	Orange	Very long	Medium and short range radar
24	H	P31	GH	—	H	Green	Green	Medium-short	General purpose oscilloscopes
25	N	P2	GL	—	N	Yellowish-green	Yellowish-green	Medium	Wide speed range oscilloscopes
26	T	—	LA	—	D	Orange	Orange	Medium	Anti-flicker displays
27	S	—	LB	—	E	Orange†	Orange	Long	Medium and short range radar
28‡	—	—	—	—	—	Orange	Orange	Long	Medium range radar
29	E	P39	GR	—	—	Green	Green	Long	Medium and short range radar. Anti-flicker displays
30	B	—	—	—	U	Blue	Blue	Medium-short	Projection
31	D	—	—	—	—	Yellow-orange	Yellow-orange	Long	Short range radar and alpha-numeric
33	U	P12	—	—	—	Orange†	Orange	Long	Short range radar
34	R	—	—	—	—	Red	Red	Medium	Projection
44	—	P32	GB	—	M	Purplish-blue	Yellowish-green	Long	Medium and short range radar
46	X	P7	GM	M	P	White	Yellowish-green	Med. short/long*	Radar and slow speed oscilloscopes
47	F	P40	—	—	—	White	Yellowish-green	Med. short/long*	Anti-flicker displays
+50	The addition of this number to the GEC code indicates an aluminized screen, i.e. GEC phosphor No. 25 with aluminized screen becomes 75.								

‡ Reduced burn type phosphor.

* White: Medium-short
Yellowish-green: Long.

† This screen is readily damaged by slow-moving traces of high brightness, and should not be used with a stationary trace. It is normally used for radar PPI display.

M-OV Stabilizer Tubes — Corona

Stabilized output voltage (V)	Type	Operating current		Continuous current max (μA)	Typical incremental impedance (kΩ)	Temperature coefficient (%°C)	Terminals
		Min (μA)	Max (μA)				
350	SC1/350 (CV2456)	2.0	425	325	17.5	0.01	
400	SC1/400 (CV2457)	2.0	450	350	20	0.01	
500	SC1/500	8.0	475	375	25	0.01	
600	SC1/600 (CV2458)	8.0	500	400	30	0.01	Top cap CT1
800	SC1/800 (CV2459)	22	575	475	40	0.01	
1000	SC1/1000 (CV2460)	28	650	550	50	0.01	
1200	SC1/1200 (CV2461)	32	725	625	60	0.01	Base B7G
1400	SC1/1400 (CV2462)	32	800	700	70	0.01	
1600	SC1/1600 (CV6065)	32	850	750	80	0.01	
1800	SC1/1800 (CV6066)	32	900	800	90	0.01	
2000	SC1/2000 (CV6067)	32	950	850	100	0.01	
2500	SC2/2500	25	1500	1000	210	0.02	
3000	SC2/3000 (CV5844)	25	1750	1000	250	0.02	Top cap CT1
3500	SC2/3500	25	1750	1000	280	0.02	Base B9A
4000	SC2/4000	25	1750	1000	320	0.02	
5000	SC5/5000*	50	2000	1000	300	0.02	
6000	SC5/6000* (CV8530)	50	2000	1000	375	0.02	CT1 both ends
6800	SC5/6800*	50	2000	1000	450	0.02	
5000	SC6/5000■	25	2000	1000	300	0.007	
7000	SC6/7000■	25	2000	1000	500	0.007	
10000	SC6/10000■	25	2000	1000	700	0.005	Anode BS448 CT2
14000	SC6/14000■	25	2000	1000	1100	0.005	
12000	SC7/12000■	25	2000	1000	950	0.005	
14000	SC7/14000■	25	2000	1000	1100	0.005	
15000	SC7/15000■	25	2000	1000	1200	0.005	Cathode body
16000	SC7/16000■	25	2000	1000	1300	0.005	

Standard voltage steps only are listed. Other voltages can be made available to special order.

SC6 between 10 and 14.9kV is available but is only suitable for use in an oil bath.

An encapsulated version of the SC7, ref. SC7/E is available for use under conditions of high humidity.

* A special quality version of the SC5, for use under conditions of shock and vibration, is available as the QSC5 (CV8960).

■ Made to special order only.

INDUSTRIAL + SCIENTIFIC

The following pages give abridged data for the current range of EEV/M-OV tubes, devices and accessories used in Industrial and Scientific Equipment.

They comprise entries for:-

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SURGE ARRESTERS AND PROTECTORS	D32
SPARK GAPS	D34
GEIGER-MULLER TUBES	D34
METHANE DETECTORS	D35
OZOTRONS	D35
NERNST FILAMENTS	D35

Comprehensive data sheets giving operating conditions, characteristic curves, and outline drawings are available on request.

Certain types listed in this catalogue may not be available from current production and their supply may be subject to a minimum order quantity.

Enquiries for special tubes not included in the catalogue are also welcome.

Colour Code

Throughout the data the following colour code is used:-

Brown indicates manufacture by English Electric Valve Company Ltd

Blue indicates manufacture by The M-O Valve Company Ltd

CARACTERISTIQUES ABREGÉES

Dans les pages suivantes sont données les caractéristiques abrégées pour la gamme courante de tubes, dispositifs et accessoires EEV/M-OV.

Des fiches de caractéristiques établissant les conditions de fonctionnement, les courbes et les schémas d'ensemble sont disponibles sur demande.

Certains types mentionnés dans ce catalogue peuvent ne pas être disponibles parmi les produits de production courante et leur livraison peut être sujette à la commande d'une quantité minimum.

Nous répondons également aux demandes de renseignements pour les tubes spéciaux non mentionnés dans ce catalogue.

Code des Couleurs

Pour toutes les indications nous utilisons le code de couleur suivant:

Marron: produits fabriqués par English Electric Valve Co Ltd

Bleu: produits fabriqués par M-O Valve Co Ltd

KURZGEFASSTE DATEN

Auf den folgenden Seiten finden Sie kurzgefaßte Daten für das gegenwertige Herstellungsprogramm von EEV/M-OV-Röhren, Geräten und Zubehör.

Ausführliche Datenblätter mit Betriebsbedingungen, Leistungskurven und Maßzeichnungen sind auf Anfrage erhältlich.

Es ist möglich, daß sich einige der in diesem Katalog angeführten Positionen nicht im gegenwertigen Produktionsprogramm befinden und daß daher deren Lieferung von einer Bestellung von Mindeststückzahlen abhängig gemacht werden muß. Anfragen wegen Spezialröhren, die nicht in diesem Katalog enthalten sind, bearbeiten wir gerne.

Farbkennzeichnung

Die folgende Farbkennzeichnung wird für die Daten verwendet:

Braun: Produkt der English Electric Valve Co Ltd

Blau: Produkt der M-O Valve Co Ltd

RESUMEN INFORMATIVO DE DATOS

En las páginas siguientes aparece un resumen informativo de datos correspondientes a la nueva gama de lámparas, dispositivos y accesorios EEV/M-OV.

Tendremos sumo gusto en facilitar, a solicitud de las partes interesadas, hojas con los datos completos, incluyendo condiciones de funcionamiento, curvas de característica y planos acotados.

Es posible que ciertos tipos detallados en este Catálogo no puedan obtenerse dentro de la línea normal de producción actual y su suministro puede estar sujeto a un pedido mínimo. Sírvanse solicitar información relativa a lámparas especiales, no incluidas en este Catálogo.

Clave de Colores

En todo lugar se ha utilizado la siguiente clave de colores:

Marrón indica fabricado por la English Electric Valve Co Ltd

Azul indica fabricado por la M-O Valve Co Ltd

DATI ABBREVIATI

Alle pagine seguenti figurano dati abbreviati inerenti la presente serie di valvole, dispositivi ed accessori EEV/M-OV.

Le pubblicazioni tecniche più approfondite, contenenti le condizioni di funzionamento, curve delle caratteristiche e disegni del contorno, vengono fornite su richiesta.

Alcuni modelli elencati nel presente catalogo non sono disponibili nella normale produzione e la relativa fornitura può essere subordinata all'ordinazione di un quantitativo minimo.

Nel caso di valvole speciali non incluse nel presente testo, il cliente è pregato di interpellarci.

Colore Codice

Nel presente opuscolo, si usa il seguente codice:-

il marrone indica che la valvola è costruita dalla English Electric Valve Co Ltd

il blu indica che la valvola è costruita dalla M-O Valve Co Ltd

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4CX10,000D	D13	1324M	D25	BK46/5555	D6	BW1124	D11	C1134	D14
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15C Arrester	D32	1446J/G4	D24	BK500	D6	BW1182J1	D11	CV2453	D16
15D Arrester	D32	1468A	D24	BK502	D6	BW1182J2	D11	CV3789	D16
15E Arrester	D32	1474B	D24	BK544	D6	BW1183J1	D11	CV4062	D16
15F Arrester	D32	1496B	D24	BK5822A	D6	BW1183J2	D11	CV4079	D16
15G Arrester	D32	1774A	D25	BM25LB	D22	BW1184J2	D11	CV5400	D15
16A Arrester	D32	1774B	D25	BM25LC	D22	BW1185J2	D11	CW1506J2	D13
16B Arrester	D32	1824A	D24	BM25LD	D22	BW1186J2	D11	CX1140	D8
16C Arrester	D32	1846A	D24	BR140	D10	BW1195	D11	CX1154	D9
16E Arrester	D32	2174C	D24	BR161	D10	BW1195J3	D11	CX1157	D9
18 Arrester	D32	2196C	D24	BR179	D10	BW1196	D11	CX1159	D8
21A Arrester	D32	2196D	D24	BR189	D10	BW1196J3	D11	CX1168	D9
21B Arrester	D32	5557	D7	BR194	D10	BW4027	D11	CX1171	D9
21C Arrester	D32	5559	D7	BR1102	D10	BW4028	D11	CX1174	D9
22 Arrester	D32	5842	D16	BR1106	D10	BW4029	D11	CX1175	D9
24B1	D31	6080	D16	BR1121	D10	BW4034	D11	CX1177	D9
24B9	D31	6080WA	D16	BR1122	D10	BW4035	D11	CX1180	D9
26A Arrester	D32	6166A	D13	BR1124	D10	BW4050	D11	CX1191	D8
26B Arrester	D32	6587	D8	BR1126	D10	BW4070	D11	CX1191A	D8
26C Arrester	D32	7703	D6	BR1131A	D10	BW4088A	D11	CX1191D	D8
27 Arrester	D32	8503	D8	BR1143	D10	BW4088B	D11	CX1192	D9
28 Arrester	D32	68506	D5	BR1160	D10	BY189A	D12	CX1193	D9
29 Arrester	D32	A207	D5	BR1161	D10	BY194	D12	CX1199	D9
34 Fuses	D33	A237	D5	BR1162	D10	BY1102	D12	CX1530	D9
53 Mount	D33	A2087	D15	BR1165	D10	BY1121	D12	CX1530D	D9
54 Mount	D33	A2134	D16	BR1167	D10	BY1122	D12	CY1170J	D13
55 Mount	D33	A2226	D15	BR1181	D10	BY1124	D12	CY1172	D13
56A Mount	D33	A2293	D16	BR1182	D10	BY1143	D12	CY4120	D13
56B Mount	D33	A2426	D15	BR1183	D10	BY1144	D12	D3a	D16
57 Mount	D33	A2521	D16	BR1195	D10	BY1144L	D12	D13-47GH	D24
59 Mount	D33	A2599	D16	BR1196	D10	BY1156	D12	D13-47GM	D24
60 Mount	D33	A2900	D16	BR1512	D10	BY1161	D12	DET22	D15
61 Mount	D33	A2913	D16	BR1512A	D10	BY4030	D12	DET22D	D15
63 Mount	D33	A2975	D16	BT5	D7	BY4031	D12	DET22E	D15
66 Mount	D33	A3012	D15	BT17	D7	BY4032	D12	DET22G	D15
67 Mount	D33	A3042	D15	BT19	D7	BY4033	D12	DET22R	D15

Type number	Page no	Type number	Page no	Type number	Page no	Type number	Page no	Type number	Page no
DET22S	D15	GXU51	D5	QS95/10	D31	U2000/3/40	D18	UFC12/30/140J	D20
DET23	D15	GXV series	D34	QS108/45	D31	U2000/3/40A	D18	UFC18/30/140J	D20
DET24	D15	GXW series	D34	QS150/15	D31	U2000/3/40B	D18	UFC34/30/140J	D20
DET29	D15	H Ozotron	D35	QS150/45	D31	U2000/3/40C	D18	UFC40/30/140J	D20
DET29M	D15	HCN2175	D30	QS1200	D31	U2000/8/75J	D18	UFC50/30/140J	D20
E14-110GM	D25	J Ozotron	D35	QS1203	D31	U2000/8/75JA	D18	UFC100/15/80	D20
E280F	D16	K211	D21	QS1209/5651	D31	U2000A/8/75	D18	UFC100/15/140	D20
E282F	D16	K324	D21	QS1212	D31	U2000A/8/75A	D18	UFC100/30/120J	D20
E702E	D28	K351	D21	QS1213	D31	U3000/3/40J	D18	UFC150/15/140	D20
E714A	D29	K359	D21	QS1215	D31	U4000/2/40	D18	UFC450/12/125J	D20
E714C	D29	K361B	D21	S130P	D31	UC200/15/70	D19	UFC450/15/125J	D20
E714G	D29	K390	D21	U30/15/20	D17	UC250/20/125	D19	UFC500/12/125J	D20
E714H	D29	K3033	D21	U50/15/30	D17	UC250/25/125J	D19	UFC500/15/125J	D20
E714K	D29	K3035	D21	U50/20/40	D17	UC250/30/150J	D19	UFC750/15/125	D20
E720A	D28	K3038	D21	U60/30/75	D17	UC250/30/150JA	D19	UFC1000/15/125	D20
E720B	D28	K3039	D21	U75/15/40	D17	UC250/30/150JD	D19	UFC1000/20/200	D20
E720C	D28	K3078/6975	D21	U80/15/40	D17	UC300/10/70J	D19	UFC1000A/12/	
E722A	D29	K3111	D21	U90/15/40	D17	UC450/30/150J	D19	125J	D20
EHM2S	D34	K4001	D21	U100/20/40	D17	UC450A/30/150	D19	UFC1000A/15/	
EP751	D28	KT66	D16	U100/25/75	D17	UC650/30/150J	D19	125J	D20
FX227	D8	KT88	D16	U150/15/40	D17	UC750/20/150J	D19	UFC1500/12/125	D20
FX297	D8	L63	D16	U150/25/75	D17	UC880/15/125	D19	UFC2000/8/125J	D20
FX2503	D8	M4121	D22	U200/10/40	D17	UC1000/8/125J	D19	UFC3000/7/125	D20
FX2505	D8	M4122	D22	U200/15/40	D17	UC1000/10/125J	D19	VQ1	D35
FX2517	D8	M5015	D22	U200/15/40A	D17	UC1000/15/125	D19	VQ2	D35
FX2519A/5949A	D8	M5028	D22	U200/20/75	D17	UC1000/15/150J	D19	VQ3	D35
FX2530/6777	D8	M5058	D22	U250/15/75J	D17	UC1000/20/150J	D19	XL601	D30
G Ozotron	D35	M5060	D23	U300/10/40	D17	UC1000A/20/150	D19	XL603	D30
GHT8	D9	M5123	D23	U300/15/40	D17	UC1500/8/125J	D19	XL615/4/2	D30
GHT9	D9	M5124	D23	U300/20/75	D17	UC1500/10/125J	D19	XL615/4/3	D30
GHT11	D9	M5125	D22	U300/20/75A	D17	UC1500/15/150J	D19	XL615/7/1.75	D30
GHT12	D9	M5137	D23	U400/10/40	D17	UC1500/20/150J	D19	XL615/7/2	D30
GM4	D34	MA52	D17	U400/10/40A	D17	UC2000/12/150J	D19	XL615/7/3	D30
GM4LB	D34	MA54	D17	U500/3/40J	D17	UC2300/8/125J	D19	XL615/7/6	D30
GT1C	D7	MA100	D18	U500/5/40J	D17	UC2300/10/125J	D19	XL615/7/6.5	D30
GU12	D5	MA125	D17	U500/10/40	D17	UC2500/5/60J	D19	XL615/7-2/	
GU25	D5	MA126	D17	U500/10/40A	D17	UCM400/5/25	D18	1.75TW	D30
GXA series	D34	MA164	D17	U500/15/75	D17	UCM500/5/25	D18	XL615/9/4	D30
GXB series	D34	MA281	D17	U500/15/75A	D17	UCM2000/5/40	D18	XL615/9/10	D30
GXC series	D34	MA282	D19	U500A/15/75J	D17	UCM2000A/5/40	D18	XL615/10/5.5	D30
GXD series	D34	MA296	D17	U600/8/40	D17	UF6/15/7	D19	XL615/10/6.5	D30
GXE series	D34	N1010A	D23	U650/3/40	D17	UF10/15/7J	D19	XL615/10/12	D30
GXF series	D34	N1010S	D23	U750/5-20/40J	D17	UF12/20/40	D19	XL615/10/40	D30
GXX series	D34	N1034A	D23	U750/10/40	D17	UF25/20/40	D19	XL615/13/6.5	D30
GXL series	D34	N1034S	D23	U750/10/40A	D17	UF50/10/40	D19	XL615/13/9	D30
GXN series	D34	NFT1	D35	U750/10/75J	D17	UF50/20/40	D19	XL615/13/12	D30
GXO series	D34	NFT2	D35	U750/15/75	D17	UF75/10/40	D19	XL627	D30
GXP series	D34	NFT3	D35	U1000/3/40	D17	UF100/10/40	D20	XL630	D30
GXQ series	D34	NFT4	D35	U1000/3/40A	D17	UF150/10/40	D20	XL631	D30
GXR series	D34	NFT5	D35	U1000/3/40C	D17	UF250/8/40	D20	XL632	D30
GXS series	D34	NFT6	D35	U1000/10/75J	D17	UF300/10/50	D20	XL639/4/1.75	D30
GXU series	D34	NFT7	D35	U1000A/3/40J	D18	UF300/15/75	D20	XL639/4/2.75	D30
GXU1	D5	NFT8	D35	U1000A/3/40JA	D18	UF500/10/50	D20	XL641	D30
GXU2	D5	NFT9	D35	U1000A/3/40JB	D18	UF750/8/75	D20	YD1400	D16
GXU3	D5	NFT10	D35	U1000A/3/40JD	D18	UF800/3/50J	D20	Z759	D16
GXU4	D5	P855	D29	U1000A/10/75J	D18	UF900/3/50J	D20	ZT1011	D7
GXU5	D5	P856	D29	U1000B/10/75	D18	UF1000/8/75	D20		
GXU6	D5	QS75/20	D31	U1200/10/75J	D18	UF2000/7/75	D20		
GXU50	D5	QS75/60	D31	U1500/8/75	D18	UFC6/30/140J	D20		

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EEV High Vacuum Rectifiers

Peak inverse voltage max (kV)	Type	Average anode current max (mA)	Peak anode current max (A)	Filament		Base
				Voltage (V)	Current (A)	
20	3B24W (CV2858)	60	0.3	2.5/5.0	6.0/3.0	B4G
45	(CV2160) A207 (CV8051)	350	1.1	4.0	12	G.E.S.
65	A237	250	1.5	4.0	12	G.E.S.

M-OV Mercury Vapour and Gas-filled Rectifiers

Average anode current max (A)	Type	Peak inverse voltage max (kV)	Peak anode current max (A)	Full load output 3-phase full wave		Filament or heater		Base
				Voltage (kV)	Current (A)	Voltage (V)	Current (A)	
0.25	GU12 (CV32) ■	10	3.0	9.5	0.75	2.5	5	4 Pin UX
0.25	GXU1 (CV1835)	10	1.0	9.5	0.75	2.5	5	4 Pin UX
0.25	GXU50 (CV8774)	5.2	1.0	4.5	0.75	4.0	3	B4
0.25	GXU51	7	1.0	6.0	0.75	4.0	3	B4
1.25	GXU2	13	5.0	12.0	3.75	5.0	7	B4F
1.25	(CV2399) GXU3 (CV8062)	13	6.0	12.0	3.75	4.0	11	G.E.S.
1.25	GXU4 (CV9006)	13	5.0	12.0	3.75	4.0	7	G.E.S.
1.75	GU25 ■	13.5	7.0	12.8	4.5	5.0	7	B4F
3.0	GXU5 ■	10	18.0	9.0	9.0	2.5	30	Special 2-Pin
3.0	GXU6 (CV5968) ■	15	12.0	14.0	9.0	2.5	30	Special 2-Pin

EEV Mercury Vapour and Gas-filled Rectifiers

Average anode current max (A)	Type	Peak inverse voltage max (kV)	Peak anode current max (A)	Full load output 3-phase full wave		Filament or heater		Base
				Voltage (kV)	Current (A)	Voltage (V)	Current (A)	
1.25	AH238 (CV1629)	13	5.0	12.4	3.75	4.0	7.0	G.E.S.
1.25	(CV5) AH221 (CV1435)	20	5.0	19	3.75	4.0	11	G.E.S.
2.0	AH211A (CV532)	16	8.0	15.2	6.0	2.5	30	B2D
3.0 5.0	AH2511 (6693)	15 2.5	12 20	14.3 2.4	9.0 15	5.0	11.5	B4D
6.0	68506 (CV2775)	Maximum d.c. output as half-wave rectifier 75V, 6A				2.3	18	G.E.S.
8.0	BD10	1.0	25	0.95	24	5.0 §	9.0	G.E.S.
10	AH205/ 857B (CV2673)	22	40	21	30	5.0	30	Leads
2 x 16.5	BD12 ‡‡	1.0	2 x 50	0.95	49.5	5.0 §	35	Leads

■ Made to special order only.

‡‡ Full wave rectifier.

§ Indirectly heated.

EEV Ignitrons — A.C. Resistance Welding

International letter size	Type	Single phase service [‡]			3-phase (frequency changing) service		
		Maximum demand (kVA)	Corresponding average anode current (A)	Maximum average anode current (A)	Maximum peak current (at 1500V peak) (A)	Corresponding average anode current (A)	Maximum average current (at 1500V peak) (A)
A	BK66/5550	300	12.1	22.4	—	—	—
B	BK448/5551A	600	30.2	56	480	4.0	18
B	BK492/7669	As BK448/5551A but with coaxial cathode terminal flange					
Up-rated B	BK502	1000	43	75	—	—	—
C	BK484/5552A	1200	75.6	140	—	—	—
C	BK494/7671	As BK484/5552A but with coaxial cathode terminal flange					
C	BK5822A	—	—	—	1200	16	56
Up-rated C	BK544	2300	110	180	—	—	—
D	BK486/5553B	2400	192	355	2400	32	112
Up-rated D	BK482	3225	210	400	—	—	—
Up-rated D	BK500	As BK482 but with coaxial cathode terminal flange					

EEV Ignitrons — Power Rectification and Control

International letter size	Type	Maximum ratings (at 900V peak)			Ignitor requirements	
		Peak anode current (A)	Average continuous current (A)	Average current 1 minute (A)	Voltage required to fire (min) (V)	Current required to fire (min) (A)
C	BK44/5554	900	100	200	450	45
D	BK46/5555	1800	200	400	450	45

EEV Ignitrons — Capacitor Discharge, Pulse Duty

International letter size	Type	Maximum ratings			
		Peak forward anode voltage (kV)	Peak anode current (kA)	Average anode current (A)	Ampere-seconds per pulse (A.s)
A	7703**	20	100	0.75	10
A	BK472††	20	100	0.75	10
A	BK474‡‡	20	100	0.75	10
A	BK476†	20	100	0.75	10
C	BK394	25	100	10	50
D	BK488	25	100	40	200
E	BK496	25	100	80	400

Note: Ignitor requirements (anode firing), 12A, 200V, for all a.c. resistance welding types.

‡ Single phase ratings are for two ignitrons in reverse parallel at any voltage from 250 to 600V_{r.m.s.} Plastic coated versions of all the above ignitrons except size A types are available.

** For use with high voltage and high current reversal.

†† For reduced degree of current reversal and switching applications.

‡‡ For current reversal at reduced voltage and current.

† For zero current reversal.

△ Maintenance type, not recommended for use in new equipment.

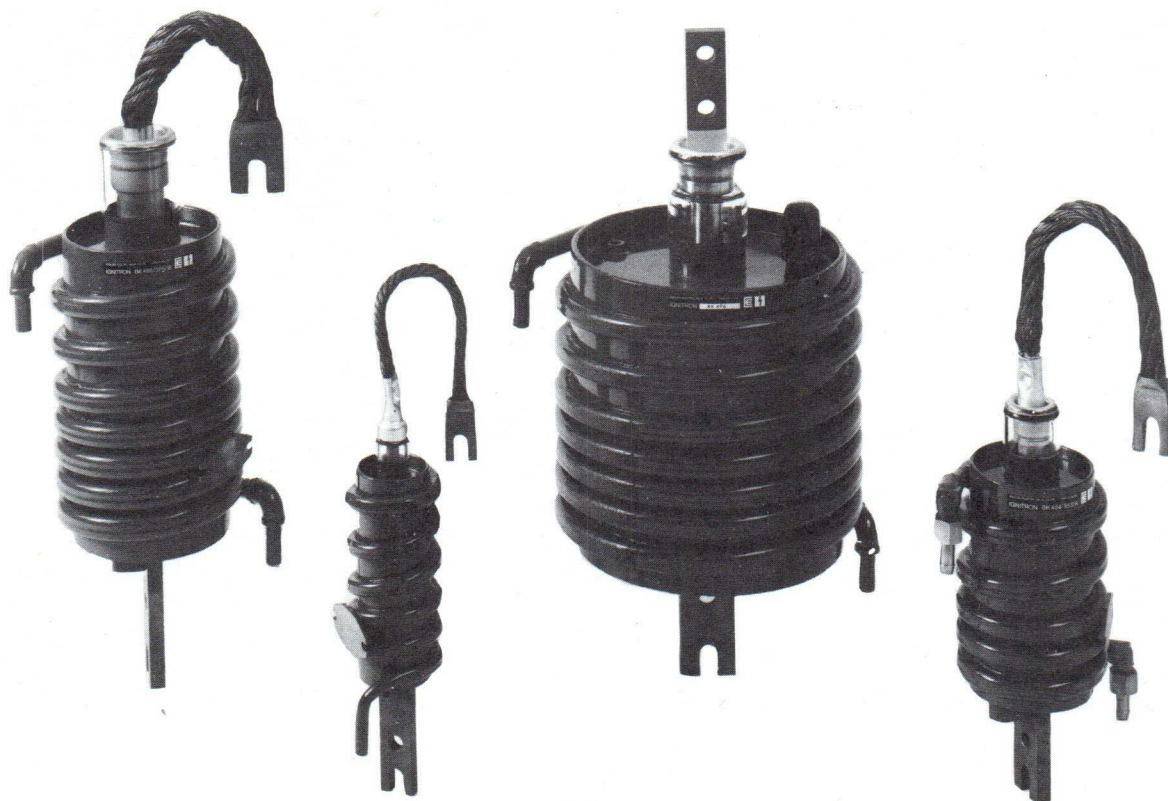
§ Indirectly heated.

EEV Mercury Vapour and Gas-filled Thyratrons

Average anode current max (A)	Type	Filling	Peak inverse voltage max (kV)	Peak forward voltage max (kV)	Peak anode current max (A)	Filament or heater		Base
						Voltage (V)	Current (A)	
0.025	6D4 (CV1949)	Argon	0.35	0.35	0.11	6.3§	0.25	B7G
0.045	AFX234 (CV5023)	Xenon	0.35	0.35	1.2	6.3§	0.49	B7G
0.5	BT89 (CV2109)	Xenon	1.5	1.0	2.0	2.5	5.0	B4
0.5	BT19 (CV1144)	M.V.	2.5	2.5	2.0	2.5	5.0	B4
0.5	5557 (CV2957)	M.V.	5.0	2.5	2.0	2.5	5.0	B4G
0.64	AFX203 (CV2868)	Xenon	0.34	0.17	7.7	2.5	5.0	B4G
1.5	BT95 (CV5141)	M.V.	15	15	12	2.5	20	Leads
2.5	BT5 (CV1147)	M.V.	1.5	1.0	12.5	5.0§	4.7	B4G
2.5	5559 (CV5027)	M.V.	1.5	1.0	15	5.0§	4.7	B4G
2.5	ZT1011 (CV5234)	Xenon	1.5	1.5	30	2.5	8.5	B4G
6.0	BT17	M.V.	1.5	1.0	40	5.0§	10.5	Leads
12.5	BT29	M.V.	2.0	2.0	75	5.0§	20	Leads
12.5	BT69	M.V.	15	15	75	5.0§	20	Leads

M-OV Argon-filled Thyatron

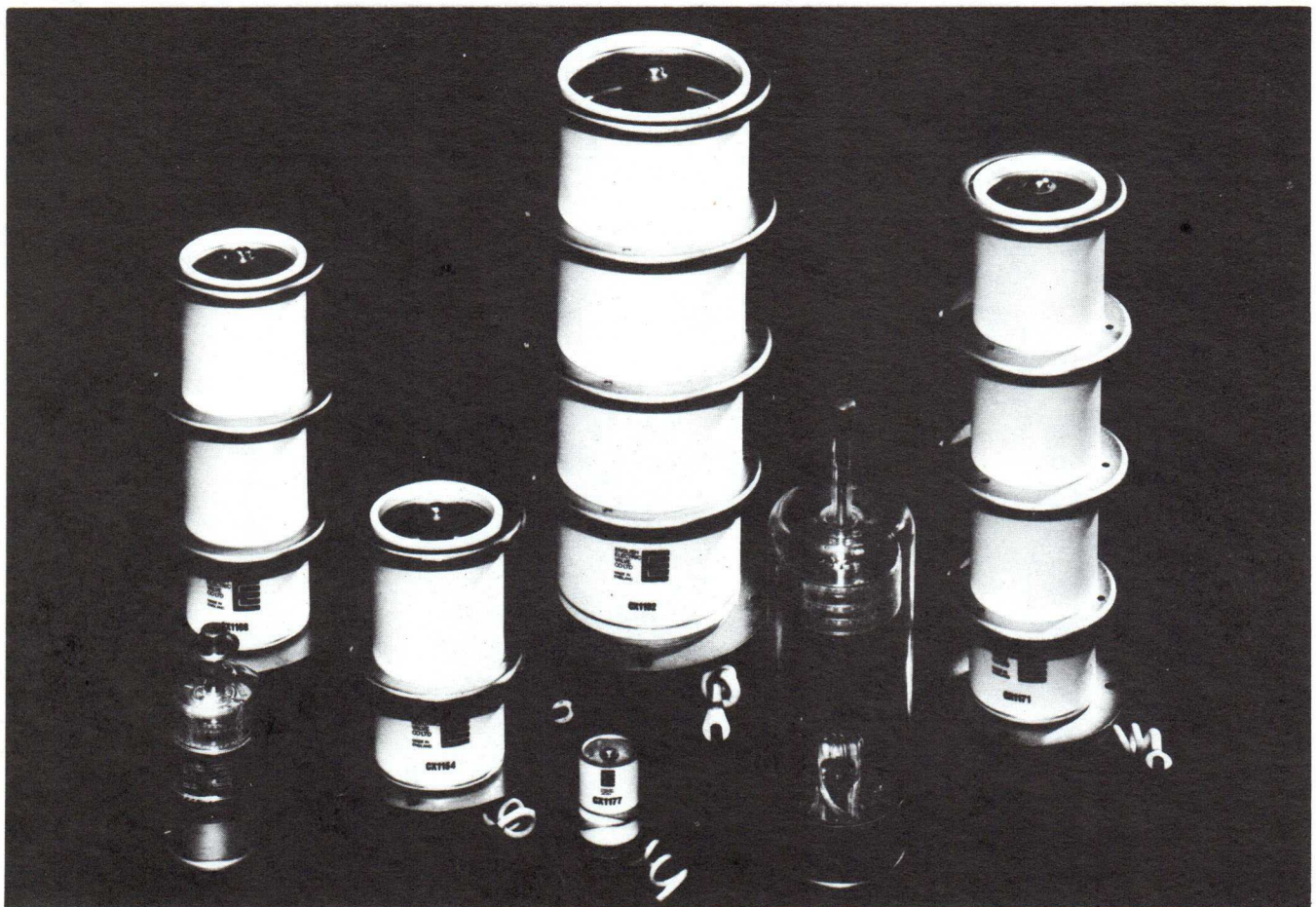
Average anode current max (mA)	Type	Description	Anode voltage max (V)	Peak anode current max (A)	Heater ratings		Base
					(V)	(A)	
300	GT1C (CV1128)Δ	Triode	500	1	4	1.35	B5



Selection of Ignitrons

EEV Hydrogen Thyratrons — Glass Envelope

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (P _b) factor x 10 ⁹ max †	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
40	(CV372) FX227 (CV3629*)	Triode	3.0	0.05	0.06	0.36	20	‡	6.3/2.7
85	FX2530/6777	Triode	8.0	0.1	0.34	2.5	5.0	‡	6.3/3.0
100	FX2517 §	Triode	10	0.1	0.5	2.8	5.0	‡	6.3/6.1
100	(CV1787) FX2505 (CV5247)	Triode	10	0.125	0.5	2.8	5.0	‡	6.3/6.1
325	6587	Triode	16	0.225	2.0	3.9	5.0	‡	6.3/10.6
325	8503 (CV6022) §	Triode	16	0.25	2.6	3.9	5.0	‡	6.3/10.6
400	CX1191 §	Tetrode	16	0.4	3.2	5.0	5.0	‡	6.3/12.5
500	CX1191A §	Tetrode	25	0.5	6.25	6.25	5.0	‡	6.3/12.5
500	FX2519A/5949A	Triode	25	0.5	6.25	6.25	5.0	4.5/3.0	6.3/18.5
500	CX1191D § ●	Tetrode	35	0.5	8.0	8.0	5.0	‡	6.3/12.5
500	FX297	Triggered diode, 25kV P.I.V., 1.25A average current						‡	6.3/21.5
500	FX2503 ●	Triggered diode, 33kV P.I.V., 1.25A average current						‡	6.3/21.5
1000	CX1140 (CV8563)	Tetrode	25	1.25	12.5	9.0	5.0	‡	6.3/22
1000	CX1159 (CV9080) ●	Tetrode	33	1.25	16.5	14	5.0	‡	6.3/22



Selection of Hydrogen Thyratrons

EEV Hydrogen Thyratrons — Ceramic Envelope — Pulse Modulator Service

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (P _b) factor × 10 ⁹ max [†]	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
150	CX1177§	Tetrode	12	0.2	0.9	4.0	5.0	6.3/2.0	6.3/4.5
350	CX1157 (CV6241)§	Tetrode	20	0.5	3.5	7.0	5.0	6.3/1.5	6.3/7.5
500	CX1530	Tetrode	25	0.5	6.25	12	5.0	6.3/2.0	6.3/11
500	CX1530D●	Tetrode	35	0.5	8.75	12	5.0	6.3/2.0	6.3/11
1000	CX1180	Tetrode	25	1.25	12.5	12.5	5.0	6.3/6.0	6.3/11
3000	CX1154●	Tetrode	40	3.0	50	30	5.0	5.0/7.0	6.3/21.5
3000	CX1168●	Two gap tetrode	80	3.0	100	70	5.0	5.0/7.0	6.3/21.5
3000	CX1171●	Three gap tetrode	120	3.0	150	70	5.0	5.0/7.0	6.3/21.5
3000	CX1199●	Four gap tetrode	160	3.0	200	70	5.0	5.0/7.0	6.3/21.5
6000	CX1174●	Tetrode	40	6.0	120	60	5.0	5.0/10	6.3/40
6000	CX1175●	Two gap tetrode	80	6.0	200	140	5.0	5.0/10	6.3/40
6000	CX1192●	Three gap tetrode	120	6.0	300	140	5.0	5.0/10	6.3/40
6000	CX1193●	Four gap tetrode	160	6.0	400	140	5.0	5.0/10	6.3/40

EEV Hydrogen Thyratrons — Metal Envelope — Pulse Modulator Service

Peak anode current max (A)	Type	Description	Peak forward voltage max (kV)	Average anode current max (A)	Peak output power (MW)	Heating (P _b) factor × 10 ⁹ max [†]	Jitter max (ns)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
3500	GHT8●	Tetrode	40	5.0	50	60	5.0	6.3/5.0	6.3/36
7500	GHT9●	Tetrode	40	15	150	150	5.0	6.3/8.0	6.3/90

EEV Hydrogen Thyratrons — Metal Envelope — Inverter Service

Peak anode current max (A)	Type	Description	Peak forward and inverse voltage (kV)	Average anode current max (A)	Power output per pair (kW)	Reservoir voltage/current (V/A)	Heater voltage/current (V/A)
40	GHT11●	Tetrode	35	20	320	6.3/5.0	6.3/36
120	GHT12●	Tetrode	35	60	1000	6.3/8.0	6.3/90

† Product of peak forward voltage, peak current and pulse repetition rate.

* Near equivalent.

‡ Reservoir operates from cathode heater supply.

§ Rugged.

● Deuterium filled.

EEV Power Triodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)	Amplification factor	Filament ratings		Base
						(V)	(A)	
25	3C24	0.1	2.0	60	25	6.3	3.0	Small UX4
1000‡ 500	B1152	2.4‡ 1.5	5.0	50	24	5.0	32.5	Special 4 pin
1500‡ 800	B1153	4.6‡ 2.7	6.0	50	22	6.3	32.5	Special 4 pin

EEV Power Triodes — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
1.0	BR1167	—	2.0	30	12	6.0	10
1.5	BR1512●	2.7	5.5	250	20	6.3	33
1.5	BR1512A●◆	2.7	5.5	250	20	6.3	33
2.5	BR1195●	4.6	7.2	85/160	20	6.3	33
3.0	BR1126△	7.0	6.0	30/110	30	15	39
3.5	BR1131A△	7.9	10	15/80	40	8.5	22
5.0	BR1160 (CV8730)	6.9	6.0	75/220	32	12.6	33
5.0	BR1165 (CV3926)	6.9	6.0	75/220	32	12.6	33
5.0	BR1196●	8.8	7.2	85/150	20	6.3	66
6.0	BR1162 (CV5239)●	10	7.2	30/85	32	12.6	33
8.0	BR140	—	12	15/40	45	19	75
8.0	BR179 (CV2323)	17	8.5	50/110	28	6.6	90
10	BR1106	15.5	6.6	30/220	30	5.0	175
10	BR1124●	20	8.5	100	37	6.0	115
10	BR1181●	26	8.0	100	11	6.6	103
10	BR1122 (CV10368)	29	12	5.0/110	37	6.0	115
15	BR161 (CV2322)	50	12	30/50	45	9.0	175
15	BR1121●	50	10	50	38	6.6	230
15	BR1182●	50	10	50	38	6.6	230
20	BR1102●	53	12	50	42	8.2	230
20	BR1183●	74	10	50	38	8.2	230
20	BR1143●	77.5	10	10	37	12	240
27	BR189 (CV5218)	80	15	5.0/50	34	9.0	240
35	BR1161 (CV9343)	100	14	10/30	90	11	155
40	BR194■	115	15	5.0/30	34	13	240

EEV Power Triodes — Water Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings		Water jacket
						(V)	(A)	
2.5	BW1195● BW1195J3●	4.6	7.2	85/160	20	6.3	33	BW4088A Integral
5.0	BW1196● BW1196J3●	8.8	7.2	85/150	20	6.3	66	BW4088B Integral
6.0	BW1165 BW1165J3	6.9	6.0	75/220	32	12.6	33	BW4088A Integral
6.0	BW1162● BW1162J3●	10	7.2	30/85	32	12.6	33	BW4088A Integral
7.5	CAT100●	27.5	10	40	23	6.5	95	—
10	BW179	17	8.5	50/110	28	6.6	90	BW4029
10	BW1124● BW1124J1● BW1124J2●	20	8.5	100	37	6.0	115	BW4029 Integral Integral
10	BW1122	29	12	5.0/110	37	6.0	115	BW4070
12	BW140 (CV2871)△	—	12	15/40	45	19	75	—
12	BW1181J3●	26	8.0	100	11	6.6	103	Integral
15	BW1121● BW1121J1● BW1121J2●	50	10	50	38	6.6	230	BW4034 Integral Integral
15	BW1182J1● BW1182J2●	52	10	50	38	6.6	230	Integral
18	BW153 (CV2872)△	—	15	20/40	45	19	100	—
20	BW1102● BW1102J2●	53	12	50	42	8.2	230	BW4028 Integral
20	BW1183J1● BW1183J2●	74	10	50	38	8.2	230	Integral
20	BW1176J1● BW1176J2●	82	10	20	38	8.2	230	Integral
30	BW1143● BW1143J2●	77	10	10	37	12	240	BW4050 Integral
35	BW189■	80	15	5.0/50	34	9.0	240	BW4050
50	BW194	115	15	5.0/30	34	13	240	BW4027
80	BW1184J2●	120	14.4	30	30	12.2	255	Integral
100	BW1144	200	14	27	34	9.6☆	290☆	BW4035
120	BW1185J2●	240	16.8	30	41	12.6	380	Integral
175	BW1156●	250	14	27	23	12.2☆	290☆	BW4035
175	BW1186J2●	250	14	27	23	20	350	Integral

Note Filament leads and grid connectors are available for most of the types listed above.

★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

☆ Per section.

‡ Duty factor 0.2, averaging time 5s.

§ Under Class C unmodulated conditions.

● Recommended for industrial heating service.

△ Maintenance type, not recommended for use in new equipment.

■ Made to special order only.

† Pulse only.

◆ BR1512 with mounting flange.

EEV Power Triodes — Vapour Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor	Filament ratings		Boiler unit
						(V)	(A)	
10	BY1124●	20	8.5	100	37	6.0	115	BY4048A‡ BY4064▲
10	BY1122	29	12	5.0/110	37	6.0	115	BY4048A‡ BY4064▲
18	BY1121●	50	10	50	38	6.6	230	BY4032** BY4033▲ BY4063‡
25	BY1102●	53	12	50	42	8.2	230	BY4030** BY4031▲
35	BY1143●	77	10	10	37	12	240	BY4037‡ BY4038▲ BY4038A**
35	BY189A■	80	15	5.0/50	34	9.0	240	BY4037‡ BY4038▲ BY4038A**
50	BY194●	115	15	5.0/30	34	13	240	BY4039▲ BY4049‡
60	BY1161	120	14	10/30	90	11	155	BY4059‡ BY4093▲
125	BY1144● BY1144L●	200	14	27	34	9.6☆	290☆	BY4036▲ BY4060‡
125	BY1156●	250	14	27	23	12.2☆	290☆	BY4036▲ BY4060‡



Vapour Cooled Triodes BY1156 (left) and BY1161 (right)

Note Filament leads and grid connectors are available for most of the types listed above.

- Recommended for industrial heating service.
- ☆ Per section.

§ Under Class C unmodulated conditions.

★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.

- Made to special order only.
- ‡ Single unit, separate condenser required.
- ▲ Single unit with integral condenser.
- ** Double unit with integral condenser.

EEV Power Tetrodes — Forced air Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g1-g2)	Filament or heater	
						(V)	(A)
1.0	4CX1000A	3.2†	3.0	110	—	6.0	9.0
1.5	4CX1500B	2.7†	3.0	30	—	6.0	9.0
1.5	CR1502	2.2††	4.0	260	16	4.2	53
5.0	4CX5000A (CV8295)	16	7.5	30/110	4.5	7.5	75
10	CR192A (CV8244)	9.0	6.9	60/220§	10	5.0	175
10	4CX10,000D (CV6184)	16	7.5	30/110	4.5	7.5	75
12	6166A	12	7.5	60/220§	10	5.0	175
12	CR1501	13††	9.0	260	8.5	8.0	120
15	4CX15,000A	36.5	10	110	4.5	6.3	160
35	4CX35,000C (CV11107)	82	20	30	4.5	10	300

EEV Power Tetrodes — Water Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)★	Amplification factor (g1-g2)	Filament ratings		Water jacket
						(V)	(A)	
10	4CW10,000A	16	7.5	30/110	4.5	7.5	75	Integral
20	CAS1■	13	8.0	220	5.5	10	110	Integral
25	4CW25,000A	36.5	10	110/225	4.5	6.3	160	Integral
150	CW1506J2	220*	15	30	4.0	20	340	Integral

EEV Power Tetrodes — Vapour Cooled

Anode dissipation max (kW)	Type	Output power (kW) §	Anode voltage max (kV)	Frequency (MHz)	Amplification factor (g1-g2)	Filament ratings		Boiler unit
						(V)	(A)	
75	CY1170J	82	15	30	4.5	10	300	Integral
150	CY1172	220*	15	30	4.0	20	340	CY4120

EEV Power Pentode — Forced-air Cooled

Anode dissipation max (kW)	Type	Output power (kW)	Anode voltage max (kV)	Screen voltage max (kV)	Frequency (MHz)	Amplification factor (g1-g2)	Filament ratings	
							(V)	(A)
1.5	5CX1500A	3.2†	5.0	0.75	110	5.5	5.0	40

* Class C, anode and screen modulated.

† Two tubes, class AB₁, audio

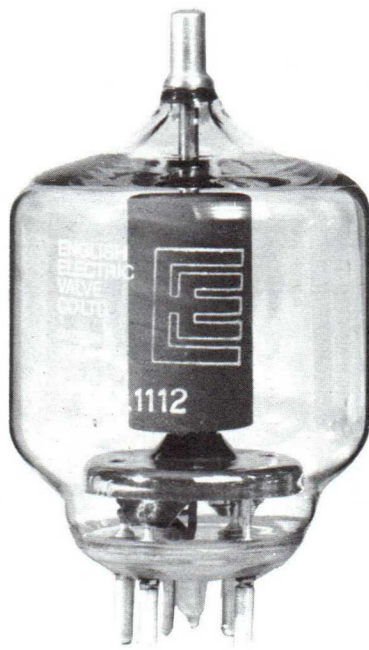
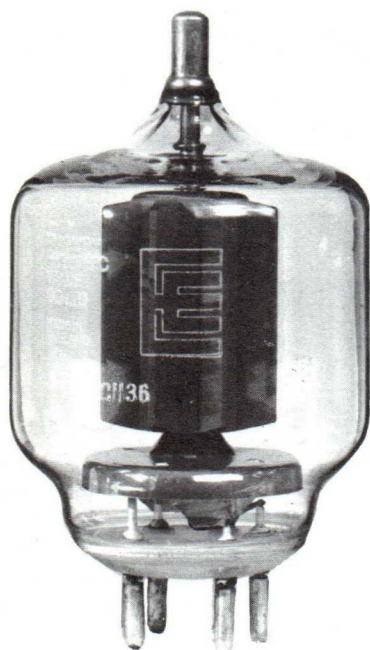
†† Class B service.

EEV Power Tetrodes — Glass Envelope

Anode dissipation max (W)	Type	Output power (W) §	Anode voltage max (V)	Frequency (MHz)★	Amplification factor (g ₁ -g ₂)	Filament or heater		Base
						(V)	(A)	
2 x 10	C1134 (CV2799)††	48◇	600	150/600	8.0	12.6 6.3	0.65 1.3	B7A
2 x 20	C178A/ 5894 (CV2797)††	90◇	600	250/500	8.0	6.3 12.6	1.8 0.9	B7A
50	4D32 (CV3543)	140	750	60	10	6.3	3.75	B7A
90	(CV6045) C1158 (CV8061)§§	—	800	—	4.5*	13 26	2.6 1.3	B7A
125	C1108 (CV2130)	375	3000	120/200	6.2	5.0	6.5	B5F
250	C1112 (CV2131)	1000	4000	75/120	5.1	5.0	14.1	B5F
400	C1136 (CV5959)	1100	4000	110	5.1	5.0	14.5	B5F

EEV Pulse Amplifier Tetrodes

Pulse output power (kW)	Type	Anode dissipation max (W)	Anode voltage max D.C. (kV)	Pulse anode current max (A)	Heater ratings		Base
					(V)	(A)	
130	C1148	40	14	12	6.3	5.0	B5F
205	C1150/1 (CV427)	60	17.5	15	26	2.15	B4A
205	C1166 (CV10404)	60	17.5	15	6.3	9.0	B5F
330	C1149/1 (CV6131)	60	20	18	26	2.15	B4A



Power Tetrodes C1136 (left), C1112 (centre) and C1134 (right)

Pulse Amplifier Tetrode C1148

- ★ Frequency: The lower value indicates the maximum operating frequency at full rating. Operation at the higher value is possible with suitable derating.
- § Under Class C unmodulated conditions.

- §§ Series regulator tube; mutual conductance 35mA/V at $V_a = V_{g2} = 150V$, $I_a = 500mA$.
- †† VHF double beam tetrode.
- ◇ With 2 sections in push-pull.
- * Triode connected.

M-OV Noise Diodes

Maximum frequency (MHz)	Type	Anode current max (mA)	Anode dissipation max (W)	Anode voltage max (V)	Heater voltage max (V)	Heater current (A)	Base
220	(CV2171) A2087 (CV8733)■	20	2.0	200	4.3	0.6	B7G
500	CV2398■	45	3.5	200	6.0	1.15	B9A/F
2500	CV2341■	200	40†	400	4.7	3.8	Coaxial 70Ω

M-OV Conduction-cooled Disc-seal Tubes

Anode dissipation max (W)	Type	Output power (W)	Anode voltage max (V)	Frequency (MHz)★	Amplification factor	Filament ratings	
						(V)	(A)
10	DET22 (CV273)	4.0	350	1000/3000	30	6.3	0.4
10	DET23◆	—	350	—	70	6.3	0.4
10	DET29 DET29M CV5400	1.5	450	4000/5000	55	6.3	0.5
20	A3012■	—	—	—	—	6.3	1.0
20	DET24 (CV397)	10	400	1000/2000	28	6.3	1.0

The DET22 series of disc-seal triodes consists of a range of mechanically identical tubes with electrical characteristics selected into various bands. The DET22 (CV273) is the basic type and has the widest characteristic spread, while the DET22D, E, G, R and S have more tightly controlled characteristics. All the types give similar performance, but one or other of the selections may be preferred when the range of circuit adjustment is limited.

Details of other DET22 variants available on request.

Type	at $V_a = 250V$			c_{a-g} (pF) (measured on a cold unscreened tube)
	at $I_a = 40mA$		at $I_a = 20mA$	
	$-V_g$ (V)	g_m (mA/V)		
DET22	—	5.0 ± 4	6.0 ± 3	1.05 ± 0.35
DET22D■	5.5 ± 2.5	8.0 ± 2	6.0 ± 2	1.05 ± 0.35
DET22E■	2.0 ± 1	6.0 ± 1	6.0 ± 2	1.05 ± 0.35
DET22G■	—	5.5 ± 3.5	6.3 ± 1.7	1.13 ± 0.07
DET22R■	—	6.7 ± 2.2	6.3 ± 1.7	1.1 ± 0.1
DET22S■	—	6.7 ± 2.2	6.3 ± 1.7	0.95 ± 0.25

M-OV Pulse Tetrodes and Pentodes

Anode dissipation max (W)	Type	Anode voltage max (kV)	Anode current pulse (A)	Amplification factor	Filament ratings		Base
					(V)	(A)	
12	A2226 (CV2231)■	10	3.0	8.5	6.3	1.2	B9A
12	A3042■	5.0	4.0	8.5	6.3	1.2	B9A
15	(CV4082)‡ A2426 (CV8978)	8.0	7.5	7.5	6.3	1.3	B8.0

† Two tubes, class AB₁, audio.

‡ Class B service.

■ Made to special order only.

◆ Low noise type.

● UHF diode.

M-OV Triodes

Anode dissipation max (W)	Type	Anode voltage max (V)	Anode current (mA)	Mutual conductance (mA/V)	Filament ratings		Base
					(V)	(A)	
2.5	A2521 (CV8064)◆	250	16	15	6.3	0.3	B9A
2.5	A2599 (CV5242)■◆	250	16	15	6.3	0.3	B9A
2.5	A2913 (CV5413)■‡◆	200	16	14	6.3	0.37	B7G
2.5	A2975 (CV10813)■◆	200	16	14	6.3	0.37	B7G
2.5	CV2453◆	250	16	15	6.3	0.37	B9A
2.5	L63 (CV1067)△	250	9.0	2.6	6.3	0.3	B8.0
2x3.5	A2900 (CV6091)*‡	1000	2x10	2x2.6	6.3 12.6	0.4 0.2	B9A
3.5	YD1400■‡◆	500	10	12	6.3	0.3	B9A/F
4.0	5842 (CV8198)◆ CV3789◆	250	25	25	6.3	0.3	B9A
2x13	(CV2984) 6080 (CV10332)*▲	250	2x125	2x7.0	6.3	2.5	B8.0
2x13	6080WA (CV5008)*‡▲	250	2x125	2x7.0	6.3	2.5	B8.0
15	(CV4079) A2293 (CV8089)▲	500	100	12	6.3	0.95	B9A
15	CV4079‡▲	500	100	12	6.3	0.95	B9A

M-OV Tetrodes

Anode dissipation max (W)	Type	Anode voltage max (V)	Anode current (mA)	Mutual conductance (mA/V)	Filament ratings		Base
					(V)	(A)	
4.0	D3a●	220	22	35	6.3	0.32	B9A
30	KT66 (CV1075)¶	550	85	7.3	6.3	1.6	B8.0
35	(CV345) 12E1 (CV8025)▲	800	200	13	6.3	1.6	B8.0
42	KT88 (CV5220)¶	800	150	12	6.3	1.6	B8.0

M-OV Pentodes

Anode dissipation max (W)	Type	Anode voltage max (V)	Anode current (mA)	Mutual conductance (mA/V)	Filament ratings		Base
					(V)	(A)	
4.0	E280F●	220	20	26	6.3	0.315	B9A
4.2	E282F●	200	35	26	6.5	0.35	B9A
5.0	(CV5060) Z759 (CV8082)●	300	20	15	6.3	0.6	B9A
9.0	A2134 (CV2179)■▲	500	55	12	6.3	0.64	B7G
9.0	A3283■▲	300	55	12	13	0.3	B7G
9.0	CV4062■‡▲	300	55	12	6.3	0.64	B7G

- ◆ Low noise type.
- Made to special order only.
- ‡ Special quality type.
- △ Maintenance type, not recommended for use in new equipment.

- * Double triode.
- ▲ Series stabilizer type.
- Wideband amplifier type.
- ¶ Audio type.

EEV High Vacuum Variable Capacitors — Glass Envelope

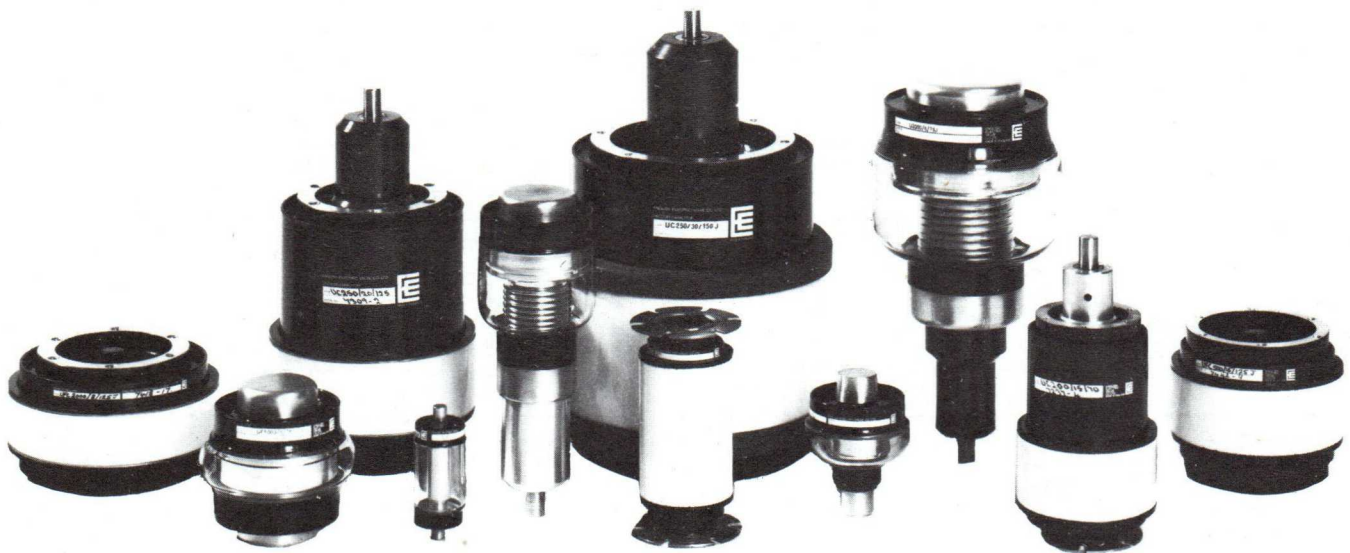
Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
5.0–30	U30/15/20	—	15	20	10.4	Integral
8.0–50	U50/15/30	—	15	30	10.4	Integral
4.0–50	U50/20/40	—	20	40	22	MA52, MA164
6.0–60	U60/30/75	—	30	75	35	MA54, MA125
4.0–75	U75/15/40	—	15	40	22.5	MA52, MA164
16–80	U80/15/40	—	15	40	10.4	Integral
16–90	U90/15/40	—	15	40	10.4	Integral
7.0–100	U100/20/40	—	20	40	22.5	MA52, MA164
8.0–100	U100/25/75	—	25	75	35	MA54, MA125
7.0–150	U150/15/40	—	15	40	23.5	MA52, MA164
10–150	U150/25/75	—	25	75	36	MA54, MA126
5.0–200	U200/10/40	—	10	40	22	MA52, MA164
7.0–200	U200/15/40	—	15	40	24	MA52, MA164
7.0–200	U200/15/40A	—	15	40	24	MA52, MA125
10–200	U200/20/75	—	20	75	35.5	MA54, MA125
10–250	U250/15/75J	UXCF250	15	75	22	MA54, MA125☆
7.0–300	U300/10/40	—	10	40	23	MA52, MA164
10–300	U300/15/40	—	15	40	22.5	MA52, MA164
11–300	U300/20/75	—	20	75	36	MA54, MA126
11–300	U300/20/75A	—	20	75	36	MA54, MA126
7.0–400	U400/10/40	—	10	40	23.5	MA52, MA164
7.0–400	U400/10/40A	—	10	40	23.5	MA52, MA164
5.0–500	U500/3/40J	USL500	3.0	40	19	Integral, MA281
5.0–500	U500/5/40J	USL500	5.0	40	19	Integral, MA281
10–500	U500/10/40	—	10	40	23.5	MA52, MA164
10–500	U500/10/40A	—	10	40	23.5	MA52, MA125
12–500	U500/15/75	—	15	75	36	MA54, MA125
12–500	U500/15/75A	—	15	75	36	MA54, MA125
15–500	U500A/15/75J	UXCF500	15	75	25.5	2 MA126☆
12–600	U600/8/40	—	8.0	40	23.5	MA52, MA164
5.0–650	U650/3/40	—	3.0	40	19	Integral, MA281
10–750 ϕ	U750/5-20/40J	UCSLPS10-750	5.0/20	40	Pull rod	MA52
15–750	U750/10/40	—	10	40	23	MA52, MA164
15–750	U750/10/40A	—	10	40	35.5	MA52, MA164
10–750	U750/10/75J	UCSXF750	10	75	27	MA54, MA125
20–750	U750/15/75	—	15	75	36.5	MA54, MA126
7.0–1000	U1000/3/40	—	3.0	40	15.5	MA52, MA296
7.0–1000	U1000/3/40A	—	3.0	40	15.5	MA52
7.0–1000	U1000/3/40C	—	3.0	40	15.5	MA52, MA296
20–1000	U1000/10/75J	UCSX1000	10	75	36	MA54, MA125

☆ Supplied with the capacitor.

ϕ Special non-linear characteristic.

EEV High Vacuum Variable Capacitors — Glass Envelope continued

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
7.0–1000	U1000A/3/40J	Special	3.0/6.0	40	Pull rod	Integral, MA296
7.0–1000	U1000A/3/40JA	Special	3.0/6.0	40	Pull rod	Integral, MA296
7.0–1000	U1000A/3/40JB	UCSL1000	3.0/6.0	40	18	MA52, MA296
7.0–1000	U1000A/3/40JD	UCSL1000	3.0/6.0	40	18†	MA52, MA296
12–1000	U1000A/10/75J	UCSXF1000	10	75	31	MA54, MA125
15–1000	U1000B/10/75	—	10	75	37	MA54, MA125
15–1200	U1200/10/75J	UCSXF1200	10	75	35	MA54, MA125
25–1500	U1500/8/75	—	8.0	75	36	MA54, MA126
10–2000	U2000/3/40	UCSL2000	3.0	40	32	MA52, MA125
10–2000	U2000/3/40A	—	3.0	40	25	MA52, MA125
10–2000	U2000/3/40B	—	3.0	40	Pull rod	MA100, MA125
10–2000	U2000/3/40C	—	3.0	40	32	MA52, MA125
50–2000	U2000/8/75J	UCSXF2000	8.0	75	33	MA54, MA126
50–2000	U2000/8/75JA	UCSXF2000	8.0	75	35	MA54, MA126
30–2000	U2000A/8/75	—	8.0	75	35	MA54, MA126
30–2000	U2000A/8/75A	—	8.0	75	34	MA54, MA126
15–3000	U3000/3/40J	UCSL3000	3.0	40	26	MA52, MA125
20–4000	U4000/2/40	—	2.0	40	30	MA52, MA125



Selection of Vacuum Capacitors

EEV High Vacuum Variable Capacitors — Miniature Ceramic Envelope

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 16MHz (A _{r.m.s.})	Shaft turns in range	Mounting flange
8.0–400	UCM400/5/25	CMV1-400	5.0	25	Pull rod	Integral
5.0–500	UCM500/5/25	CMV1-500	5.0	25	Pull rod	Integral
12–2000	UCM2000/5/40	CMV1-2000	5.0	40	Pull rod	Integral
20–2000	UCM2000A/5/40	—	5.0	40	20	Integral

EEV High Vacuum Variable Capacitors — Ceramic Envelope

Capacitance range (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz ($A_{r.m.s.}$)	Shaft turns in range	Mounting flange
15–200	UC200/15/70	CVDD200	15	70	24.5	Integral
15–250	UC250/20/125	—	20	125	33	Integral
15–250	UC250/25/125J	CVFP250	25	125	27	Integral
10–250	UC250/30/150J	CVHP250	30	150	55	Integral
10–250	UC250/30/150JA	VMMHC250*	30	150	55	Integral
10–250	UC250/30/150JD	VMMHC250*	30	150	55	Integral
10–300	UC300/10/70J	CVDD300	10	70	19	Integral
25–450	UC450/30/150J	CVHP450	30	150	42	Integral
25–450	UC450A/30/150	VMMHC450*	30	150	52	Integral
30–650	UC650/30/150J	CVHP650	30	150	56	Integral
20–750	UC750/20/150J	CVFP750	20	150	43.5	Integral
35–880	UC880/15/125	—	15	125	34	Integral
25–1000	UC1000/8/125J	CVDD1000	8.0	125	24	Integral
25–1000	UC1000/10/125J	CVDD1000	10	125	24	Integral
35–1000	UC1000/15/125	—	15	125	38.5	Integral
50–1000	UC1000/15/150J	CVDP1000	15	150	22	Integral
35–1000	UC1000/20/150J	CVFP1000	20	150	49	Integral
60–1000	UC1000A/20/150	VMMHC1000*	20	150	56	Integral
35–1500	UC1500/8/125J	CVDP1500	8.0	125	24	Integral
35–1500	UC1500/10/125J	CVDP1500	10	125	24	Integral
100–1500	UC1500/15/150J	CVDP1500	15	150	30	Integral
100–1500	UC1500/20/150J	CVFP1500	20	150 [‡]	62	Integral
100–2000	UC2000/12/150J	CVDP2000	12	150	40.5	Integral
50–2300	UC2300/8/125J	CVDP2300	8.0	125	35	Integral
50–2300	UC2300/10/125J	CVDP2300	10	125	35	Integral
25–2500	UC2500/5/60J	CVCC2500	5.0	60	Pull rod	Integral

EEV High Vacuum Fixed Capacitors — Glass Envelope

Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz ($A_{r.m.s.}$)	Mounting flange
6.25	UF6/15/7	X–6.25	15	7.0	—
10	UF10/15/7J	X–10	15	7.0	—
12	UF12/20/40	VCCA12	20	40	MA281 or MA282
25	UF25/20/40	VCCA25	20	40	MA281 or MA282
50	UF50/10/40	JCS1-50	10	40	MA164
50	UF50/20/40	VCCA50	20	40	MA281 or MA282
75	UF75/10/40	JCS1-75	10	40	MA164

† 21 turns over extended range.

‡ Up to 16MHz.

* Adaptor kit available for EEV type.

EEV High Vacuum Fixed Capacitors — Glass Envelope continued

Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz ($A_{r.m.s.}$)	Mounting flange
100	UF100/10/40	JCS1-100	10	40	MA164
150	UF150/10/40	JCS1-150	10	40	MA164
250	UF250/8/40	JCS1-250	8.0	40	MA164
300	UF300/10/50	—	10	50	MA125
300	UF300/15/75	—	15	75	MA125
500	UF500/10/50	—	10	50	MA125
750	UF750/8/75	—	8.0	75	MA125
800	UF800/3/50J	JCSL800	3.0	50	—
900	UF900/3/50J	JCSL900	3.0	50	—
1000	UF1000/8/75	—	8.0	75	MA125
2000	UF2000/7/75	—	7.0	75	MA126

EEV High Vacuum Fixed Capacitors — Ceramic Envelope

Capacitance (pF)	Type	Equivalent	Peak r.f. working voltage max. (kV)	R.F. current max. up to 27MHz ($A_{r.m.s.}$)	Mounting flange
6.5	UFC6/30/140J	CFHE6.5	30	140	Integral
12	UFC12/30/140J	CFHE12	30	140	Integral
18.5	UFC18/30/140J	CFHE18.5	30	140	Integral
34	UFC34/30/140J	CFHE34	30	140	Integral
40	UFC40/30/140J	CFHE40	30	140	Integral
50	UFC50/30/140J	CFHE50	30	140	Integral
100	UFC100/15/80	—	15	80	Integral
100	UFC100/15/140	—	15	140	Integral
100	UFC100/30/120J	CFHD100	30	120	Integral
150	UFC150/15/140	—	15	140	Integral
450	UFC450/12/125J	CFED450	12	125 \ddagger	Integral
450	UFC450/15/125J	CFED450	15	125 \ddagger	Integral
500	UFC500/12/125J	CFED500	12	125 \ddagger	Integral
500	UFC500/15/125J	CFED500	15	125 \ddagger	Integral
750	UFC750/15/125	—	15	125	Integral
1000	UFC1000/15/125	—	15	125	Integral
1000	UFC1000/20/200	—	20	200 \ddagger	Integral
1000	UFC1000A/12/125J	CFED1000	12	125 \ddagger	Integral
1000	UFC1000A/15/125J	CFED1000	15	125 \ddagger	Integral
1500	UFC1500/12/125	—	12	125	Integral
2000	UFC2000/8/125J	CFDP2000	8.0	125	Integral
3000	UFC3000/7/125	—	7.0	125	Integral

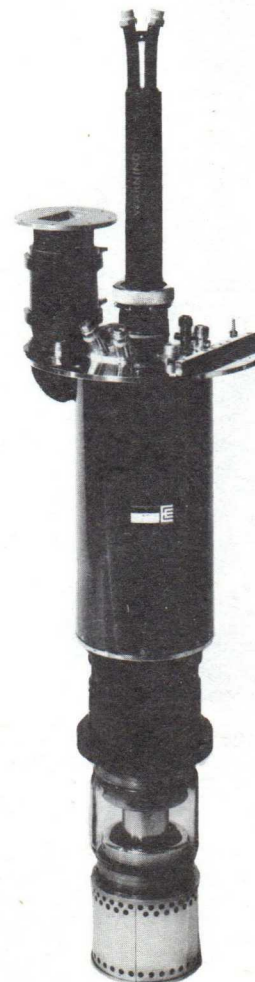
\ddagger Up to 16MHz.

EEV Oscillator Klystrons

Mechanical tuning range (GHz)	Type	Output power (mW)	Electronic tuning range (MHz)	Beam voltage (V)	Base	Application
2.65–3.7	K3033	100	30	300	Octal	Local oscillator
8.1–8.75	K359 (CV5985) §	90	55	350	Leads	Local oscillator
8.5–9.6	K3078/6975 §☆	35	37	300	B3A	Local oscillator
8.5–9.6	K3111 §☆	35	37	300	Leads	Local oscillator
8.5–9.655	K351 (CV2494) §	90	45	300	Leads	Local oscillator
9.0–10.0	K324 (CV2304) △	45	30	350	Octal	Local oscillator
10.675–10.7	K361B △	27	20	300	Leads	Low power doppler
33.5–36.0 †	K3038 ■	350	50	2500	Leads	Instrumentation
33.5–36.0 †	K3039 ■	75	50	2000	Leads	Local oscillator
34.1–35.6	K3035 ■	75	60	2000	BA7P	Local oscillator

EEV Amplifier Klystrons — Pulse Operation

Output power (peak) (kW)	Type	Frequency (MHz)	Gain (dB)	Pulse duration (μ s)	Pulse repetition rate (p.p.s.)	Beam voltage (peak) (kV)	Beam current (peak) (A)	Cooling	Focus mount.
7000	K211 ■	2998 \pm 5 Fixed	32	2.5	600	197	93	Water/air	Integral
8000	K390 ■	2998 \pm 5 Fixed	42	2.5	500	196	96	Water/air	K4001



Oscillator Klystron K3111 (left) and Pulse Amplifier Klystron K390 (right).

§ Rugged.

☆ Reflector voltage precision tuned within ± 5 V.

■ Made to special order only.

△ Maintenance type, not recommended for use in new equipment.

† Other frequencies available to special order.

EEV CW Magnetrons

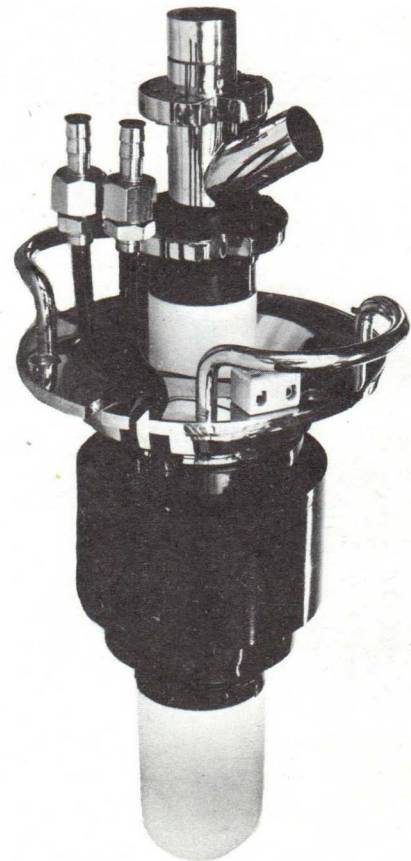
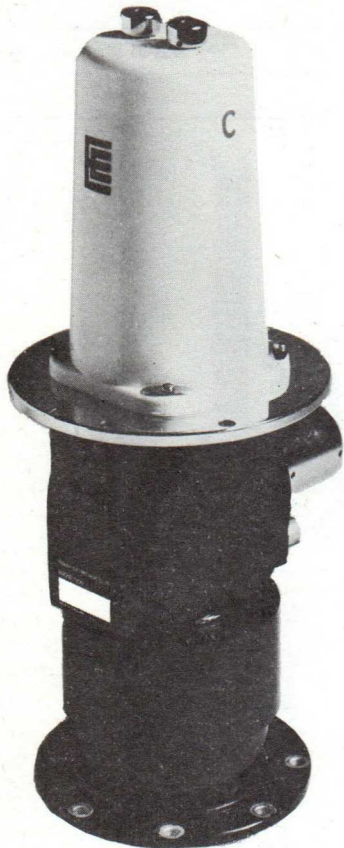
Fixed frequency types, operating in electro-magnet and launching section M4122.

Typical output power (kW)	Type	Frequency range (MHz)	Typical operation			Cooling
			Anode voltage (kV)	Anode current (A)	Load V.S.W.R. max	
25††	BM25LB	896 ± 10**	12.5	2.4	2.5:1	Water/air
	BM25LC	915 ± 10‡				
	BM25LD	896 ± 10**				

EEV Pulse Magnetrons for Particle Accelerators

All types tunable over their specified frequency ranges.

Peak output power (kW)	Type	Frequency range (MHz)	Typical operation				Class (see foot-notes)
			Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (μs)	Duty cycle	
1300	M5058	2994–3002	36	70	5.0	0.0015	SWX
2000	M5125	2992–3001	43	100	4.0	0.001	SWX
2000	M5015	2994–3002	43	90	2.0	0.0015	SWX
5000	M5028★	2851–2861	51	240	2.3	0.0006	EWAZ



Pulse Magnetron M5125 (left) and CW Magnetron BM25LB (right)

†† 30kW under matched load conditions.

** For U.K.

‡ For U.S.A.

|| Identical with BM25LB apart from external fitting.

◆ Frequency agile.

† Mechanically tuned over the specified range.

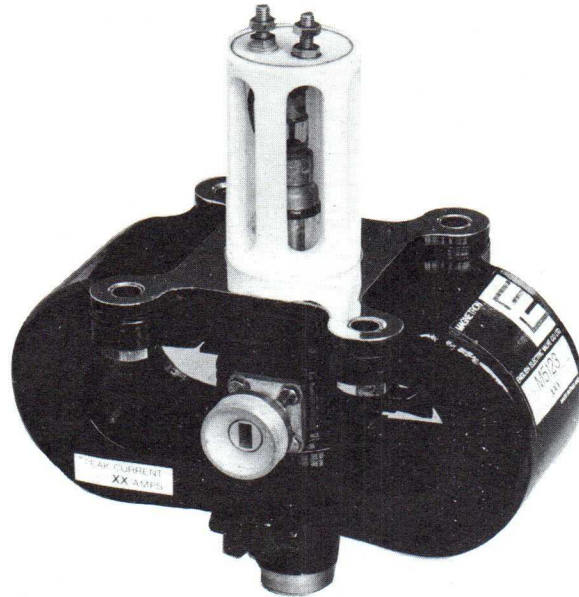
★ Water cooled electro-magnet and launching section assembly M4121 available.

☆ Variation of typical output power over the band.

EEV Pulse Magnetrons — Q-Band

Tunable types

Peak output power (kW)	Type	Centre frequency range (GHz)	Typical operation					Class (see foot-notes)
			Tuning range (MHz)	Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (ns)	Duty cycle	
20	M5123	34.7–35.2	500†	12	9.0	30	0.00045	PAG
45	M5060	34.7–35.2	500†	14	15	100	0.0004	PAG



Q-Band Magnetron M5123

EEV Pulse Magnetrons — O-Band

Tunable types

Peak output power (kW)	Type	Centre frequency range (GHz)	Typical operation					Class (see foot-notes)
			Tuning range (MHz)	Peak anode voltage (kV)	Peak anode current (A)	Pulse duration (ns)	Duty cycle	
4.0	M5137	79.0–81.0	1000†	12	5.0	50	0.0002	PAG
5.0	M5124	80.5–81.5	600♦	12	5.0	50	0.0002	PAG

EEV Backward Wave Oscillators — O Type

Frequency range (GHz)	Type	Typical output power (mW)†	Delay line voltage range (V)	Delay line current max (mA)	Integral focusing	Coaxial output connections	Base
2.4–4.5	N1034A (CV2381)	90–400	150–1170	50	Magnet Solenoid	Type N	B7D
	N1034S (CV6023)						
7.0–11.5	N1010A (CV2393)	40–130	300–1500	40	Magnet Solenoid	Type N	USM7
	N1010S (CV6024)						

CLASS

Magnetic Field

E Electro-magnet
P Packaged integral magnet
S Separate magnet

Cooling

A Forced-air
W Water

Output

G Waveguide
X Requires transition section
Z Requires electro-magnet with launching section

M-OV Instrument Cathode Ray Tubes — Single Gun (Electrostatic Focus and Deflection)

Screen size (cm)	Type	Overall length (mm)	Anode 1 voltage (kV)	PDA voltage (kV)	Cut-off voltage max (V)	Sensitivity		Base
						x (V/cm)	y (V/cm)	
4.8 x 2.4	724E	215	2.0	—	-100	46	100	B12A
7 x 5	974W 996W	230	0.6	6.0	-65	13.8	9.6	B12F
10 x 6	1374Q■	335	0.9	9.0	-84	13.5	4.5	B12F
10 x 6	D13-47GH D13-47GM	368	1.0	4.0	-65	17.5	8.3	B12F
10 x 8	1424A■ 1424A/G1■ 1446A/G1■ 1468A■	368	1.0	4.0	-65	18	9.5	B12F
10 x 8	1474B 1496B■	350	1.2	12	-80	11	5.3	B12F
10 x 8	1424J■ 1424J/G4 1446J/G4	388	1.0	4.0	-65	17	8.7	B12F
13	1324Y 1346Y	371	1.0	4.0	-75	18	9.2	B12F
13	1324Z■ 1346Z■	371	1.0	3.0	-70	18	9.0	B12F
15.4 x 20	2196D	386	1.45	9.0	-80	13	9.0	B12F
18	1824A■ 1846A■	473	2.0	6.0	-110	24	14	B12F
20 x 15.4	2174C 2196C	386	1.45	9.0	-80	13	9.0	B12F



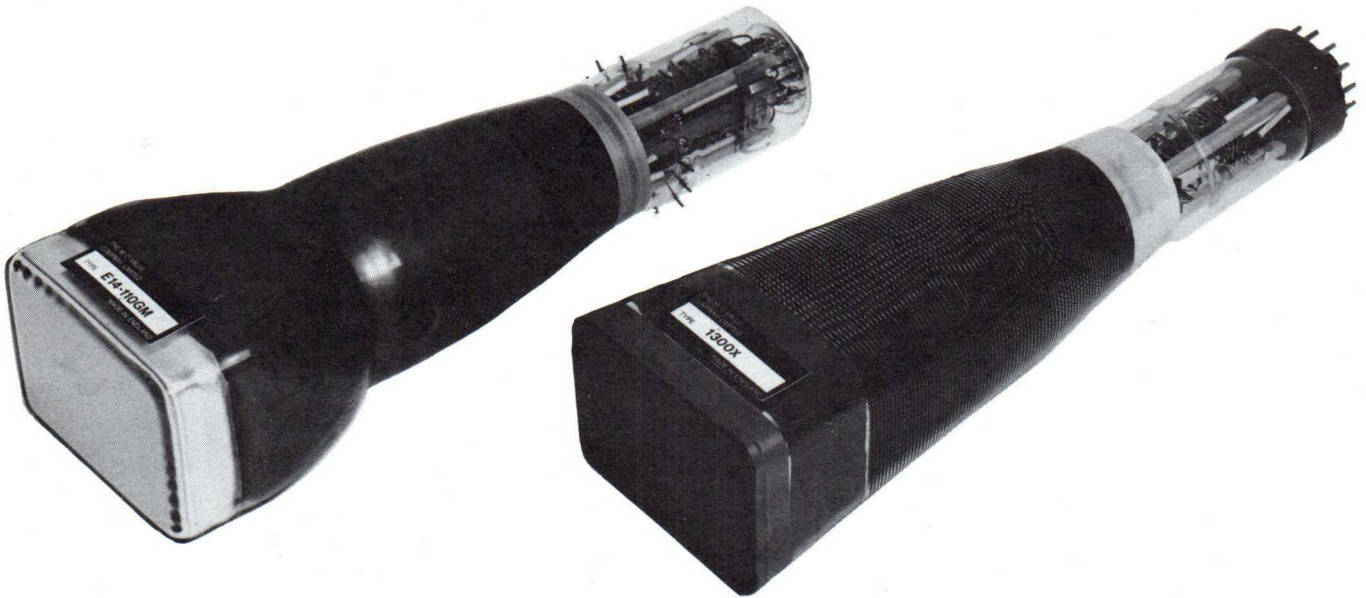
Instrument Tubes 1424J (top) and 974W (bottom)

Shields: Mu metal shields can be supplied for all instrument tubes. Details on request.

Graticule: A series of internal graticules is available which can be applied to most rectangular flat faced instrument tubes to special order. See page D26.

M-OV Instrument Cathode Ray Tubes — Double Gun (Electrostatic Focus and Deflection)

Screen size (cm)	Type	Overall length (mm)	Anode 1 voltage (kV)	PDA voltage (kV)	Cut-off voltage max (V)	Sensitivity		Base
						x (V/cm)	y (V/cm)	
4	E14-110GM	390	0.8	8.0	-100	10	4.0	B12F
10	1074H	386	1.2	4.5	-72	21	8.0	B12F
13	1324M■ 1325M■ 1346M■	386	1.0	4.0	-60	21	6.6	B12F



Instrument Tube E14-110GM (top) and Fibre Optic Tube 1358X (bottom)

M-OV Monitor Cathode Ray Tubes (Electrostatic Focus and Magnetic Deflection)

Screen size (cm)	Type	Overall length (mm)	Deflection angle (deg)	Final anode voltage (kV)	Focus voltage (V)	Anode 1 voltage (V)	Cut-off voltage max (V)	Base
20.2 x 15.6	AW21-80	274	85	9	-30 to +200	400	-80	B12A
31.7 x 24.7	AW36-48	455	65	14	±200	300	-70	B12A

M-OV Fibre Optic Cathode Ray Tubes

Screen size (cm)	Type	Overall length (mm)	Numerical aperture	Final anode voltage (kV)	Cut-off voltage max (V)	Sensitivity		Base	Class (see footnotes)
						x (V/cm)	y (V/cm)		
8 x 11	1358X	380	0.72	6††	-90	29	16	B14A	EE
12.7 x 12.7	1774A	305	0.66	10	-110	-	-	B9A/D	MM
12.7 x 12.7	1774B	305	0.40	10	-110	-	-	B9A/D	MM

CLASS

(First letter denotes focus, second letter denotes deflection)

E Electrostatic
M Magnetic

△ Maintenance type, not recommended for use in new equipment

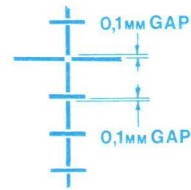
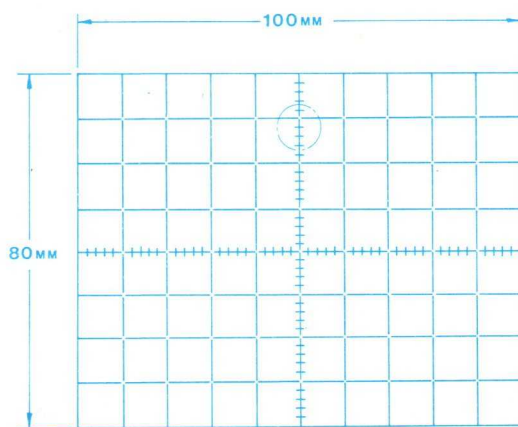
■ Made to special order only

†† Anode 1 voltage 2kV, PDA voltage 6kV

M-OV Instrument Tube Graticules

The graticules shown below can be applied to most rectangular flat faced instrument tubes, to special order.

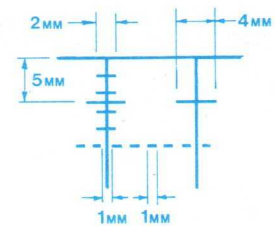
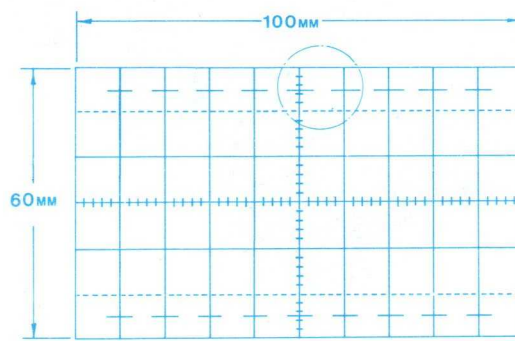
Graticule G1 – Black



WIDTH OF ALL LINES 0,3mm

ENLARGED DETAIL OF PART MARKED

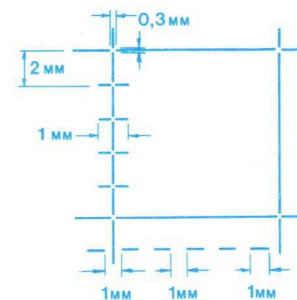
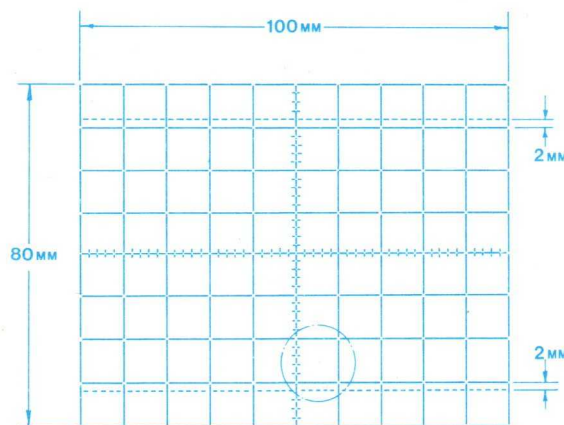
Graticule G3 – White



WIDTH OF ALL LINES 0,4mm

ENLARGED DETAIL OF PART MARKED

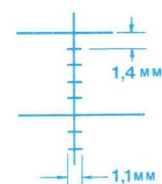
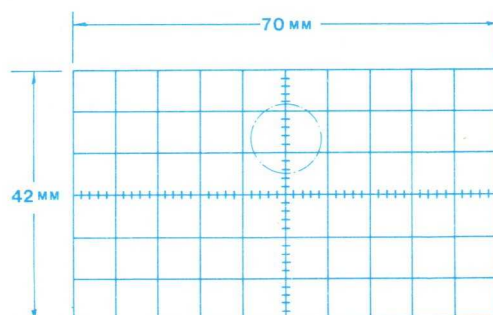
Graticules G4 – Black
G5 – White



WIDTH OF ALL LINES 0,2mm

ENLARGED DETAIL OF PART MARKED

Graticules G6 – Black
G7 – White



WIDTH OF ALL LINES 0,2mm

ENLARGED DETAIL OF PART MARKED

M-OV Cathode Ray Tube Phosphors

GEC	EEV	EIA	European	Old GEC	Old European	Fluorescence	Phosphorescence (Afterglow)	Persistence (approx)	Typical use
01	G	P1	GJ	B	G	Yellowish-green	Yellowish-green	Medium	Projection and oscilloscope
02	V	P28	—	C	—	Yellowish-green	Yellowish-green	Long	Short range radar
08	P	P11	BE	E	B	Blue	Blue	Medium-short	Photographic recording
15	A	P24	GE	U	K	Green	Green	Short	Flying spot scanners
18	W	P4	W	G	W	White	White	Medium-short	Television monitors
19	Z	P26	LC	T	F	Orange†	Orange	Very long	Long range radar
22	C	P16	BA	—	C	Violet and U.V.	Violet and U.V.	Very short	Flying spot scanners
23	Y	P33	LD	J	L	Orange†	Orange	Very long	Medium and short range radar
24	H	P31	GH	—	H	Green	Green	Medium-short	General purpose oscilloscopes
25	N	P2	GL	—	N	Yellowish-green	Yellowish-green	Medium	Wide speed range oscilloscopes
26	T	—	LA	—	D	Orange	Orange	Medium	Anti-flicker displays
27	S	—	LB	—	E	Orange†	Orange	Long	Medium and short range radar
28‡	—	—	—	—	—	Orange	Orange	Long	Medium range radar
29	E	P39	GR	—	—	Green	Green	Long	Medium and short range radar. Anti-flicker displays
30	B	—	—	—	U	Blue	Blue	Medium-short	Projection
31	D	—	—	—	—	Yellow-orange	Yellow-orange	Long	Short range radar and alpha-numeric
33	U	P12	—	—	—	Orange†	Orange	Long	Short range radar
34	R	—	—	—	—	Red	Red	Medium	Projection
44	—	P32	GB	—	M	Purplish-blue	Yellowish-green	Long	Medium and short range radar
46	X	P7	GM	M	P	White	Yellowish-green	Med. short/long*	Radar and slow speed oscilloscopes
47	F	P40	—	—	—	White	Yellowish-green	Med. short/long*	Anti-flicker displays
+50	The addition of this number to the GEC code indicates an aluminized screen, i.e. GEC phosphor No. 25 with aluminized screen becomes 75.								

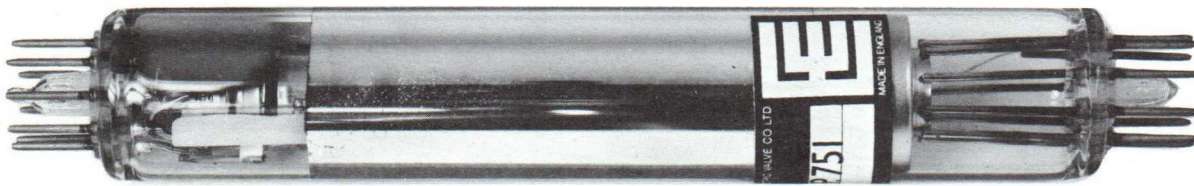
‡ Reduced burn type phosphor.

* White: Medium-short
Yellowish-green: Long.

† This screen is readily damaged by slow-moving traces of high brightness, and should not be used with a stationary trace. It is normally used for radar PPI display.

EEV Storage Tubes

Useful screen size	Type	Description	Typical brightness (ft-lamberts)	Deflection
—	EP751	Single gun storage tube, electrical input and output, with a silicon target and a modified short vidicon envelope. Used for video information storage, scan conversion, image integration.	—	Magnetic
4.0 inches (10.2cm) dia.	E702E	Direct view storage tube recommended for radar, medical and picture storage applications. Similar to E702A but gives improved uniformity of erasure.	900	Electrostatic
10 div. x 8 div. (9cm x 7.2cm) rectangular	E720A	Direct view storage cathode ray oscilloscope tube with single-beam writing gun. It has encapsulated screen lead and internal graticule. Normally used in half-tone mode, but it will also operate as a P.D.A. oscilloscope tube without storage.	100 min	Electrostatic
10 div. x 8 div. (9cm x 7.2cm) rectangular	E720B	Direct view storage oscilloscope tube with split-beam writing gun. It has encapsulated screen lead and internal graticule. Normally used in half-tone mode, but it will also operate as a P.D.A. oscilloscope tube without storage.	100 min	Electrostatic
10 div. x 8 div. (9cm x 7.2cm) rectangular	E720C	Direct view storage oscilloscope tube, shorter than E720A with reduced deflection sensitivity. Normally used in half-tone mode, but will also operate as a P.D.A. oscilloscope tube without storage.	100 min	Electrostatic



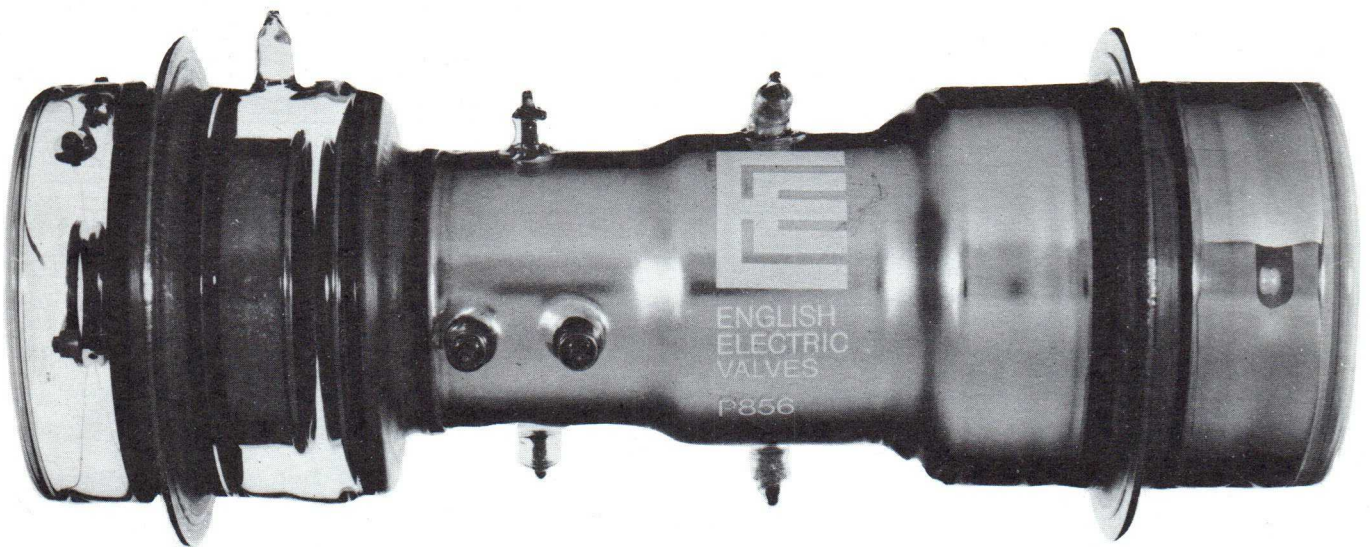
Storage Tube EP751



Direct View Storage Tube E702E

EEV Storage Tubes continued

Useful screen size	Type	Description	Typical brightness (ft-lamberts)	Deflection
10cm x 6cm rectangular	E714A	Direct view storage cathode ray oscilloscope tube with split-beam writing gun. Normally used in half-tone mode, but it will also operate as a P.D.A. oscilloscope tube without storage.	90 min	Electrostatic
10cm x 6cm rectangular	E714C	Direct view storage cathode ray oscilloscope tube with single-beam writing gun. It has encapsulated screen lead and internal graticule. Normally used in half-tone mode, but it will also operate as a P.D.A. oscilloscope tube without storage.	90 min	Electrostatic
10cm x 6cm rectangular	E714G	Direct view storage cathode ray oscilloscope tube similar to E714C but without internal graticule.	90 min	Electrostatic
10cm x 6cm rectangular	E714H	Direct view storage cathode ray oscilloscope tube with single beam writing gun. Shorter than other E714 types with reduced deflection sensitivity, but higher writing speed. Encapsulated screen lead. Normally used in half-tone mode, but it will also operate as a P.D.A. oscilloscope tube without storage.	90 min	Electrostatic
10cm x 6cm rectangular	E714K	Direct view storage cathode ray oscilloscope tube similar to E714C but without encapsulation or internal graticule.	90 min	Electrostatic
14 inches (35.6cm) dia.	E722A	Direct view storage tube recommended for radar and data terminal applications. Selective erasure is possible by voltage switching.	400	Magnetic



Shutter Tube P856

EEV Shutter Tubes

Electrostatically focused image converters with electrostatic deflectors, for both pulse and sweep operation; the deflection system enables the tubes to function as an electronic shutter.

When used in a suitable camera* the tubes can display a sequence of frames showing the development of a high speed event.

The tubes are available with an output faceplate of either plain glass or fibre optic of 33mm, 45mm or 75mm diameter.

Useful screen area (mm)	Type	Structure	Photo-cathode†	Screen	Operating voltage (kV)	Equivalent light input (max) (ft-candle)	Static resolution (min) (line pairs/mm)
75 x 40	P855	Tetrode	S20	P11	16	10 ⁻⁶	13
75 x 40	P856	Triode	S20	P11	18	10 ⁻⁶	13

* Available from John Hadland Ltd., Newhouse Laboratories, Bovingdon, Herts.

† Also available to special order with S1, S9, S11 or S25 photocathode.

EEV Flash Tubes

The XL615 and XL639 series of flash tubes are suitable for the excitation of lasers

Energy input per flash max (J)	Type	Bore diameter (mm)	Arc length (inches)	Typical operating conditions			
				Voltage (kV)	Series inductance (μH)	Flash rate	Trigger voltage (kV)
—	XL630	Spiral flash tube for stroboscopic applications. Average input power 40W max, operating frequency 300Hz max.					
100	XL615/7-2/1.75TW	7.0–2.0	1.75	2.5	400	1 per 15s	16–20
250	XL615/4/2	4.0	2.0	2.5	400	1 per 30s	12–16
250	XL639/4/1.75	4.0	1.75	2.5	400	1 per 30s	12–16
300	XL615/7/1.75	7.0	1.75	2.5	400	1 per 15s	12–16
400	XL615/4/3	4.0	3.0	2.5	400	1 per 30s	12–16
400	XL615/7/2	7.0	2.0	2.5	400	1 per 15s	12–16
400	XL639/4/2.75	4.0	2.75	2.5	400	1 per 30s	12–16
600	XL615/7/3	7.0	3.0	2.5	400	1 per 15s	12–16
1200	XL615/7/6	7.0	6.0	2.5	400	1 per 15s	16–20
1300	XL615/7/6.5	7.0	6.5	2.5	400	1 per 15s	16–20
1500	XL615/9/4	9.0	4.0	2.5	400	1 per 30s	16–20
3500	XL615/9/10	9.0	10	2.5	400	1 per 30s	16–20
3500	XL615/10/5.5	10	5.5	2.5	400	1 per 60s	16–20
5000	XL615/10/6.5	10	6.5	2.5	800	1 per 2 min.	20–25
9000	XL615/10/12	10	12	2.5	800	1 per 2 min.	25
10 000	XL615/13/6.5	13	6.5	2.5	800	1 per 2 min.	25
12 500	XL615/13/9	13	9.0	2.5	800	1 per 2 min.	25
18 000	XL615/13/12	13	12	2.5	800	1 per 2 min.	25
20 000	XL615/10/40	10	40	3.0	800	1 per 2 min.	25

M-OV HCN Laser

Output wavelength (μm)	Type	Power output (mW)	Tube arc voltage (kV)	Tube discharge current max (A)	Overall length (cm)
337	HCN2175	1.0	1.4 to 1.7	1.0	198

EEV Glow Modulators

Crater diameter (inch)	Type	Luminance min^\dagger (candela/ in^2)	Luminous intensity min^\dagger (candela)	Peak cathode current max (mA)	Average cathode current range (mA)	Breakdown voltage max (V)	Operating voltage max^\dagger (V)
0.016	XL632	550	0.11	35	0.25–25	225	150*
0.028	XL601	550	0.27	45	0.25–30	225	150*
0.028	XL627	Rugged version of XL601 in metal envelope					
0.028	XL631	550	0.27	45	0.25–30	225	150*
0.028	XL641	650	0.4	100	1.0–70	225	150
0.060	1B59	110	0.3	75	5.0–35	225	150
0.060	XL603	137	0.375	75	5.0–30	225	150

EEV Voltage Stabilizers

Operating voltage approx (V)	Type	Striking voltage max (V)		Tube current range (mA)	Regulation max (V)	Base
		○	●			
75	QS75/20 (CV284) □	110	160	2-20	6.0	B7G
75	0C2 (CV8766)	115	145	5-30	4.5	B7G
75	QS75/60 (CV434)	117	—	5-60	5.0	B8G
78	75C1 (CV4080)	115	115	2-60	8.0	B7G
90	QS1215 (CV5173)	115	115	1-40	12	B7G
95	QS95/10 (CV286)	110	—	2-10	5.0	B7G
108	QS108/45 (CV422)	120	—	5-45	5.0	B8G
108	(CV1833) 0B2 (CV8162)	127	210	5-30	3.5	B7G
108	(CV4028) 0B2WA (CV4101) ‡	130	130	5-30	3.0	B7G
120	S130P (CV45)	135	—	10-75	10	B4
150	(CV4020) (CV4100) 0A2WA (CV8168) ‡	165	165	5-30	5.0	B7G
150	QS150/15 (CV287)	170	—	2-15	5.0	B7G
150	QS150/45 (CV395)	170	—	5-45	5.0	B8G
150	QS1203 (CV4053) ‡	180	225	2-15	4.5	B7G/F
150	150C4 (CV10664)	185	185	5-30	5.0	B7G
150	(CV1832) 0A2 (CV8161)	185	225	5-30	6.0	B7G

EEV Voltage Reference Tubes

Operating voltage approx. (V)	Type	Striking voltage max (V)		Tube current range (mA)	Regulation max (V)	Base
		○	●			
85	QS1209/5651 (CV449, CV2012)	115	160	1-10	4.0	B7G
85	(CV4048) QS1212 (CV5285) ‡	115	115	1-10	4.0	B7G
85	QS1213 (CV4054) ‡	115	115	1-10	4.0	B7G/F
150	QS1200 (CV2225)	180	225	5-15	5.0	B7G

EEV Trigratrons

Peak output power (kW)	Type	Pulse repetition rate max (p.p.s.)	Pulse duration max (μs)	Hold-off voltage max (kV)	Trigger voltage min (kV)	Base
160	24B1 (CV6008) 24B9 (CV6173)	3000	1.0	10.5	5.0	CL3

- ‡ This is a rugged and reliable type.
○ In normal lighting.
● In total darkness.

- Also CV5083 (with an operating voltage of 70V).
* At 20mA d.c.
† At 30mA d.c.

M-OV Surge Arresters and Protectors

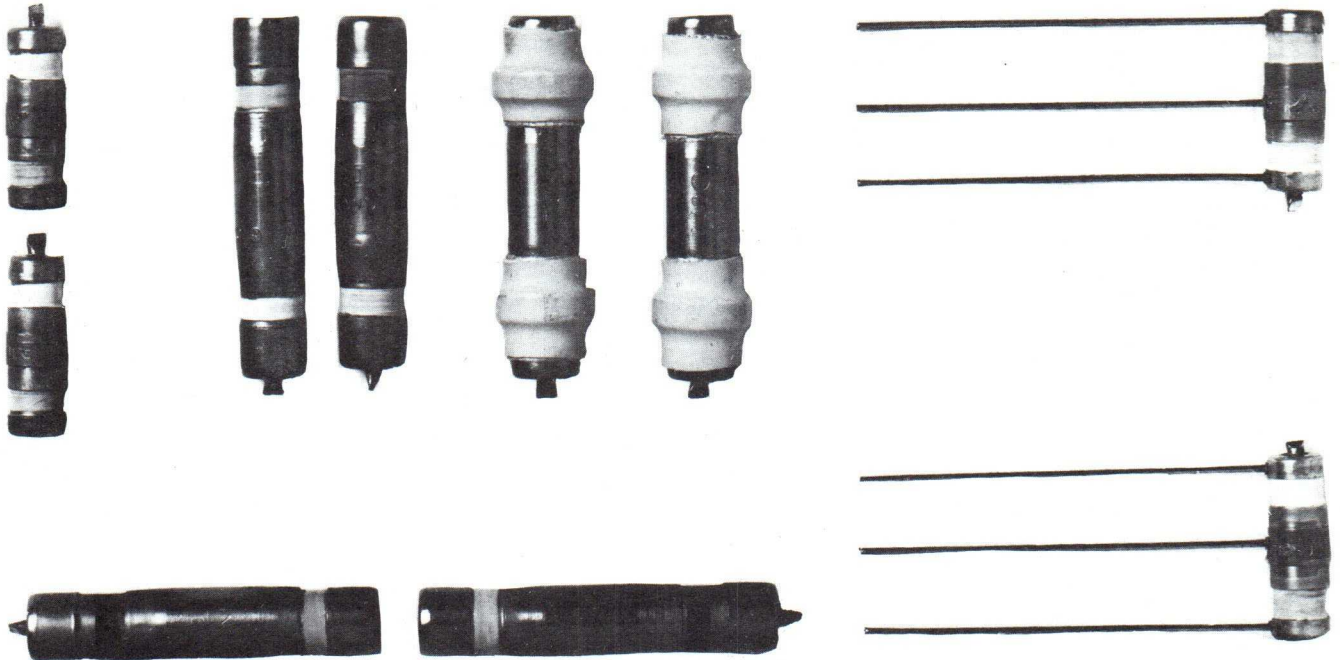
Description	Type	D.C. striking voltage (V)	D.C. glow voltage (V)	Colour marking
2-electrode metal-ceramic replacement for Type 13	5A	240–360	155–215	–
2-electrode moulded air gap	13B■	600–900	–	Black
2-electrode moulded air gap	13D■	1100–1700	–	Blue
2-electrode moulded air gap	13E■	1050–1350	–	Blue
2-electrode glass envelope	15A△	150–250	100–200	–
2-electrode glass envelope	15B△	250–350	–	–
2-electrode glass envelope	15C△	350–450	–	–
2-electrode glass envelope	15D△	600–900	–	–
2-electrode glass envelope	15E△	200–350	150–250	–
2-electrode glass envelope	15F△	100–150	50–100	–
2-electrode glass envelope	15G△	450–600	–	–
Standard 2-electrode metal-ceramic envelope	28	240–360	155–215	Yellow
Wire ended version of Type 28	29			
Miniature 2-electrode metal-ceramic envelope	18	285–395	145–195	Yellow
Type 18 in a plastic sleeve with eyelet protecting the pinch-off seal	101			
Wire ended version of Type 18	105			
Standard 3-electrode metal-ceramic envelope	16A	150–350	150–260	Black
Standard 3-electrode metal-ceramic envelope	16B	300–500	155–215	Yellow
Standard 3-electrode metal-ceramic envelope	16C	500–900	165–225	Red
Standard 3-electrode metal-ceramic envelope	16E	800–1400	165–235	Purple
Fail-safe version of Type 16A	160A			
Fail-safe version of Type 16B	160B			
Fail-safe version of Type 16C	160C			
Fail-safe version of Type 16E	160E			
High power 3-electrode metal-ceramic envelope	26A	150–350	150–260	Black
High power 3-electrode metal-ceramic envelope	26B	300–500	155–215	Yellow
High power 3-electrode metal-ceramic envelope	26C	500–900	165–225	Red
Wire ended version of Type 26	27			
Fail-safe version of Type 26A	260A			
Fail-safe version of Type 26B	260B			
Fail-safe version of Type 26C	260C			
Miniature 3-electrode metal-ceramic envelope	21A	150–350	150–260	Black
Miniature 3-electrode metal-ceramic envelope	21B	300–500	155–215	Yellow
Miniature 3-electrode metal-ceramic envelope	21C	500–900	165–225	Red
Wire ended version of Type 21	22			

■ Made to special order only

△ Maintenance type, not recommended for use in new equipment

M-OV Arrester Mounts

Type	Description
6■	A unit for surge arrester type 15 incorporating an adjustable air gap in parallel with the arrester.
53	A unit for surge arrester type 16 incorporating two gaps. The base is of glazed ceramic providing high insulation resistance and dimensional stability in humid conditions.
54	A composite mounting for surge arrester type 16 incorporating mount type 53 with connections for type 34 fuses in twin line protection.
55	An enclosed composite mounting for surge arrester type 16 and two type 34 fuses, primarily designed for subscribers' instrument protection.
56A	A strip mounting to accommodate 10 type 53, 54 or 59 arrester mounts.
56B	Similar to 56A but with accommodation for 20 type 53, 54 or 59 arrester mounts.
57	A pole mounted weatherproofed enclosure incorporating a type 53 arrester mount. The earth connection is connected to the mounting spindle. The unit may be used either as a terminal or a 'T' junction.
59■	A unit designed for two arresters type 13 and two fuses type 34; designed for strip mounting on mounts 56A or 56B.
60■	Open-sided ceramic sleeve between two end caps to take a surge arrester type 16. This is a replacement unit for special applications such as those which originally used the earlier types Drg. 36 and Drg. 36/2.
61■	A unit for surge arrester type 16. Similar to the type 53 but with provision for rear mounting.
63	A simple slide-in mount incorporating a surge arrester type 16. Suitable for mounting in banks on distribution frames.
66■	A mount suitable for the type 21 arrester. The mounting forms part of an existing range of interlocking parts which can be built up into terminal banks sized to suit the end user.
67■	A block of 10 mounts similar to the 53 but without spark gap. The block is designed to be split into two sets of 5 if required.



Selection of Surge Arresters

M-OV Fuses

Standard procelain body fuse with knife type contacts for use in mount types 54, 55 and 59. Available as type 34A 2.5 amp, 34B 0.5 amp, 34C 1.0 amp, 34D■ 1.5 amp.

Type 2B fuse dummies are available. These are interchangeable solid connectors to replace type 34 fuse.

■ Made to special order only

EEV Spark Gaps

EEV manufactures a comprehensive range of spark gaps for ignitor applications, d.c. protection, heavy current applications and for the protection of pulsed circuits. Each of the styles listed below comprises a series of spark gaps with breakdown voltages covering the specified range. Customers' enquiries for spark gaps to suit individual requirements are invited.

Style	Number of electrodes	Range of breakdown voltage (kV)	Cumulative charge rating (coulomb)	Connections/mounting
A	2	8–16 (pulsed d.c. over a range 1000–1200p.p.s.)	100	CT2 end cap and octal base
B	2	8–16 (pulsed d.c. over a range 1000–1200p.p.s.)	100	CT2 end caps
C	2	0.5–30 (d.c.)	100	Flexible leads
D	2	0.5–25 (d.c.)	75	CT1 end caps
E	2	0.5–3.0 (d.c.)	50	Flexible leads
F	2	0.5–15 (d.c.)	20 000	Bolt on
K	2	0.4–12 (d.c.)	50	CT1 end caps
L	3	0.4–12 (d.c.)	50	CT1 end caps
N	2	0.4–12 (d.c.)	400	CT1 end caps
O	3	0.4–12 (d.c.)	400	CT1 end caps
P	2	0.4–12 (d.c.)	50	Stud mounted
Q	3	0.4–40 (d.c.)	1000	Screw mounted
R	2	0.4–12 (d.c.)	400	Stud mounted
S	2	0.5–30 (d.c.)	100	Flexible leads
U	2	0.4–12 (d.c.)	400	CT1 end caps
V	2	0.4–12 (d.c.)	400	Stud mounted
W	2	0.4–30 (d.c.)	1000	Screw mounted

M-OV Geiger Muller Tubes — Organically Quenched

GEC organically quenched tubes use ethyl formate as the quenching agent, which has many advantages over ethyl alcohol. Tubes using ethyl formate have better plateau characteristics, longer life, better temperature coefficient and a lower minimum operating temperature.

Plateau length average (V)	Type	Plateau slope average (%)	Operating voltage limits (V)	Count life	Shielded back-ground counts/min.	Signal output (V)	Dead time (μ s)	Recovery time (μ s)
200	GM4LB■	0.08	1200–1400	—	down to 0.4	$\frac{280}{140 + C}$	—	—
250	GM4 (CV2138)■	0.05	1250–1450	6×10^8	7–15	$\frac{220}{100 + C}$	100	250
250	2B7■	0.05	1400–1600	4×10^8	30–46	$\frac{340}{120 + C}$	220	700
300	EHM2S (CV2139)■	0.04	1400–1600	6×10^8	5–13	$\frac{160}{100 + C}$	150	380
300	2B2■	0.04	1400–1600	4×10^8	25–45	$\frac{120}{100 + C}$	150	750

C is the total capacitance across the tube, in pF.
The operating temperature range of all types is -20 to $+50^\circ\text{C}$.
PLANCHETS can be supplied; 15mm, 25mm, flat or dished.

■ Made to special order only

EEV Methane Detector Elements

The methane detectors listed below consist of two elements which are used as two arms of a bridge circuit. They are designed to detect methane in air in concentrations from 0.1% upwards. There is no interference from water vapour or carbon dioxide. The minimum sensitivities specified apply when the recommended circuit and mounting are used.

Type	Minimum sensitivity (mV/% methane)	Linearity (% methane)	Response time (sec)★	Maximum methane concentration (%)	Bridge supply (V)	Bridge power consumption (W)
VQ1	20	up to 3	2	10	2.0 ± 0.1	0.75
VQ2	15	up to 3	2	5	2.0 ± 0.1	0.48
VQ3	20	up to 3	2	6	2.5 ± 0.1	1.1



Methane Detector Elements VQ1 (left), VQ2 (centre) and VQ3 (right)

EEV Ozotrons — Halogen Sensitive Elements

The ozotron will detect minute quantities of halogen or halogen compound gases in the atmosphere.

Three types of ozotron are available. Type H has a glass envelope; types G and J have ceramic envelopes and are demountable so that the inner electrodes can be cleaned.

The three types are capable of detecting halogen concentrations of 1 part in 1 500 000. A leakage of Arcton (dichlorodifluoromethane) at the rate of 1.5 milligrams per day (0.02 ounce per year) can be located.

EEV Nernst Filaments — Infra Red Sources

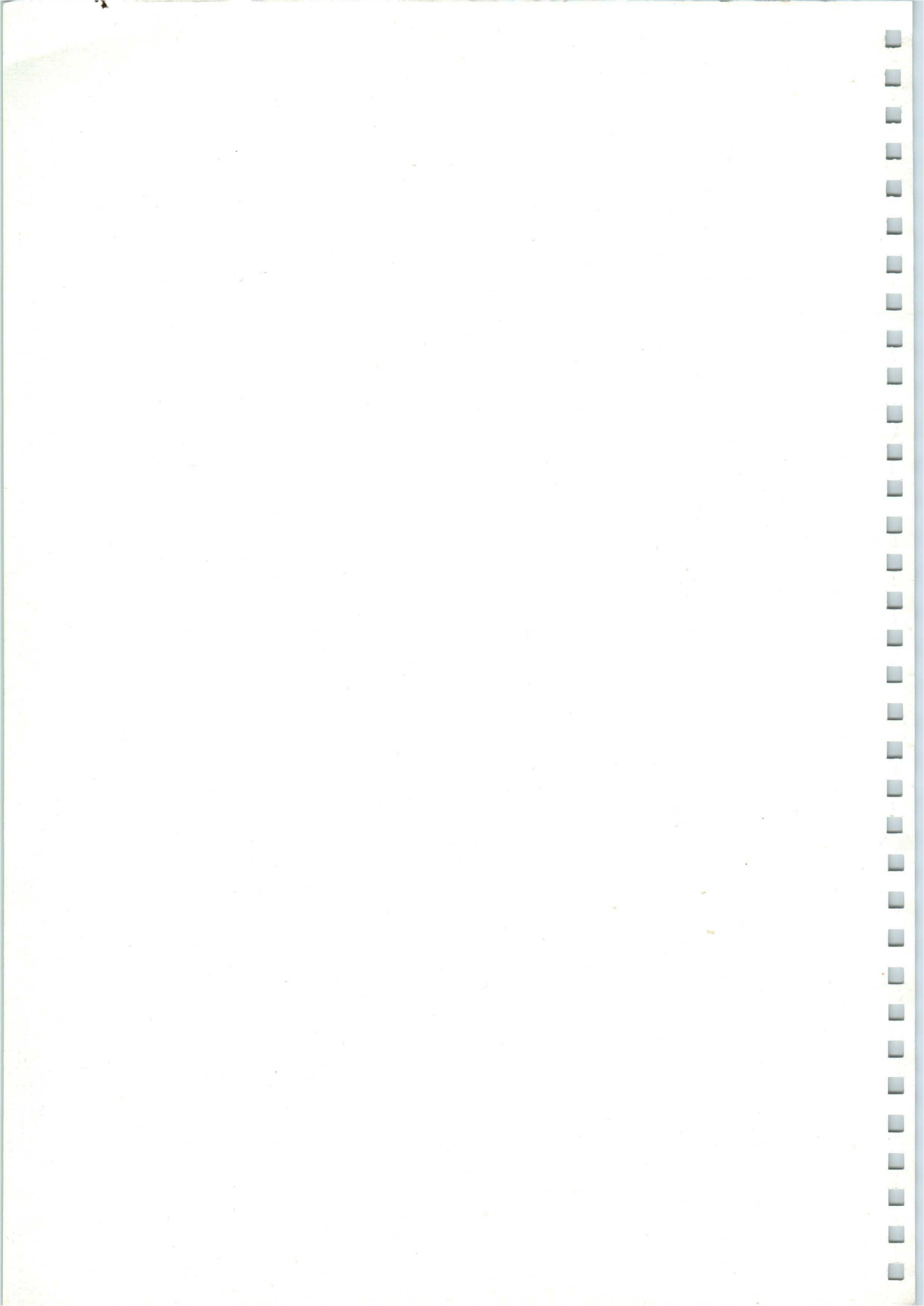
Type	Operating current		Temperature range (°C)	A.C. supply voltage♦ (V)	Voltage drop (V _{r.m.s.})
	minimum (A _{r.m.s.})‡	maximum (A _{r.m.s.})‡			
NFT1	0.3	0.65	1350–1750	200–250	90–110
NFT2	0.5	1.3	1350–1700	200–250	70–90
NFT3	0.4	1.2	1350–1720	200–250	70–95
NFT4	0.5	1.5	1300–1700	200–250	95–130
NFT5	0.2	1.2	850–1330	200–250	70–100
NFT6	0.3	0.8	1300–1700	200–250	70–90
NFT7	0.3	1.4	1050–1550	200–250	50–70
NFT8	0.3	1.4	1075–1600	200–250	50–80
NFT9	0.3	0.8	975–1700	200–250	60–80
NFT10	0.3	1.2	1125–1625	200–250	60–80

‡ Minimum value for stable operation.

‡ For maximum operating temperature.

♦ With suitable series impedance.

★ Time to register 1¼% in a 2½% concentration.



EQUIVALENTS

The following pages list tubes of various manufacturers for which EEV/M-OV tubes may be used as replacements. Service type numbers are also included.

The types listed in the column 'EEV/M-OV replacement' may be used as direct replacements for those under the heading 'type to be replaced' except where indicated by an asterisk * which means that minor modifications may be necessary because of slight mechanical or electrical differences.

The page numbers refer to the Abridged Data Booklets where concise information for each product is given. These booklets comprise four parts as listed below, the booklet letter reference being incorporated in the page number.

- A - Products for Broadcasting and Communications Equipment
- B - Products for Radar Equipment
- C - Products for Electro-Optical/TV Equipment
- D - Products for Industrial and Scientific Equipment

Each of these sections is available separately, and a complete set of four, bound together with this equivalents list is also available to give in one publication details of the most comprehensive range of professional electron tubes in Europe.

Where the symbol † appears in the column 'page number' abridged data for the tube are not given in this catalogue but enquiries are welcomed.

Colour Code

Throughout the data the following colour code is used:-

Brown indicates manufacture by English Electric Valve Company Ltd.

Blue indicates manufacture by The M-O Valve Company Ltd

LISTE GLEICHWERTIGER ROHREN

Diese Liste zeigt Röhren verschiedener Hersteller, welche durch Röhren von EEV/M-OV ersetzt werden können. Service-Typennummern werden ebenfalls angeführt. Die in der Spalte 'EEV/M-OV replacement' angegebenen Typen können direkt als gleichwertiger Ersatz anstelle der Typen in der Rubrik 'type to be replaced' verwendet werden. Bei den mit einem Sternchen* gekennzeichneten Typen können jedoch unbedeutende Abänderungen auf Grund von geringfügigen mechanischen oder elektrischen Unterschieden erforderlich sein.

Das Symbol † in der Spalte 'page number' bedeutet, daß für die entsprechende Röhre in diesem Katalog keine Kurzdaten angeführt sind. Anfragen zu diesen Röhren sind uns jedoch willkommen.

Farbkennzeichnung

Die folgende Farbkennzeichnung wird für die Daten verwendet:

Braun: Produkt der English Electric Valve Co Ltd

Blau: Produkt der M-O Valve Co Ltd

INDEX D'EQUIVALENCE DES TUBES

Cet index comprend les tubes de divers fabricants et pour le remplacement desquels il existe des tubes EEV/M-OV. Les numéros des types de service sont également inclus. Les types mentionnés dans la colonne 'EEV/M-OV replacement' peuvent être utilisés directement pour le remplacement de ceux mentionnés sous le titre 'type to be replaced' sauf lorsque marqué d'un astérisque* qui indique qu'il peut être nécessaire de procéder à une légère modification en raison d'une différence mineure mécanique ou électrique.

Lorsque le symbole † est porté dans la colonne 'page number' les caractéristiques abrégées de ce tube ne sont pas données dans cet index mais nous répondrons à toute demande de renseignements.

Code des couleurs

Pour toutes les indications nous utilisons le code de couleur suivant :

Marron: produits fabriqués par English Electric Valve Co Ltd

Bleu: produits fabriqués par M-O Valve Co Ltd

INDICE DE INTERCAMBIABILIDAD

En este Índice se dá una relación de lámparas electrónicas de diversas marcas para las que se pueden utilizar como repuesto las lámparas EEV/M-OV. Asimismo, se incluyen los números del tipo de servicio.

Los tipos que figuran en la columna 'EEV/M-OV replacement' pueden utilizarse directamente como repuestos de los detallados bajo el epígrafe 'type to be replaced' excepto cuando vayan acompañados de un asterisco*, el cual indica que pueden ser necesarias pequeñas modificaciones debido a ligeras diferencias de orden mecánico o eléctrico.

El símbolo † en la columna 'page number' significa que no se facilita en este Catálogo un resumen informativo sobre la lámpara, pero se suministrarán con el mayor gusto los datos procedentes, a solicitud del interesado.

Clave de Colores

En todo lugar se ha utilizado la siguiente clave de colores:

Marrón indica fabricado por la English Electric Valve Co Ltd

Azul indica fabricado por The M-O Valve Co Ltd

INDICE DEGLI EQUIVALENTI

Il presente indice elenca le valvole costruite da altre società che possono venire sostituite dalle valvole EEV/M-OV. La distinta elenca parimenti i numeri di servizio.

I modelli figuranti nella colonna 'EEV/M-OV replacement' possono venir usati a sostituzione diretta dei modelli elencati sotto la dicitura 'type to be replaced', eccettuato il caso in cui figurì l'asterisco*, in detto caso, occorre apportare lievi modifiche per compensare leggere diversità meccaniche o elettriche.

Dove appare il simbolo † nella colonna 'page number' non vengono forniti i dati abbreviati inerenti la valvola; in tal caso, comunque, il cliente è pregato di interpellarci.

Colore Codice

Nel presente opuscolo, si usa il seguente codice:-

il marrone indica che la valvola è costruita dalla English Electric Valve Co Ltd

il blu indica che la valvola è costruita dalla M-O Valve Co Ltd

Type to be replaced	EEV/M-OV replacement	Page no
0A2	0A2	D31
0A2WA	0A2WA	D31
0B2	0B2	D31
0B2WA	0B2WA	D31
0C2	0C2	D31
0G3*	QS1209/5651	D31
1B35A	BS412	B13
1B59	1B59	D30
1B63A	BS914	B11
1G32P	FX2505	B6 D8
1G35P	FX2505	B6 D8
1G45P	FX227	B6 D8
1K24*	3B24W	A12 D5
2B2	2B2	D34
2B7	2B7	D34
2B52*	C1134	A9 D14
2B94*	C178A/5894	A9 D14
2C18501	2C18501	A23
2C18502	2C18502	A23
2G/402A	GXU1	D5
2G/472B	GXU2	D5
2G/473C	GXU3	D5
2G22P	8503	B6, D8
2G57	5557	D7
2H28	GXU1	D5
2H66	GU12	D5
2J30 to 2J34	2J30 to 2J34	†
2J42	2J42	B23
2J42A*	M513B	B24
2J42H	2J42H	B23
2J51A	2J51A	B23
2J55	2J55	B24
2J70A	2J70A	B20
2J70B	M5063/2J70B	B20
2K28*	K3033	B18 D21
2V/400A	GU12	D5
2V/474C	AH238	D5
2V/490C*	AH221	D5
2V/500C	AH221	D5
2XM600A	GU12	D5
3-25D3*	3C24	A5 D10
3B24W	3B24W	A12 D5
3B28	GXU1	D5
3B29*	3B24W	A12 D5
3C/800E	B1153	A5

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3C24	3C24	A5 D10
3C45	FX227	B6 D8
3C45/6130	FX227	B6 D8
3C45/PL345	FX227	B6 D8
3C45A	FX227	B6 D8
3C45W*	FX227	B6 D8
3CC115S	3CC115S	A23 B31
3CC120S	3CC120S	A23 B31
3CC210S	3CC210S	A23 B31
3CC310S	3CC310S	A23 B31
3CC1100	3CC1100	A23 B31
3CC1200	3CC1200	A23 B31
3CC2100	3CC2100	A23 B31
3CC2200	3CC2200	A23 B31
3CC3100	3CC3100	A23 B31
3CC3101	3CC3101	A23 B31
3CC4100	3CC4100	A23 B31
3F10TA*	BW179	A7 D11
3F10TR*	BR179	A6 D10
3F15TR*	BR161	A6 D10
3G15*	AFX203	D7
3J/121E	ACT9	A6
3J/187E*	BR1196	A6 D10
3J/192E*	BR1165	A6 D10
3J/202E*	BR1162	A6 D10
3JC/187E*	BR1196	A6 D10
3K3000LQ	3K3000LQ	A21
3K50,000LF	3K50,000LF	A21
3KM3000LA	3KM3000LA	A21
3L5T*	BR1162	A6

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3MC2200	3MC2200	A24 B31
3MC3200	3MC3200	A24 B31
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4-250*	C1112	A9 D14
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4-250A/5D22*	C1112	A9 D14
4-400A*	C1136	A9 D14
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4B/602E	C1149/1	B5 D14
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4B32	GXU2	D5
4C35	FX2505	B6 D8
4C35/PL435	FX2505	B6 D8
4C35A	FX2505	B6 D8
4CC1100	4CC1100	A24 B31
4CC2100	4CC2100	A24 B31
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4CW10,000A	4CW10,000A	A10 D13
4CW25,000A	4CW25,000A	A10 D13
4CX250B	4CX250B	A10
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4CX1500B	4CX1500B	A10 D13
4CX5000A	4CX5000A	A10 D13
4CX10,000D	4CX10,000D	A10 D13
4CX15,000A	4CX15,000A	A10 D13
4CX35,000C	4CX35,000C	A10 D13
4D21*	C1108	A9 D14
4D32	4D32	A9 D14
4F15R	4CX250B	A10
4F21*	C1108	A9 D14
4H/135M	4CX250B	A10
4H/160M	4CX250B	A10
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4H73*	AH221	D5
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4HC/160M	4CX250B	A10
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4J33	4J33	B20
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4J50*	4J50A	B26
4J50A	4J50A	B26
4J52A	4J52A	B25
4J53	4J53	B20
4JC/201E	6166A	A10 D13
4JC/201S*	CR192A	A10 D13
4KM100LA*	K376	A20
4KM100LF*	K377	A20
4KM50,000LA3*	K365	A20
4KM50,000LQ	4KM50,000LQ	A21
4KM50,000LR	4KM50,000LR	A21
4MA7	M5057	B27
4PR60B*	C1149/1	B5 D14
4X150A	4CX250B	A10
4X250B	4CX250B	A10
5A Arrester	5A Arrester	A26 D32
5A/185K	D3a	A12 D16
5B/900A	C1158	A9 D14

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5CX1500A	5CX1500A	A11 D13
5D22*	C1112	A9 D14
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6F66R*	6166A	A10 D13
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6H51*	AH2511	D5
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8T11R*	6166A	A10 D13
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8T71R*	BR189	A6 D10
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9RP33	2273D	B34
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11E15	C1134	A9 D14
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11TA31*	0A2	D31
12/03HB	3073Q	B34
12/04HM	3069M	B34
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12E12*	C1150/1	B5 D14
12E13	KT88	A12 D16
13B Arrester	13B Arrester	A26 D32
13D Arrester	13D Arrester	A26 D32
13E Arrester	13E Arrester	A26 D32
13E1	C1158	A9 D14
15A Arrester	15A Arrester	A26 D32
15B Arrester	15B Arrester	A26 D32
15C Arrester	15C Arrester	A26 D32
15D Arrester	15D Arrester	A26 D32
15D12	B1153	A5 D10
15E Arrester	15E Arrester	A26 D32
15F Arrester	15F Arrester	A26 D32
15G Arrester	15G Arrester	A26 D32
16A Arrester	16A Arrester	A26 D32
16B Arrester	16B Arrester	A26 D32
16C Arrester	16C Arrester	A26 D32
16E Arrester	16E Arrester	A26 D32
17	5557	D7
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21B Arrester	21B Arrester	A26 D32
21C Arrester	21C Arrester	A26 D32
21N13	5559	D7
22 Arrester	22 Arrester	A26 D32
22M1	1B59	D30
24B1	24B1	D31
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25T*	3C24	A5 D10
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26A Arrester	26A Arrester	A26 D32
26B Arrester	26B Arrester	A26 D32
26C Arrester	26C Arrester	A26 D32
27 Arrester	27 Arrester	A26 D32
28 Arrester	28 Arrester	A26 D32
29 Arrester	29 Arrester	A26 D32
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43QV26*	8541A	C6
43QV26/P*	P849D	C6
43QV26/R*	8541	C6
43QV26/T*	8541	C6
44QV26*	8051	C9
52QV26*	8541A	C6
52QV26/R*	P842X	C6
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54 Mount	54 Mount	A27 D33
55 Mount	55 Mount	A27 D33
55B/200A	C1134	A9 D14
55B/400A	C178A/5894	A9 D14
55QU26	8541	C6
56A Mount	56A Mount	A27

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56B Mount	56B Mount	A27 D33
57	5559	D7
57 Mount	57 Mount	A27 D33
59 Mount	59 Mount	A27 D33
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59-60/05/003	TWJ30	B28
59-60/08/001	BS834	B8
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59-60/90/031	SC6 series	C16
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60 Mount	60 Mount	A27 D33
61 Mount	61 Mount	A27 D33
63 Mount	63 Mount	A27 D33
63QV26*	8541A	C6
63QV26/P*	8541	C6
64QV26*	8051	C9
66 Mount	66 Mount	A27 D33
67 Mount	67 Mount	A27 D33
75B1	QS75/20	D31
75C1	75C1	D31
75PC11	P874	C10
85A2	QS1209/5651	D31
90C1	QS1215	D31
95A1	QS95/10	D31
100MD1	BS510	B17
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101 Arrester	101 Arrester	A26 D32
105 Arrester	105 Arrester	A26 D32
108C1	0B2	D31

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150B3	QS150/15	D31
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150C4	150C4	D31
160A Arrester	160A Arrester	A26 D32
160B Arrester	160B Arrester	A26 D32
160C Arrester	160C Arrester	A26 D32
160E Arrester	160E Arrester	A26 D32
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210-0404-001	210-0404-001	A28
210-0405-001	210-0405-001	A28
210-0406-001	210-0406-001	A28
238B	BK46/5555	D6
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260B Arrester	260B Arrester	A26 D32
260C Arrester	260C Arrester	A26 D32
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513QM8	P874	C10
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575A*	AH2511	D5
631*	5559	D7
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651	BK484/5552A	D6
652	BK448/5551A	D6
655	BK486/5553B	D6
656	BK484/5552A	D6
657	BK448/5551A	D6
658	BK486/5553B	D6
673*	AH2511	D5
676*	BT17	D7
681	BK66/5550	D6
715	5557	D7
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724E	724E	D24
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* † Please refer to page E1.

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966	GU12	D5	2255RF	P8031N	†	5551A	BK448/5551A	D6
967	5557	D7	2255ROE*	P842X	C6	5552	BK484/5552A	D6
974W	974W	D24	2255SF	P8031Z	†	5552A	BK484/5552A	D6
996W	996W	D24	2260AMR	P849D	C6	5553	BK486/5553B	D6
1074H	1074H	D25	2260BAE	P849D	C6	5553B	BK486/5553B	D6
1163	68506	D5	2260ENT	P849D	C6	5554	BK44/5554	D6
1255FIM*	7038	C7	2260FIM	P844	C6	5555	BK46/5555	D6
1255NOR*	7038	C7	2260IND	8541	C6	5557	5557	D7
1257	5559	D7	2260NOR	8541A	C6	5559	5559	D7
1290-99-618-9155	BS806B	B14	2260ROE	P842X	C6	5586	5586	B20
1295*	5559	D7	2269Y	2269Y	B34	5586A	M5083A	B20
	BT5	D7	2273D	2273D	B34	5651*	QS1209/5651	D31
1324M	1324M	D25	2273P	2273D	B34	5651WA	QS1212	D31
1324Y	1324Y	D24	2700*	8134	C8	5657	5657	B20
1324Z	1324Z	D24	2700IND*	8134V1/4811	C8	5671*	BR189	A6
1325M	1325M	D25	2705IND	8134V1/4811	C8			D10
1346M	1346M	D25	2861B	4CX250B	A10	5720*	5559	D7
1346Y	1346Y	D24	3069M	3069M	B34	5728*	5559	D7
1346Z	1346Z	D24	3069Q	3069Q	B34	5820*	P874	C10
1351U	1351U	C14	3069R	3069R	B34		P875	C10
1358X	1358X	D25	3073Q	3073Q	B34	5820A*	P874	C10
1368U	1368U	C14	3077R	3077R	B34		P875	C10
1374Q	1374Q	D24	3079R	3079R	B34	5820A/E*	P874	C10
1380U	1380U	C14	3096Q	3096Q	B34		P875	C10
1384U	1384U	C14	3096R	3096R	B34	5820A/L*	P874	C10
1424A	1424A	D24	4017	GU12	D5		P875	C10
1424A/G1	1424A/G1	D24	4049D	AH221	D5	5822	BK5822A	D6
1424J	1424J	D24	4169B	4169B	B35	5822A	BK5822A	D6
1424J/G4	1424J/G4	D24	4196B	4196B	B35	5830*	BT69	D7
1446A/G1	1446A/G1	D24	4212E	V1505	A5	5842	5842	D16
1446J/G4	1446J/G4	D24	4261	5557	D7	5853	BS110	B9
1468A	1468A	D24	4304CB	V1505	A5	5861	DET22G	A11
1474B	1474B	D24	4415	P875	C10			D15
1478E	1478E	B34	4478	P826/4478	C7	5894*	C178A/5894	A9
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1496B	1496B	D24	4494	P894/4494	C8	5910-99-142-5816	UC1000A/20/	A15
1578A	1578A	B34	4495	P895/4495	C8		150	D19
1578B	1578B	B34	4536	P858	C10	5910-99-142-5817	UC450A/30/	A15
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1774B	1774B	D25	4559A	8507A	C6	5910-99-519-0952	U500/10/40	A13
1824A	1824A	D24	4588*	P8034A	C6			D17
1846A	1846A	D24	4589	P841F	†	5910-99-519-0953	U2000A/8/75	A14
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2174C	2174C	D24	4591L	P8000L	C5		120J	D20
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2196D	2196D	D24	4592B*	P8001B	C5			D17
2255*	8626	C6	4592G*	P8001G	C5	5910-99-580-1052	U50/15/30	A13
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2255ENT*	P849D	C6	4810	8480V1/4810	C8			D17
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5910-99-954-0794	UF10/15/7J	A15 D19
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5910-99-957-2089	U2000/8/75J	A14 D18
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5920-99-193-9835	16B Arrester	A26 D32
5920-99-711-7317	16C Arrester	A26 D32
5920-99-901-6279	55 Mount	A27 D33
5923	BW1165	A7 D11
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5935-99-105-7229	MA153	†
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5948*	CX1140	B6 D8
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5956*	FX2517	B6 D8
5957*	FX2517	B6 D8
5960-00-082-4125	7262A	C7
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5960-00-188-3564	0A2	D31
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5960-00-230-5272	4CX250B	A10
5960-00-242-6051	2J55	B24
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5960-00-262-0180	6080	D16
5960-00-262-0181	6080WA	D16
5960-00-262-0227	4J53	B20
5960-00-262-0286	QS1212	D31
5960-00-262-1355	FX227	B6 D8
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5960-00-390-5208	8503	B6 D8
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5960-00-504-8548	4J31	B20
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5960-00-548-9851	8503	B6 D8
5960-00-552-8277	FX2505	B6 D8
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5960-00-663-5968	4CX5000A	A10 D13
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5960-00-844-8284	K3099	A21
5960-00-892-0813	6080WA	D16
5960-00-892-0814	QS1212	D31
5960-00-892-0828	4CX250B	A10
5960-00-936-7931	4CX1500B	A10 D13
5960-00-958-0083	7262A	C7
59-60/04/001	SC7 series	C16
59-60/04/003	SC6 series	C16
59-60/05/003	TWJ30	B28
59-60/08/001	BS834	B8
59-60/08/005	BS800	B9
59-60/08/006	BS730	B8
59-60/08/011	BS968	B12
59-60/08/012	BS974	B12
59-60/08/014	BS912	B8
59-60/08/024	BS960	B12
5960-12-127-0721	QS1209/5651	D31
5960-14-200-1412	QS1209/5651	D31
5960-14-201-2293	0B2	D31
5960-14-205-0742	6587	B6 D8
5960-14-206-3385	4J50A	B26
5960-14-206-3386	4J52A	B25
5960-14-220-4487	2J34	†
5960-14-220-4497	C1108	A9 D14
5960-14-220-4515	5586	B20
5960-14-220-4517	2J30	†
5960-14-220-4521	K3033	B18 D21
5960-14-220-4523	FX227	B6 D8
5960-14-220-4526	C1112	A9 D14
5960-14-220-4783	2J32	†
5960-14-220-4784	2J31	†
5960-14-226-0204	5657	B20
5960-14-256-3774	P862	†
5960-14-256-8726	K3078/6975	B18 D21
5960-14-269-8319	2J33	†
5960-15-252-9810	2J42H	B23
5960-17-024-3472	QS1215	D31
5960-17-032-8318	M599B	B23
5960-17-033-9201	4CX5000A	A10

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5960-17-033-9201	4CX5000A	D13
5960-17-035-0700	8541	C6
5960-17-606-4243	CX1140	B6
		D8
59-60/90/001	BS502	B17
59-60/90/006	BS716	B8
59-60/90/007	BM1038	B25
59-60/90/008	BM1039	B25
59-60/90/011	K3007	B18
59-60/90/013	BS510	B17
59-60/90/024	BS104	B9
59-60/90/027	BS724 series	B8
59-60/90/031	SC6 series	C16
59-60/90/053	BS710	B8
59-60/90/062	YD1400	D16
5960-99-000-0005	AH221	D5
5960-99-000-0028	ACT9	A6
5960-99-000-0187	U19	A12
5960-99-000-0233	GXA50	D34
5960-99-000-0273	DET22	A11
		D15
5960-99-000-0284	QS75/20	D31
5960-99-000-0286	QS95/10	D31
5960-99-000-0287	QS150/15	D31
5960-99-000-0294	BS710	B8
5960-99-000-0295	GXA85	D34
5960-99-000-0345	12E1	A12
		D16
5960-99-000-0354	DET23	A11
		D15
5960-99-000-0372	FX227	B6
		D8
5960-99-000-0395	QS150/45	D31
5960-99-000-0397	DET24	A11
		D15
5960-99-000-0402	GXA80	D34
5960-99-000-0422	QS108/45	D31
5960-99-000-0427	C1150/1	B5
		D14
5960-99-000-0429	3069M	B34
5960-99-000-0434	QS75/60	D31
5960-99-000-0436	ACT25	A6, B5
5960-99-000-0449	QS1209/5651	D31
5960-99-000-0460	BS48	B13
5960-99-000-0461	BS92	B13
5960-99-000-0462	BS84	B13
5960-99-000-0463	BS82	B13
5960-99-000-0482	A237	A12
		D5
5960-99-000-0488	GXA95	D34
5960-99-000-0489	BT75	†
5960-99-000-0513	4J53	B20
5960-99-000-0532	AH211A	D5
5960-99-000-0789	3C24	A5
		D10

Type to be replaced	EEV/M-OV replacement	Page no
5960-99-000-1075	KT66	A12
		D16
5960-99-000-1128	GT1C	D7
5960-99-000-1144	BT19	D7
5960-99-000-1147	BT5	D7
5960-99-000-1219	DA100	A5
5960-99-000-1435	AH221	D5
5960-99-000-1619	V1505	A5
5960-99-000-1629	AH238	D5
5960-99-000-1742	BK44/5554	D6
5960-99-000-1743	GXA60	D34
5960-99-000-1747	M505	B24
5960-99-000-1787	FX2505	B6
		D8
5960-99-000-1807	2J31	†
5960-99-000-1808	2J32	†
5960-99-000-1809	2J33	†
5960-99-000-1810	2J34	†
5960-99-000-1832	0A2	D31
5960-99-000-1833	0B2	D31
5960-99-000-1835	GXU1	D5
5960-99-000-1841	BS52	B11
5960-99-000-1859	GXA160	D34
5960-99-000-1866	2J42	B23
5960-99-000-1881	BS384	B14
5960-99-000-1897	4J34	B20
5960-99-000-1898	4J35	B20
5960-99-000-1914	4J31	B20
5960-99-000-1916	4J33	B20
5960-99-000-1923	BS810	B11
5960-99-000-1949	6D4	D7
5960-99-000-1994	ACT9B	A6
5960-99-000-2012	QS1209/5651	D31
5960-99-000-2109	BT89	D7
5960-99-000-2124	BK484/5552A	D6
5960-99-000-2130	C1108	A9
		D14
5960-99-000-2131	C1112	A9
		D14
5960-99-000-2138	GM4	D34
5960-99-000-2139	EHM2S	D34
5960-99-000-2157	BS710	B8
5960-99-000-2159	BR153	†
5960-99-000-2160	A207	A12
		D5
5960-99-000-2161	K301	†
5960-99-000-2163	ACT28	A6, B5
5960-99-000-2164	K302	B18
5960-99-000-2167	BM1041	†
5960-99-000-2179	A2134	D16
5960-99-000-2181	BS104	B9
5960-99-000-2186	BM1031	B24
5960-99-000-2203	FX215	†
5960-99-000-2225	QS1200	D31
5960-99-000-2231	A2226	B5

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5960-99-000-2231	A2226	D15
5960-99-000-2261	BM1038	B25
5960-99-000-2262	BM1039	B25
5960-99-000-2263	K305	†
5960-99-000-2273	K312	†
5960-99-000-2274	BS114	B13
5960-99-000-2281	M537A	B23
5960-99-000-2282	K308	†
5960-99-000-2284	4J50A	B26
5960-99-000-2285	BS702	B8
5960-99-000-2303	BS924	B9
5960-99-000-2304	K324	B19, D21
5960-99-000-2306	BS156	B11
5960-99-000-2307	BS158	B11
5960-99-000-2308	BS116	B13
5960-99-000-2309	BS118	B13
5960-99-000-2311	BS200	B11
5960-99-000-2312	BS202	B11
5960-99-000-2319	BM1006	B21
5960-99-000-2322	BR161	A6
		D10
5960-99-000-2323	BR179	A6
		D10
5960-99-000-2324	CR176	†
5960-99-000-2343	K335	B19
5960-99-000-2351	BS456	B9
5960-99-000-2362	M525	B21
5960-99-000-2363	M525	B21
5960-99-000-2364	M525	B21
5960-99-000-2365	M525	B21
5960-99-000-2366	M525	B21
5960-99-000-2367	M525	B21
5960-99-000-2368	M525	B21
5960-99-000-2376	M521	B24
5960-99-000-2377*	C1158	A9
		D14
5960-99-000-2378	BS718	B8
5960-99-000-2379	BS720	B8
5960-99-000-2381	N1034A	B19
		D23
5960-99-000-2383	5762	†
5960-99-000-2393	N1010A	B19
		D23
5960-99-000-2397	DET29	A11
		D15
5960-99-000-2399	GXU3	D5
5960-99-000-2412	M523	B26
5960-99-000-2416*	C1149/1	B5
		D14
5960-99-000-2423	BS730	B8
5960-99-000-2424	M549	B26
5960-99-000-2425	M539	B26
5960-99-000-2426	M529	B26
5960-99-000-2430	BS716	B8
5960-99-000-2453	A2521	D16

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5960-99-000-2456	SC1/350	C16
5960-99-000-2457	SC1/400	C16
5960-99-000-2458	SC1/600	C16
5960-99-000-2459	SC1/800	C16
5960-99-000-2460	SC1/1000	C16
5960-99-000-2461	SC1/1200	C16
5960-99-000-2462	SC1/1400	C16
5960-99-000-2463	2269Y	B34
5960-99-000-2473	M538A	B26
5960-99-000-2481	BS932	B9
5960-99-000-2482	BS838	B8
5960-99-000-2488	BS724 series	B8
5960-99-000-2494	K351	B18 D21
5960-99-000-2518	GXU2	D5
5960-99-000-2519	4CX250B	A10
5960-99-000-2520	8503	B6 D8
5960-99-000-2673	AH205/857B	D5
5960-99-000-2723	AH213	†
5960-99-000-2736	3C24 (in pairs)	A5 D10
5960-99-000-2744	4J34	B20
5960-99-000-2774	68504	†
5960-99-000-2775	68506	D5
5960-99-000-2797	C178A/5894	A9 D14
5960-99-000-2799	C1134	A9 D14
5960-99-000-2852	2J56	†
5960-99-000-2858	3B24W	A12 D5
5960-99-000-2868	AFX203	D7
5960-99-000-2871	BW140	A7 D11
5960-99-000-2872	BW153	A7 D11
5960-99-000-2902	GX402	†
5960-99-000-2957	5557	D7
5960-99-000-2993	8503	B6 D8
5960-99-000-3521	FX229	†
5960-99-000-3528	M513A	B24
5960-99-000-3540	8503	B6 D8
5960-99-000-3543	4D32	A9 D14
5960-99-000-3560	2J51A	B23
5960-99-000-3611	5586	B20
5960-99-000-3629*	FX227	B6 D8
5960-99-000-3676	2J42	B23
5960-99-000-3789	5842	D16
5960-99-000-3840	BS462	B11
5960-99-000-3926	BR1165	A6

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5960-99-000-3926	BR1165	D10
5960-99-000-3958	5657	B20
5960-99-000-3982	M506A	B24
5960-99-000-3997	M513B	B24
5960-99-000-4020	0A2WA	D31
5960-99-000-4028	0B2WA	D31
5960-99-000-4048	QS1212	D31
5960-99-000-4052	QS1202	†
5960-99-000-4053	QS1203	D31
5960-99-000-4054	QS1213	D31
5960-99-000-4079	A2293	D16
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5960-99-000-4107	A2913	D16
5960-99-000-4120	A2975	D16
5960-99-000-4515	K337	B19
5960-99-000-5008	6080	D16
5960-99-000-5018	4J52A	B25
5960-99-000-5023	AFX234	D7
5960-99-000-5027	5559	D7
5960-99-000-5031	M548	†
5960-99-000-5060	Z759	D16
5960-99-000-5130	K337	B19
5960-99-000-5134	2J51A	B23
5960-99-000-5135	6027	B24
5960-99-000-5141	BT95	D7
5960-99-000-5167	BM1040	B25
5960-99-000-5173	QS1215	D31
5960-99-000-5730	K337	B19
5960-99-000-6008	24B1	D31
5960-99-037-0335	C1134	A9 D14
5960-99-037-2063	BR189	A6 D10
5960-99-037-2070	KT88	A12 D16
5960-99-037-2081	BS502	B17
5960-99-037-2083	FX227	B6 D8
5960-99-037-2084	ZT1011	D7
5960-99-037-2089	BR1162	A6 D10
5960-99-037-2097	A2599	D16
5960-99-037-2101	K342	B18
5960-99-037-2118	8503	B6 D8
5960-99-037-2119	N1034S	B19 D23
5960-99-037-2120	N1010S	B19 D23
5960-99-037-2156	CX1140	B6 D8
5960-99-037-2162	BS834	B8
5960-99-037-2221	C1158	A9

Type to be replaced	EEV/M-OV replacement	Page no
5960-99-037-2221	C1158	D14
5960-99-037-2231	CX1191	B6 D8
5960-99-037-2238	5762	†
5960-99-037-2254	0A2WA	D31
5960-99-037-2268	0B2WA	D31
5960-99-037-2288	ACT28A	A6, B5
5960-99-037-2297	BS310	B13
5960-99-037-2332	6861	B28
5960-99-037-2361	N1045M	B28
5960-99-037-2368	BS732	B8
5960-99-037-2398	A2913	D16
5960-99-037-2432	BS836	B8
5960-99-037-2563	N1016M	B28
5960-99-037-2902	3073Q	B34
5960-99-037-2909	N1017M	B28
5960-99-037-2961	E702A	B33
5960-99-037-2964	BS510	B17
5960-99-037-2968	M537A	B23
5960-99-037-3112	M569P	B21
5960-99-037-3120	BS840	B8
5960-99-037-3124	DET29M	A11 D15
5960-99-037-3159	DET22	A11 D15
5960-99-037-3162	DET22D	A11 D15
5960-99-037-3164	C1136	A9 D14
5960-99-037-3172	N1033	A17
5960-99-037-3176	GXU6	D5
5960-99-037-3195	K359	B18 D21
5960-99-037-3196	E702B	†
5960-99-037-3200	BS204	B9
5960-99-037-3201	BS286	B9
5960-99-037-3212	A292	B5
5960-99-037-3213	M570W	B21
5960-99-037-3214	M569W	B21
5960-99-037-3215	M579	B21
5960-99-037-3263	A207	A12 D5
5960-99-037-3273	C1158	A9 D14
5960-99-037-3279	C1134	A9 D14
5960-99-037-3334	N1042M	B28
5960-99-037-3335	C1134X	†
5960-99-037-3370	0A2	D31
5960-99-037-3371	0B2	D31
5960-99-037-3377	0A2WA	D31
5960-99-037-3393	CR192A	A10 D13
5960-99-037-3466	TT21	A9
5960-99-037-3472	3073Q	B34

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5960-99-037-3474	GXB160	D34
5960-99-037-3500	BS390	B9
5960-99-037-3518	BS714	B8
5960-99-037-3523	T989D	B35
5960-99-037-3584	C1149/1	B5 D14
5960-99-037-3590	BS440	B11
5960-99-037-3736	8356	B24
5960-99-037-3749	SC5/6000	C16
5960-99-037-3828	CX1140	B6 D8
5960-99-037-3829	4CX250B	A10
5960-99-037-3996	BR1160	A6 D10
5960-99-037-4032	OC2	D31
5960-99-037-4037	M566W	B21
5960-99-037-4038	M570B	B21
5960-99-037-4039	M569B	B21
5960-99-037-4063	P831	C7
5960-99-037-4077	K391A	B18
5960-99-037-4166	KY366CD/T	A21
5960-99-037-4188*	M577B	B20
5960-99-037-4189	M595B	B20
5960-99-037-4192	N1047M	B28
5960-99-037-4242	QSC5/6800	C16
5960-99-037-4367	CX1159	B6 D8
5960-99-037-4407	T963Z	B35
5960-99-037-4556	24B9	D31
5960-99-037-5558	AW21-80	D25
5960-99-037-4602	BR1161	A6 D10
5960-99-037-4603	BS816	B12
5960-99-037-4627	4CX10,000D	A10 D13
5960-99-037-4671	E713B	B33
5960-99-037-4672	K3007	B18
5960-99-037-4673	M5005	B24
5960-99-037-4688	BS390	B9
5960-99-037-4689	BS426	B9
5960-99-037-4690	BS430	B9
5960-99-037-4952	BS814	B12
5960-99-037-5016	K3101	†
5960-99-037-5146	4J52A	B25
5960-99-037-5171	K391	B18
5960-99-037-5177	M577B	B20
5960-99-037-5295	BR1122	A6 D10
5960-99-037-5320	C1166	B5 D14
5960-99-037-5321	8626	C6
5960-99-037-5406	K3102M	†
5960-99-037-5426*	N1034S	B19 D23
5960-99-037-5439	BS818	B12

Type to be replaced	EEV/M-OV replacement	Page no
5960-99-037-5440	BS826	B12
5960-99-037-5616	M599B	B23
5960-99-037-5879	P863	C7
5960-99-037-5940	M5035	B20
5960-99-037-6033	CX1157	B7 D9
5960-99-037-6044	SC6/5000	C16
5960-99-037-6045	SC6/7000	C16
5960-99-037-6046	SC6/10000	C16
5960-99-037-6047	SC6/14000	C16
5960-99-038-0134	TWJ30	B28
5960-99-038-0248	BS834	B8
5960-99-038-0259	SC7/15000	C16
5960-99-038-0260	SC7/E/14000	C16
5960-99-038-0328	BS968	B12
5960-99-038-0329	BS974	B12
5960-99-038-0340	BS912	B8
5960-99-038-0456	YD1400	D16
5960-99-038-0505	BS800	B9
5960-99-038-0529	BS960	B12
5960-99-038-0612	SC7/E/15000	C16
5960-99-118-0160	CX1180	B7 D9
5960-99-118-0680	M5032Q	B22
5960-99-118-0681	M5033Q	B22
5960-99-118-0722	1424A/G1	D24
5960-99-118-0723	1446A/G1	D24
5960-99-118-0737	BS876	B8
5960-99-118-1205	1474B	D24
5960-99-118-1555	N1038	A19
5960-99-118-1616	8541	C6
5960-99-118-1689	5CX1500A	A11 D13
5960-99-118-1690	4CX35,000C	A10 D13
5960-99-118-1754	TWX22	A19 B29
5960-99-118-1763	FX2517	B6 D8
5960-99-118-1819	1074H	D25
5960-99-118-1922	P831S	†
5960-99-118-2205	FX2518	†
5960-99-118-2274	724E	D24
5960-99-118-2536	1496B	D24
5960-99-118-2853	BS386	B14
5960-99-118-3526	M5083A	B20
5960-99-118-3769	D3a	A12 D16
5960-99-196-4635	K3080	B19
5960-99-522-3862	UFC100/30/120J	A16 D20
5960-99-527-9185	TWX34	A19 B29
5960-99-711-9597	M569Q	B21
5960-99-714-5244	6027H	B24

Type to be replaced	EEV/M-OV replacement	Page no
5960-99-714-5521	6027	B24
5985-99-519-7065	BS804	B13
5985-99-519-7066	BS802	B13
6027	6027	B24
6027H	6027H	B24
6031	5559	D7
6073	0A2WA	D31
6074	0B2	D31
6080	6080	D16
6080WA	6080WA	D16
6093	CV4005	A12
6130	FX227	B6 D8
6155*	C1108	A9 D14
6156*	C1112	A9 D14
6166*	6166A	A10 D13
6166A	CR192A	A10 D13
	6166A	A10 D13
6198	7735A	C7
6240-99-996-4114	XL615/4/3	D30
6252*	C1134	A9 D14
6268/4C35	FX2505	B6 D8
6279/5C22	8503	B6 D8
6279A	8503	B6 D8
6326	7038	C7
6346*	BK448/5551A	D6
6347*	BK484/5552A	D6
6348*	BK486/5553B	D6
6354	QS1200	D31
6421*	BR1124	A6 D10
6511*	BK5822A	D6
6512*	BK44/5554	D6
6513*	BK46/5555	D6
6522	8503	B6 D8
6550	KT88	A12 D16
6587	6587	B6 D8
6587A	6587	B6 D8
6626*	0A2WA	D31
6627*	0B2WA	D31
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6861	6861	B28
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6972	M575	B25
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7007	6166A	A10 D13
7021	BK448/5551A	D6
7028	M599B	B23
7031	BK484/5552A	D6
7034	4CX250B	A10
7038	7038	C7
7041	BK486/5553B	D6
7092	B1153	A5 D10
7182	7182	B21
7226*	7262A	C7
7226A*	P831	C7
7237	BR1162	A6 D10
7262A	7262A	C7
7290	P8034	C7
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7293	P875	C10
7293A	P875	C10
7293A/E	P875	C10
7293B	P875	C10
7294	P874	C10
7294/E	P874	C10
7295	7295C	C10
7295/E	7295C	C10
7295B	7295C	C10
7295B/E	7295C	C10
7295C	7295C	C10
7325	7735A	C7
7381	BS918	B11
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7671	BK494/7671	D6
7672	BK5822A	D6
7673	BK486/5553B	D6
7681	BK544	D6
7697	7735A	C7
7703	7703	D6
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8168	4CX1000A	A10 D13
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8349	4CX35,000C	A10 D13
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8360*	BK492/7669	D6

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8424	8503	B6 D8
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8503	8503	B6 D8
8507	8507	C6
8507A	8507A	C6
8521	8521	C9
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8803	FX2505	B6 D8
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9677P	P849D	C6
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9677SC	8541A	C6

* † Please refer to page E1.

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9728D	P8031F	†
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9812PA	8541	C6
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10667B*	7735B	C7
10667F*	7038	C7
10667G	7735A	C7
10667M	P826/4478	C7
10667S	7735A	C7
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55850*	7038	C7
55850F	P844	C6
55850N	8541	C6
55850S	8541A	C6
55875	P8000	C5
55875B	P8000B	C5
55875G	P8000G	C5
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A292	A292	B5
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ACT14*	BR140	A6 D10
ACT25	ACT25	A6 B5
ACT27	ACT27	A6
ACT28	ACT28	A6 B5
ACT28A	ACT28A	A6 B5
ACT70	BR1160	A6 D10
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AFX203	AFX203	D7
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AG866A	GU12	D5
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AG5210	0B2	D31
AG5211	0A2	D31
AH201	GU12	D5
AH205	AH205/857B	D5
AH205/857B	AH205/857B	D5
AH211	AH211A	D5
AH211A	AH211A	D5
AH221	AH221	D5
AH238	AH238	D5
AH2511	AH2511	D5
AJ5551	BK448/5551A	D6
AJ5552	BK484/5552A	D6
AJ6346*	BK448/5551A	D6
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AX4-250A/5D22*	C1112	A9 D14
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AX9904	BW1165	A7 D11
AX9904R	BR1165	A6 D10
AX9907R	ACS4	A10
AX9910*	C1134	A9 D14
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BK44	BK44/5554	D6
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BK178	BK488	D6
BK194	BK496	D6
BK394	BK394	D6
BK416	7703	D6
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BK428	BK472	D6

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BK442	BK492/7669	D6
BK442/7669	BK492/7669	D6
BK444	BK494/7671	D6
BK444/7671	BK494/7671	D6
BK448/5551A	BK448/5551A	D6
BK472	BK472	D6
BK474	BK474	D6
BK476	BK476	D6
BK482	BK482	D6
BK484	BK484/5552A	D6
BK484/5552A	BK484/5552A	D6
BK486	BK486/5553B	D6
BK486/5553B	BK486/5553B	D6
BK488	BK488	D6
BK492/7669	BK492/7669	D6
BK494/7671	BK494/7671	D6
BK496	BK496	D6
BK500	BK500	D6
BK502	BK502	D6
BK542/1081	BK502	D6
BK544	BK544	D6
BK5822A	BK5822A	D6
BL27	BS918	B11
BLT088	BS192	B11
BLT119	BS110	B9
BM25LB	BM25LB	D22
BM25LC	BM25LC	D22
BM25LD	BM25LD	D22
BM1001	M5015	D22
BM1001A	M5015	D22
BM1002	BM1002	B24
BM1003	BM1003	B21
BM1004	BM1004	B21
BM1005	BM1005	B21
BM1006	BM1006	B21
BM1026	BM1026	B24
BM1027	BM1027	B24
BM1028	BM1028	B24
BM1029	BM1029	B24
BM1030	BM1030	B24
BM1031	BM1031	B24
BM1032	BM1032	B25
BM1033	BM1033	B25
BM1034	BM1034	B25
BM1035	BM1035	B25
BM1036	BM1036	B25
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BM1038	BM1038	B25
BM1039	BM1039	B25
BM1040	BM1040	B25
BPF1	BPF1	A22
BR140	BR140	A6
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BR161	BR161	A6

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		D10
BR189	BR189	A6
		D10
BR194	BR194	A6
		D10
BR1102	BR1102	A6
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BR1106	BR1106	A6
		D10
BR1121	BR1121	A6
		D10
BR1122	BR1122	A6
		D10
BR1124	BR1124	A6
		D10
BR1126	BR1126	A6
		D10
BR1131A	BR1131A	A6
		D10
BR1143	BR1143	A6
		D10
BR1151*	BR1161	A6
		D10
BR1160	BR1160	A6
		D10
BR1161	BR1161	A6
		D10
BR1162	BR1162	A6
		D10
BR1165	BR1165	A6
		D10
BR1167	BR1167	A6
		D10
BR1169	BR1181	A6
		D10
BR1181	BR1181	A6
		D10
BR1182	BR1182	A6
		D10
BR1183	BR1183	A6
		D10
BR1195	BR1195	A6
		D10
BR1196	BR1196	A6
		D10
BR1512	BR1512	A6
		D10
BR1512A	BR1512A	A6
		D10
BS48	BS48	B13
BS52	BS52	B11
BS52A	BS52A	B11
BS58	BS58	B9

Type to be replaced	EEV/M-OV replacement	Page no
BS60	BS60	B13
BS66	BS66	B14
BS70	BS70	B13
BS78	BS78	B13
BS80	BS80	B13
BS82	BS82	B13
BS84	BS84	B13
BS90	GXA95	D34
BS92	BS92	B13
BS100	DA100	A5
BS104	BS104	B9
BS108	BS108	B12
BS110	BS110	B9
BS114	BS114	B13
BS116	BS116	B13
BS118	BS118	B13
BS120	BS120	B13
BS122	BS122	B12
BS128	BS128	B8
BS130	BS130	B12
BS132	BS132	B12
BS138	BS138	B8
BS148	BS148	B13
BS156	BS156	B11
BS158	BS158	B11
BS162	BS162	B12
BS166	BS166	B13
BS168	BS168	B14
BS170	BS170	B9
BS172	BS172	B9
BS180	BS180	B10
BS190	BS190	B10
BS192	BS192	B11
BS194	BS194	B9
BS196	BS196	B11
BS200	BS200	B11
BS202	BS202	B11
BS204	BS204	B9
BS206	BS206	B12
BS208	BS208	B13
BS216	BS216	B12
BS220	BS220	B10
BS224	BS224	B10
BS228	BS228	B11
BS248	BS248	B13
BS254	BS254	B12
BS256	BS256	B12
BS258	BS258	B12
BS264	BS264	B12
BS286	BS286	B9
BS306	BS306	B14
BS310	BS310	B13
BS314	BS314	B11
BS316	BS316	B11
BS324	BS324	B9

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Type to be replaced	EEV/M-OV replacement	Page no
BS332	BS810	B11
BS338	BS338	B13
BS340	BS340	B14
BS342	BS342	B14
BS344	BS344	B14
BS384	BS384	B14
BS386	BS386	B14
BS390	BS390	B9
BS392	BS392	B13
BS402	BS402	B13
BS412	BS412	B13
BS426	BS426	B9
BS430	BS430	B9
BS440	BS440	B11
BS450	BS450	B11
BS452	BS452	B11
BS456	BS456	B9
BS460	BS460	B13
BS462	BS462	B11
BS466	BS466	B11
BS470	GXE30	D34
BS500	BS500	B12
BS502	BS502	B17
BS506	BS510	B17
BS510	BS510	B17
BS512	BS512	B17
BS514	BS514	B17
BS516	BS516	B17
BS524	BS524	B17
BS528	BS528	B17
BS534	BS534	B17
BS536	BS536	B17
BS538	BS538	B17
BS540	BS540	B17
BS546	BS546	B17
BS582	BS582	B16
BS598	BS598	B16
BS600	BS600	B17
BS602	BS602	B17
BS604	BS604	B14
BS606	BS606	B14
BS608	BS608	B16
BS610	BS610	B15
BS610A	BS610A	B15
BS610B	BS610B	B15
BS610C	BS610C	B15
BS614	BS614	B17
BS616	BS616	B16
BS620	BS620	B14
BS624	BS624	B16
BS628	BS628	B14
BS630	BS630	B16
BS632	BS632	B14
BS636	BS636	B14
BS638	BS638	B14

Type to be replaced	EEV/M-OV replacement	Page no
BS640	BS640	B15
BS642	BS642	B14
BS644	BS644	B15
BS646	BS646	B15
BS648	BS648	B15
BS650	BS650	B15
BS652	BS652	B14
BS658	BS658	B15
BS660	BS660	B15
BS662	BS662	B15
BS674	BS674	B15
BS676	BS676	B15
BS678	BS678	B15
BS684	BS684	B14
BS690	BS690	B15
BS692	BS692	B15
BS696	BS696	B14
BS698	BS698	B15
BS702	BS702	B8
BS708	BS708	B8
BS710	BS710	B8
BS714	BS714	B8
BS716	BS716	B8
BS718	BS718	B8
BS720	BS720	B8
BS724	BS724	B8
BS726	BS726	B8
BS728	BS728	B8
BS730	BS730	B8
BS732	BS732	B8
BS742	BS742	B16
BS748	BS748	B16
BS750	BS750	B15
BS752	BS752	B15
BS758	BS758	B15
BS762	BS762	B15
BS764	BS764	B15
BS800	BS800	B9
BS802	BS802	B13
BS804	BS804	B13
BS806	BS806	B14
BS810	BS810	B11
BS812	BS812	B12
BS814	BS814	B12
BS816	BS816	B12
BS818	BS818	B12
BS820	BS820	B12
BS822	BS822	B11
BS824	BS824	B9
BS826	BS826	B12
BS828	BS828	B12
BS830	BS830	B12
BS832	BS832	B9
BS834	BS834	B8
BS836	BS836	B8

Type to be replaced	EEV/M-OV replacement	Page no
BS838	BS838	B8
BS840	BS840	B8
BS842	BS842	B11
BS844	BS844	B12
BS846	BS846	B9
BS848	BS848	B9
BS850	BS450	B11
BS852	BS852	B9
BS854	BS854	B14
BS856	BS856	B10
BS858	BS858	B10
BS860	BS860	B11
BS864	BS864	B13
BS870	BS870	B8
BS872	BS872	B8
BS876	BS876	B8
BS880	BS880	B8
BS882	BS882	B12
BS886	BS886	B12
BS888	BS888	B14
BS892	BS892	B11
BS894	BS894	B9
BS896	BS896	B12
BS904	BS904	B9
BS908	BS908	B12
BS910	BS910	B8
BS912	BS912	B8
BS914	BS914	B11
BS916	BS916	B9
BS918	BS918	B11
BS924	BS924	B9
BS928	BS928	B11
BS930	BS930	B11
BS932	BS932	B9
BS940	BS940	B8
BS946	BS946	B9
BS950	BS950	B12
BS952	BS952	B12
BS956	BS956	B11
BS958	BS958	B12
BS960	BS960	B12
BS966	BS966	B10
BS968	BS968	B12
BS970	BS970	B11
BS974	BS974	B12
BS986	BS986	B8
BS990	BS990	B9
BT5	BT5	D7
BT17	BT17	D7
BT19	BT19	D7
BT29	BT29	D7
BT69	BT69	D7
BT79	FX227	B6
		D8
BT83	8503	B6

Type to be replaced	EEV/M-OV replacement	Page no
BT83	8503	D8
BT89	BT89	D7
BT95	BT95	D7
BTL6-1*	BR179	A6
		D10
	BR1106	A6
		D10
	BR1124	A6
		D10
BTL15-2*	BR161	A6
		D10
	BR1102	A6
		D10
BW140	BW140	A7
		D11
BW153	BW153	A7
		D11
BW179	BW179	A7
		D11
BW189	BW189	A7
		D11
BW194	BW194	A7
		D11
BW1102	BW1102	A7
		D11
BW1102J2	BW1102J2	A7
		D11
BW1121	BW1121	A7
		D11
BW1121J1	BW1121J1	A7
		D11
BW1121J2	BW1121J2	A7
		D11
BW1122	BW1122	A7
		D11
BW1124	BW1124	A7
		D11
BW1124J1	BW1124J1	A7
		D11
BW1124J2	BW1124J2	A7
		D11
BW1143	BW1143	A7
		D11
BW1143J2	BW1143J2	A7
		D11
BW1144	BW1144	A7
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BW1156	BW1156	A7
		D11
BW1162	BW1162	A7
		D11
BW1162J3	BW1162J3	A7
		D11
BW1165	BW1165	A7
		D11

Type to be replaced	EEV/M-OV replacement	Page no
BW1165J3	BW1165J3	A7
		D11
BW1169J3	BW1181J3	A7
		D11
3W1176J1	BW1176J1	A7
		D11
BW1176J2	BW1176J2	A7
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BW1181J3	BW1181J3	A7
		D11
BW1182J1	BW1182J1	A7
		D11
BW1182J2	BW1182J2	A7
		D11
BW1183J1	BW1183J1	A7
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BW1183J2	BW1183J2	A7
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BW1184J2	BW1184J2	A7
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BW1185J2	BW1185J2	A7
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BW1186J2	BW1186J2	A7
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BW1195	BW1195	A7
		D11
BW1195J3	BW1195J3	A7
		D11
BW1196	BW1196	A7
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BW1196J3	BW1196J3	A7
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BW4027	BW4027	A7
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BW4028	BW4028	A7
		D11
BW4029	BW4029	A7
		D11
BW4034	BW4034	A7
		D11
BW4035	BW4035	A7
		D11
BW4050	BW4050	A7
		D11
BW4070	BW4070	A7
		D11
BW4088A	BW4088A	A7
		D11
BW4088B	BW4088B	A7
		D11
BWS1	BWS1	B19
BWS2	BWS2	B19
BWX5	BWX5	B19
BY189A	BY189A	A8
		D12

Type to be replaced	EEV/M-OV replacement	Page no
BY194	BY194	A8
		D12
BY1102	BY1102	A8
		D12
BY1121	BY1121	A8
		D12
BY1122	BY1122	A8
		D12
BY1124	BY1124	A8
		D12
BY1143	BY1143	A8
		D12
BY1144	BY1144	A8
		D12
BY1144L	BY1144L	A8
		D12
BY1151*	BY1161	A8
		D12
BY1156	BY1156	A8
		D12
BY1161	BY1161	A8
		D12
BY4030	BY4030	A8
		D12
BY4031	BY4031	A8
		D12
BY4032	BY4032	A8
		D12
BY4033	BY4033	A8
		D12
BY4036	BY4036	A8
		D12
BY4037	BY4037	A8
		D12
BY4038	BY4038	A8
		D12
BY4038A	BY4038A	A8
		D12
BY4039	BY4039	A8
		D12
BY4048A	BY4048A	A8
		D12
BY4049	BY4049	A8
		D12
BY4059	BY4059	A8
		D12
BY4060	BY4060	A8
		D12
BY4063	BY4063	A8
		D12
BY4064	BY4064	AC
		D12
BY4093	BY4093	A8
		D12
C1A*	AFX203	D7

* † Please refer to page E1.

Type to be replaced	EEV/M-OV replacement	Page no
C3J	ZT1011	D7
C3JA	ZT1011	D7
C102A	P8031	†
C103B	8541A	C6
C104B	P844	C6
C105A	P8031Z	†
C178A	C178A/5894	A9 D14
C178A/5894	C178A/5894	A9 D14
C910/2325	3069R	B34
C932*	7735A	C7
C933*	7038	C7
C960	P874	C10
	P875	C10
C962	P874	C10
C1108	C1108	A9 D14
C1111*	C1150/1	B5 D14
C1112	C1112	A9 D14
C1123	4D32	A9 D14
C1133*	C1149/1	B5 D14
C1134	C1134	A9 D14
C1136	C1136	A9 D14
C1148	C1148	B5 D14
C1149	C1149/1	B5 D14
C1149/1	C1149/1	B5 D14
C1150	C1150/1	B5 D14
C1150/1	C1150/1	B5 D14
C1158	C1158	A9 D14
C1166	C1166	B5 D14
C9132A	P8031	†
C9133A	P8031	†
C9138A	P8031	†
CAS1	CAS1	A10 D13
CAT6	BW140	A7 D11
CAT9	BW153	A7 D11
CAT100	CAT100	A7 D11

Type to be replaced	EEV/M-OV replacement	Page no
CCS1	CCS1	A9
CCS2	CCS2	A9
CCS3	YL1550	A9
CE309	5557	D7
CFDP2000	UFC2000/8/ 125J	A16 D20
CFED450	UFC450/12/ 125J	A16 D20
	UFC450/15/ 125J	A16 D20
CFED500	UFC500/12/ 125J	A16 D20
	UFC500/15/ 125J	A16 D20
CFED1000	UFC1000A/12/ 125J	A16 D20
	UFC1000A/15/ 125J	A16 D20
CFHD100	UFC100/30/ 120J	A16 D20
CFHE6.5	UFC6/30/140J	A16 D20
CFHE12	UFC12/30/140J	A16 D20
CFHE18.5	UFC18/30/140J	A16 D20
CFHE34	UFC34/30/140J	A16 D20
CFHE40	UFC40/30/140J	A16 D20
CFHE50	UFC50/30/140J	A16 D20
CIC4	WGI6100	A23
CIC5	WGI9050	A23
CIC6	WGI9050	A23
CIC7	WGI9020	A23
CIC8	WGI9020	A23
CIC9	WGI9020	A23
CIC10	WGI9020	A23
CIC39	WGI9020	A23
CIC40	WGI9020	A23
CIC41	WGI9020	A23
CIC42	WGI7100	A23
CIC43	WGC2100	A25 B32
CIC44	WGC2100	A25 B32
CIC45	WGC2100	A25 B32
CIS14	3CC115SA	A23 B31
CIS15	3CC120SB	A23 B31
CIS16	3CC115SC	A23 B31

Type to be replaced	EEV/M-OV replacement	Page no
CIS17	3CC120SD	A23 B31
CIS18	3CC115SA	A23 B31
CIS19	3CC120SB	A23 B31
CIS20	3CC115SC	A23 B31
CIS21	3CC120SD	A23 B31
CIS23	5CC1151	A24 B32
CIS24	5CC1152	A24 B32
CIS27	3CC115SG	A23 B31
CIS28	3CC120SH	A23 B31
CIS29	3CC115SA	A23 B31
CIS30	3CC120SB	A23 B31
CIS37	3CC120SK	A23 B31
CIX38	WGC4100	A25 B32
CIX48	WGC4100	A25 B32
CMV1-400	UCM400/5/25	A14 D18
CMV1-500	UCM500/5/25	A14 D18
CO43*	N1010	B19 D23
CO119*	N1034	B19 D23
CQL5-1	4CX5000A	A10 D13
CR192	CR192A	A10 D13
CR192A	CR192A	A10 D13
CR1501	CR1501	A10 D13
CR1502	CR1502	A10 D13
CT1-500	BT19	D7
CT1-2500	5559	D7
CV5	AH221	D5
CV28	ACT9	A6
CV32	GU12	D5
CV45	S130P	D31
CV120A	BM1014	†
CV120B	BM1015	†
CV120C	BM1016	†

Type to be replaced	EEV/M-OV replacement	Page no
CV187	U19	A12
CV188	QS92/10	†
CV273	DET22	A11 D15
CV284	QS75/20	D31
CV286	QS95/10	D31
CV287	QS150/15	D31
CV294	BS710	B8
CV345	12E1	A12 D16
CV354	DET23	A11 D15
CV372	FX227	B6 D8
CV395	QS150/45	D31
CV397	DET24	A11 D15
CV402	GXA80	D34
CV422	QS108/45	D31
CV427	C1150/1	B5 D14
CV429 (Tri)	3069M	B34
CV434	QS75/60	D31
CV436	ACT25	A6 B5
CV449	QS1209/5651	D31
CV460	BS48	B13
CV461	BS92	B13
CV462	BS84	B13
CV463	BS82	B13
CV482	A237	A12 D5
CV488	GXA95	D34
CV513	4J53	B20
CV532	AH211A	D5
CV789	3C24	A5 D10
CV1067	L63	D16
CV1075	KT66	A12 D16
CV1128	GT1C	D7
CV1144	BT19	D7
CV1147	BT5	D7
CV1219	DA100	A5
CV1252	V1505	A5
CV1435	AH221	D5
CV1475	CV1475	B22
CV1476	CV1476	B22
CV1477	CV1477	B22
CV1478	CV1478	B22
CV1479	CV1479	B22
CV1480	CV1480	B22
CV1481	CV1481	B22
CV1482	CV1482	B22
CV1483	CV1483	B22

Type to be replaced	EEV/M-OV replacement	Page no
CV1484	CV1484	B22
CV1485	CV1485	B22
CV1486	CV1486	B22
CV1619	V1505	A5
CV1629	AH238	D5
CV1742	BK44/5554	D6
CV1743	GXA60	D34
CV1747	M505	B24
CV1787	FX2505	B6 D8
CV1832	0A2	D31
CV1833	0B2	D31
CV1835	GXU1	D5
CV1841	BS52	B11
CV1858	GXA130	D34
CV1866	2J42	B23
CV1881	BS384	B14
CV1892*	K3033	B18 D21
CV1897	4J34	B20
CV1898	4J35	B20
CV1914	4J31	B20
CV1916	4J33	B20
CV1923	BS810	B11
CV1932	L63	D16
CV1949	6D4	D7
CV1994	ACT9B	A6
CV2012*	QS1209/5651	D31
CV2109	BT89	D7
CV2124	BK484/5552A	D6
CV2130	C1108	A9 D14
CV2131	C1112	A9 D14
CV2138	GM4	D34
CV2139	EHM2S	D34
CV2157	BS710	B8
CV2160	A207	A12 D5
CV2163	ACT28	A6 B5
CV2164	K302	B18
CV2171	A2087	D15
CV2179	A2134	D16
CV2181	BS104	B9
CV2186	BM1031	B24
CV2203	FX215	†
CV2225	QS1200	D31
CV2231	A2226	B5 D15
CV2261	BM1038	B25
CV2262	BM1039	B25
CV2274	BS114	B13
CV2281	M537A	B23
CV2284	4J50A	B26

Type to be replaced	EEV/M-OV replacement	Page no
CV2285	BS702	B8
CV2303	BS924	B9
CV2304	K324	B19 D21
CV2306	BS156	B11
CV2307	BS158	B11
CV2308	BS116	B13
CV2309	BS118	B13
CV2311	BS200	B11
CV2312	BS202	B11
CV2319	BM1006	B21
CV2322	BR161	A6 D10
CV2323	BR179	A6 D10
CV2341	CV2341	D15
CV2343	K335	B19
CV2351	BS456	B9
CV2362	M525	B21
CV2363	M525	B21
CV2364	M525	B21
CV2365	M525	B21
CV2366	M525	B21
CV2367	M525	B21
CV2368	M525	B21
CV2376	M521	B24
CV2377*	C1158	A9 D14
CV2378	BS718	B8
CV2379	BS720	B8
CV2381	N1034A	B19 D23
CV2393	N1010A	B19 D23
CV2394	DA42	A5
CV2397	DET29	A11 D15
CV2398	CV2398	D15
CV2399	GXU3	D5
CV2412	M523	B26
CV2416*	C1149/1	B5 D14
CV2424	M549	B26
CV2425	M539	B26
CV2426	M529	B26
CV2430	BS716	B8
CV2453	CV2453	D16
CV2456	SC1/350	C16
CV2457	SC1/400	C16
CV2458	SC1/600	C16
CV2459	SC1/800	C16
CV2460	SC1/1000	C16
CV2461	SC1/1200	C16
CV2462	SC1/1400	C16
CV2463	2269Y	B34

* † Please refer to page E1.

Type to be replaced	EEV/M-OV replacement	Page no
CV2473	M538A	B26
CV2481	BS932	B9
CV2482	BS838	B8
CV2488	BS724 series	B8
CV2494	K351	B18
		D21
CV2518	GXU2	D5
CV2520	8503	B6
		D8
CV2673	AH205/857B	D5
CV2736	3C24 (in pairs)	A5
		D10
CV2744	CV2744	B20
CV2775	68506	D5
CV2797	C178A/5894	A9
		D14
CV2799	C1134	A9
		D14
CV2815	GXU2	D5
CV2826	BS914	B11
CV2858	3B24W	A12
		D5
CV2868	AFX203	D7
CV2871	BW140	A7
		D11
CV2872	BW153	A7
		D11
CV2957	5557	D7
CV2984	6080	D16
CV2993	8503	B6
		D8
CV3521	FX2519A/ 5949A	B6
		D8
CV3528	M513A	B24
CV3540*	8503	B6
		D8
CV3543	4D32	A9
		D14
CV3560	2J51A	B23
CV3611	5586	B20
CV3629*	FX227	B6
		D8
CV3676	2J42	B23
CV3789	CV3789	D16
CV3840	BS462	B11
CV3926	BR1165	A6
		D10
CV3958	5657	B20
CV3982	M506A	B24
CV3997	M513B	B24
CV4005	CV4005	A12
CV4020	0A2WA	D31
CV4028	0B2WA	D31
CV4048	QS1212	D31
CV4053	QS1203	D31

Type to be replaced	EEV/M-OV replacement	Page no
CV4054	QS1213	D31
CV4062	CV4062	D16
CV4079	A2293	D16
CV4080	75C1	D31
CV4082	A2426	B5
		D15
CV4100	0A2WA	D31
CV4101	0B2WA	D31
CV4107	A2913	D16
CV4120	A2975	D16
CV4515	K337	B19
CV5008	6080WA	D16
CV5018	4J52A	B25
CV5023	AFX234	D7
CV5027	5559	D7
CV5060	Z759	D16
CV5083*	QS75/20	D31
CV5130	K337	B19
CV5134	2J51A	B23
CV5135	6027	B24
CV5141	BT95	D7
CV5167	BM1040	B25
CV5173	QS1215	D31
CV5207	1B59	D30
CV5218	BR189	A6
		D10
CV5219	ACS4	A10
CV5220	KT88	A12
		D16
CV5234	ZT1011	D7
CV5239	BR1162	A6
		D10
CV5242	A2599	D16
CV5247	FX2505	B6
		D8
CV5249	K3078/6975	B18
		D21
CV5285	QS1212	D31
CV5300*	2273D	B34
CV5326	ACT28A	A6
		B5
CV5362	6861	B28
CV5386	N1045M	B28
CV5398	BS732	B8
CV5400	CV5400	A11
		D15
CV5403	N1033	A17
CV5413	A2913	D16
CV5426	K350	†
CV5438	TWC5	A18
CV5458	DET22E	A11
		D15
CV5819	T957Y	B35
	3073Q	B34
CV5844	SC2/3000	C16

Type to be replaced	EEV/M-OV replacement	Page no
CV5877	E702A	B33
CV5956	DET22	A11
		D15
CV5959	C1136	A9
		D14
CV5962	DET22D	A11
		D15
CV5968	GXU6	D5
CV5985	K359	B18
		D21
CV5987	E702B	†
CV5990	BS204	B9
CV5991	BS286	B9
CV5998	A292	B5
CV6003	K342	B18
CV6005	BS502	B17
CV6007	FX227	B6
		D8
CV6008	24B1	D31
CV6022	8503	B6
		D8
CV6023	N1034S	B19
		D23
CV6024	N1010S	B19
		D23
CV6028	BS834	B8
CV6045	C1158	A9
		D14
CV6051	CX1191	B6
		D8
CV6065	SC1/1600	C16
CV6066	SC1/1800	C16
CV6067	SC1/2000	C16
CV6070	BS310	B13
CV6085	TWS6	B29
CV6086	BS836	B8
CV6091	A2900	D16
CV6098	N1016M	B28
CV6106	N1017M	B28
CV6107	BS510	B17
CV6108	M537A	B23
CV6110	BS840	B8
CV6113	T963D	B35
CV6117	TWS7	B29
CV6129	BS714	B8
CV6130	T989D	B35
CV6131	C1149/1	B5
		D14
CV6132	BS440	B11
CV6142	K391A	B18
CV6146	KY366C/T	A21
CV6147	KY366D/T	A21
CV6150	KY366CD/T	A21
CV6157	TWS6	B29
CV6167	T963Z	B35

Type to be replaced	EEV/M-OV replacement	Page no
CV6172	T989Z	B35
CV6173	24B9	D31
CV6178	BS816	B12
CV6179	TWS17	B28
CV6180	TWC18	B28
CV6181	TWX19	B28
CV6182	TWJ20	B28
CV6184	4CX10,000D	A10 D13
CV6192	BS814	B12
CV6194	K391	B18
CV6206	BS818	B12
CV6207	BS826	B12
CV6217	769H	B35
CV6229	1478E	B34 B35
CV6241	CX1157	B7 D9
CV6243	P863	C7
CV8002	M579	B21
CV8025	12E1	A12 D16
CV8026	DET23	A11 D15
CV8051	A207	A12 D5
CV8061	C1158	A9 D14
CV8062	GXU3	D5
CV8064	A2521	D16
CV8067	C1134	A9 D14
CV8082	Z759	D16
CV8089	A2293	D16
CV8114	7ABP7A	B34
CV8131	N1042M	B28
CV8161	0A2	D31
CV8162	0B2	D31
CV8168	0A2WA	D31
CV8198	5842	D16
CV8232	6080WA	D16
CV8244	CR192A	A10 D13
CV8286	TT21	A9
CV8293	T957Y	B35
	3073Q	B34
CV8295	4CX5000A	A10 D13
CV8296	GXB160	D34
CV8404	FX2519A/ 5949A	B6 D8
CV8505	8356	B24
CV8530	SC5/6000	C16
CV8563	CX1140	B6 D8

Type to be replaced	EEV/M-OV replacement	Page no
CV8671	GXK20	D34
CV8699	4CX10,000D	A10 D13
CV8730	BR1160	A6 D10
CV8733	A2087	D15
CV8766	0C2	D31
CV8774	GXU50	D34
CV8797	P831	C7
CV8904*	M577B	B20
CV8905	M595B	B20
CV8908	N1047M	B28
CV8960	QSC5	C16
CV8978	A2426	B5 D15
CV9006	GXU4	D5
CV9080	CX1159	B6 D8
CV9335	T957Z	B35
CV9335*	3069Q	B34
CV9343	BR1161	A6 D10
CV9422	E713B	B33
CV9423	K3007	B18
CV9424	M5005	B24
CV9442	BS390	B9
CV9443	BS426	B9
CV9444	BS430	B9
CV9492	K311	B18
CV9874	T957Y	B35
	3073Q	B34
CV9918	4CX1000A	A10 D13
CV10013	K3101	†
CV10210	M577B	B20
CV10332	6080	D16
CV10361	ACM3	A6
CV10368	BR1122	A6 D10
CV10369	ACS4	A10
CV10374	K3099	A21
CV10404	C1166	B5 D14
CV10470*	1478E	B34 B35
CV10570	K3102M	†
CV10611*	N1034S	B19 D23
CV10664	150C4	D31
CV10702*	AW21-80	D25
CV10703	T940R	C14
CV10704	T940B	C14
CV10705	T940G	C14
CV10757	F21-10LD	B34
CV10758	M599B	B23

Type to be replaced	EEV/M-OV replacement	Page no
CV10775	E280F	D16
CV10804	D3a	A12 D16
CV10813	A2975	D16
CV10888	T963S	B35
CV10948	T990Z	B35
CV10949	T989Z	B35
CV10951	T988Z	B35
CV10952	T988D	B35
CV11039	TWC14	A18
CV11106	5CX1500A	A11 D13
CV11107	4CX35,000C	A10 D13
CV11154	M5035	B20
CVCC2500	UC2500/5/60J	A15 D19
CVDD200	UC200/15/70	A15 D19
CVDD300	UC300/10/70J	A15 D19
CVDD1000	UC1000/8/ 125J	A15 D19
	UC1000/10 125J	A15 D19
CVDP1500	UC1500/8/ 125J	A15 D19
	UC1500/10/ 125J	A15 D19
CVDP2300	UC2300/10/ 125J	A15 D19
CVDP1000	UC1000/15/ 150J	A15 D19
CVDP1500	UC1500/15/ 150J	A15 D19
CVDP2000	UC2000/12/ 150J	A15 D19
CVFP250	UC250/25/125J	A15 D19
CVFP750	UC750/20/150J	A15 D19
CVFP1000	UC1000/20/ 150J	A15 D19
CVHP250	UC250/30/150J	A15 D19
CVHP450	UC450/30/150J	A15 D19
CVHP650	UC650/30/150J	A15 D19
CW1506J2	CW1506J2	A10 D13
CX1119	CX1140	B6 D8
CX1120	CX1191	B6 D8

* † Please refer to page E1.

Type to be replaced	EEV/M-OV replacement	Page no
CX1140	CX1140	B6 D8
CX1154	CX1154	B7 D9
CX1157	CX1157	B7 D9
CX1159	CX1159	B6 D8
CX1168	CX1168	B7 D9
CX1171	CX1171	B7 D9
CX1174	CX1174	B7 D9
CX1175	CX1175	B7 D9
CX1177	CX1177	B7 D9
CX1180	CX1180	B7 D9
CX1191	CX1191	B6 D8
CX1191A	CX1191A	B6 D8
CX1191D	CX1191D	B6 D8
CX1192	CX1192	B7 D9
CX1193	CX1193	B7 D9
CX1199	CX1199	B7 D9
CX1530	CX1530	B7 D9
CX1530D	CX1530D	B7 D9
CY1170J	CY1170J	A10 D13
CY1172	CY1172	A10 D13
CY4120	CY4120	A10 D13
D3a	D3a	A12 D16
D13-47GH	D13-47GH	D24
D13-47GM	D13-47GM	D24
DA42	DA42	A5
DA100	DA100	A5
DA100B	DA100B	A5
DCG4/1000G	GU12	D5
DCG4/5000*	AH221	D5
	AH238	D5
DCG6-18	AH2511	D5
DCX4/1000	GXU1	D5
DCX4/5000	GXU2	D5

Type to be replaced	EEV/M-OV replacement	Page no
DET22	DET22	A11 D15
DET22D	DET22D	A11 D15
DET22E	DET22E	A11 D15
DET22G	DET22G	A11 D15
DET22R	DET22R	A11 D15
DET22S	DET22S	A11 D15
DET23	DET23	A11 D15
DET24	DET24	A11 D15
DET29	DET29	A11 D15
DET29M	DET29M	A11 D15
DET40	DET40	A5
DET41	DET41	A5
DET42	DET42	A5
DQ2	GU12	D5
DQ4*	AH238	D5
DQ4a*	AH221	D5
DQ7*	AH205/857B	D5
DQ61*	AH2511	D5
DR857B*	AH205/857B	D5
DX2	GXU1	D5
E14-110GM	E14-110GM	D25
E36*	FX2517	B6 D8
E37B	FX2517	B6 D8
E38	FX2517	B6 D8
E125A*	C1108	A9 D14
E250A*	C1112	A9 D14
E280F	E280F	D16
E282F	E282F	D16
E702A	E702A	B33
E702E	E702E	B33 D28
E712A	E712A	B33
E713B	E713B	B33
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NL1061	BK492/7669	D6
NL1062	BK494/7671	D6
NL1063	BK482	D6
NL1068	BK5822A	D6
NL1081	BK502	D6
NL1082	BK544	D6
NL2408*	BK448/5551A	D6
NL5550	BK66/5550	D6
NL5553B	BK486/5553B	D6
NL7673	BK486/5553B	D6
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NV2441	BS838	B8
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OA2WA	OA2WA	D31
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Type to be replaced	EEV/M-OV replacement	Page no
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P810	7735A	C7
P811	7295C	C10
P811/E	7295C	C10
P813	7038	C7
P816*	P874 P875	C10 C10
P816/E*	P874 P875	C10 C10
P820	7038	C7
P822	7389C	C10
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P826	P826/4478	C7
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P831	P831	C7
P841	8507A	C6
P841X	P841X	C6
P842	8541A	C6
P842X	P842X	C6
P843	8572A	C6
P844	P844	C6
P846	8625	C6
P847	8626	C6
P848	8507	C6
P848D	P848D	C6
P849	8541	C6
P849D	P849D	C6
P850	P850	C11
P851	P875	C10
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P862*	P849D	C6
P863	P863	C7
P866	P866	C6
P872	P872	C10
P873	P873	C10
P874	P874	C10
P875	P875	C10

Type to be replaced	EEV/M-OV replacement	Page no
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P882	P882	C10
P883	P883	C10
P887	P887	C11
P893/4493	P893/4493	C8
P894/4494	P894/4494	C8
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P896	P896	C12
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P8000	P8000	C5
P8000B	P8000B	C5
P8000G	P8000G	C5
P8000L	P8000L	C5
P8000R	P8000R	C5
P8001	P8001	C5
P8001B	P8001B	C5
P8001G	P8001G	C5
P8001L	P8001L	C5
P8001R	P8001R	C5
P8003	P8003	C5
P8003A	P8003A	C5
P8003AG	P8003AG	C5
P8003AL	P8003AL	C5
P8003AR	P8003AR	C5
P8003G	P8003G	C5
P8003L	P8003L	C5
P8003R	P8003R	C5
P8005	P8005	C5
P8005B	P8005B	C5
P8005G	P8005G	C5
P8005L	P8005L	C5
P8005R	P8005R	C5
P8008L	P8008L	C5
P8018A	P8018A	C7
P8018B	P8018B	C7
P8021	P8021	C5
P8021B	P8021B	C5
P8021G	P8021G	C5
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P8021R	P8021R	C5
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P8090	P8090	C9
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P8101	P8101	C13
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PL4D21*	C1108	A9 D14
PL5C22/HT415	8503	B6 D8
PL5D22*	C1112	A9 D14
PL17	5557	D7
PL57	5559	D7
PL165A	FX2505	B6 D8
PL174	6587	B6 D8
PL255*	BT29	D7
PL345	FX227	B6 D8
PL435	FX2505	B6 D8
PL522	8503	B6 D8
PL2052A	BK484/5552A	D6
PL5551A	BK448/5551A	D6
PL5552A	BK484/5552A	D6
PL5553B	BK486/5553B	D6
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PL5557	5557	D7
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PMC14	PMC14	A18
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Q400-1*	C1112	A9 D14
Q450-1*	C1136	A9 D14
QB3/300	C1108	A9 D14
QB3.5/750	C1112	A9 D14
QB4-1100	C1136	A9 D14
QBL5-3500	ACS4	A10
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QF41M	BS462	B11
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* † Please refer to page E1.

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QQV03-20A	C1134	A9 D14
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QS83/3	QS1209/5651	D31
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QS1200	QS1200	D31
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QS1207	OA2	D31
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QY4-250	C1112	A9 D14
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QY5-3000A	ACS4	A10
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RCY	RCY	A28
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RE125C*	C1108	A9 D14

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RG3-1250	AH238	D5
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RR3-1250	GXU2	D5
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RS635*	B1153	A5 D10
RS683*	C1108	A9 D14
RS685*	C1108	A9 D14
RS686*	C1136	A9 D14
RS726	BR1161	A6 D10
RS822*	BY189A	A8 D12
	BY1102	A8 D12
RS826	BY1161	A8 D12
RS833*	BY1122	A8 D12
RS1002A	C1136	A9 D14
RS1007*	C1108	A9 D14
RS1009*	C178A/5894	A9 D14
RS1019*	C1134	A9 D14
RS1036	B1152	A5 D10
RS1046	B1153	A5 D10
RS2002V	CY1172	A10 D13
RS2793	4CX5000A	A10 D13
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T940W	T940W	C14
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T963D	T963D	B35
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T983Z	T983Z	B35
T986Z	3069R	B34
T988D	T988D	B35
T988S	T988S	B35
T988Y	T988Y	B35
T988Z	T988Z	B35
T989D	T989D	B35
T989S	T989S	B35
T989Z	T989Z	B35
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TH1657	5657	B20
TH5021B	GU12	D5
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TH5657	5657	B20
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TH6522	8503	B6
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TH7010	BK66/5550	D6
TH7020	BK448/5551A	D6
TH7021*	BK448/5551A	D6
TH7030	BK484/5552A	D6
TH7031*	BK484/5552A	D6
TH7040	BK486/5553B	D6
TH7041*	BK486/5553B	D6
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TH9701	P874	C10
TH9801	P849D	C6
TH9804	7038	C7
TH9806PA*	8541	C6
TH9807PA	P844	C6
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TH9808PA	8541	C6
TH9810	P849D	C6
TH9812PA*	P842X	G6
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TH9814PA	P831	C7
TH9815PA*	P842X	C6
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TWC35A	TWC35A	A18
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TY6-5000A	BR1165	A6 D10
TY6-5000B	BR1160	A6 D10
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U150/25/75	U150/25/75	A13 D17
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UC250/30/150J	UC250/30/150J	A15 D19
UC250/30/150JA	UC250/30/150JA	A15 D19
UC250/30/150JD	UC250/30/150JD	A15 D19
UC300/10/70J	UC300/10/70J	A15 D19
UC450/30/150J	UC450/30/150J	A15 D19
UC450A/30/150	UC450A/30/150	A15 D19
UC650/30/150J	UC650/30/150J	A15 D19
UC750/20/150J	UC750/20/150J	A15 D19
UC880/15/125	UC880/15/125	A15 D19
UC1000/8/125J	UC1000/8/125J	A15 D19
UC1000/10/125J	UC1000/10/125J	A15 D19
UC1000/15/125	UC1000/15/125	A15

Type to be replaced	EEV/M-OV replacement	Page no
UC1000/15/125	UC1000/15/125	D19
UC1000/15/150J	UC1000/15/150J	A15 D19
UC1000/20/150J	UC1000/20/150J	A15 D19
UC1000A/20/150	UC1000A/20/150	A15 D19
UC1500/8/125J	UC1500/8/125J	A15 D19
UC1500/10/125J	UC1500/10/125J	A15 D19
UC1500/15/150J	UC1500/15/150J	A15 D19
UC1500/20/150J	UC1500/20/150J	A15 D19
UC2000/12/150J	UC2000/12/150J	A15 D19
UC2300/8/125J	UC2300/8/125J	A15 D19
UC2300/10/125J	UC2300/10/125J	A15 D19
UC2500/5/60J	UC2500/5/60J	A15 D19
UCM400/5/25	UCM400/5/25	A14 D18
UCM500/5/25	UCM500/5/25	A14 D18
UCM2000/5/40	UCM2000/5/40	A14 D18
UCM2000A/5/40	UCM2000A/5/40	A14 D18
UCS5-200*	U200/10/40	A13 D17
	U200/15/40	A13 D17
UCS10-300*	U300/10/40	A13 D17
	U300/15/40	A13 D17
UCS10-400	U400/10/40	A13 D17
UCSF500	U500/10/40A	A13 D17
UCSL1000	U1000A/3/40JB	A14 D18
	U1000A/3/40JD	A14 D18
UCSL1000 special	U1000A/3/40JA	A14 D18
	U2000/3/40	A14 D18
UCSL2000	U3000/3/40J	A14 D18
UCSL3000	U3000/3/40J	A14 D18

Type to be replaced	EEV/M-OV replacement	Page no
UCSLPS10-750	U750/5-20/40J	A13 D17
UCSX700*	U750/10/40	A13 D17
UCSX1000	U1000/10/75J	A13 D17
UCSXF750	U750/10/75J	A13 D17
UCSXF1000	U1000A/10/75J	A14 D18
UCSXF1200	U1200/10/75J	A14 D18
UCSXF1500*	U1500/8/75	A14 D18
UCSXF2000	U2000/8/75J	A14 D18
	U2000/8/75JA	A14 D18
UD100/20/40	U100/20/40	A13 D17
UD200/15/40	U200/15/40	A13 D17
UD500/10/40	U500/10/40	A13 D17
UD500/10/40A	U500/10/40A	A13 D17
UE300/15/40	U300/15/40	A13 D17
UE750/10/40	U750/10/40	A13 D17
UE966	GU12	D5
UE967	5557	D7
UF6/15/7	UF6/15/7	A15 D19
UF10/15/7J	UF10/15/7J	A15 D19
UF12/20/40	UF12/20/40	A15 D19
UF25/20/40	UF25/20/40	A15 D19
UF50/10/40	UF50/10/40	A15 D19
UF50/20/40	UF50/20/40	A15 D19
UF75/10/40	UF75/10/40	A15 D19
UF100/10/40	UF100/10/40	A16 D20
UF150/10/40	UF150/10/40	A16 D20
UF250/8/40	UF250/8/40	A16 D20
UF300/10/50	UF300/10/50	A16 D20
UF300/15/75	UF300/15/75	A16

* † Please refer to page E1.

Type to be replaced	EEV/M-OV replacement	Page no
UF300/15/75	UF300/15/75	D20
UF500/10/50	UF500/10/50	A16
		D20
UF750/8/75	UF750/8/75	A16
		D20
UF800/3/50J	UF800/3/50J	A16
		D20
UF900/3/50J	UF900/3/50J	A16
		D20
UF1000/8/75	UF1000/8/75	A16
		D20
UF2000/7/75	UF2000/7/75	A16
		D20
UFC6/30/140J	UFC6/30/140J	A16
		D20
UFC12/30/140J	UFC12/30/ 140J	A16
		D20
UFC18/30/140J	UFC18/30/ 140J	A16
		D20
UFC34/30/140J	UFC34/30/ 140J	A16
		D20
UFC40/30/140J	UFC40/30/ 140J	A16
		D20
UFC50/30/140J	UFC50/30/ 140J	A16
		D20
UFC100/15/80	UFC100/15/80	A16
		D20
UFC100/15/140	UFC100/15/ 140	A16
		D20
UFC100/30/120J	UFC100/30/ 120J	A16
		D20
UFC150/15/140	UFC150/15/ 140	A16
		D20
UFC450/12/125J	UFC450/12/ 125J	A16
		D20
UFC450/15/125J	UFC450/15/ 125J	A16
		D20
UFC500/12/125J	UFC500/12/ 125J	A16
		D20
UFC500/15/125J	UFC500/15/ 125J	A16
		D20
UFC750/15/125	UFC750/15/ 125	A16
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UFC1000/15/125	UFC1000/15/ 125	A16
		D20
UFC1000/20/200	UFC1000/20/ 200	A16
		D20
UFC1000A/12/125J	UFC1000A/12/ 125J	A16
		D20
UFC1000A/15/125J	UFC1000A/15/ 125J	A16
		D20
UFC1500/12/125	UFC1500/12/ 125	A16
		D20
UFC2000/8/125J	UFC2000/8/ 125J	A16
		D20

Type to be replaced	EEV/M-OV replacement	Page no
UFC3000/7/125	UFC3000/7/ 125	A16
		D20
UG60/30/75	U60/30/75	A13
		D17
UG100/25/75	U100/25/75	A13
		D17
UG200/20/75	U200/20/75	A13
		D17
UG500/15/75	U500/15/75	A13
		D17
UG1000/10/75	U1000B/10/75	A14
		D18
UH150/25/75	U150/25/75	A13
		D17
UH300/20/75	U300/20/75	A13
		D17
UH750/15/75	U750/15/75	A13
		D17
UH1500/8/75	U1500/8/75	A14
		D18
UH2000/8/75	U2000A/8/75	A14
		D18
UH2000/8/75A	U2000A/8/75A	A14
		D18
UJ750/5-24	U750/5-20/40J	A13
		D17
UJ1000/3	U1000A/3/40J	A14
		D18
UJ1000/3A	U1000A/3/ 40JA	A14
		D18
UJ1000/3B	U1000A/3/ 40JB	A14
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UKC450/30/150	UC450/30/ 150J	A15
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USL500	U500/5/40J	A13
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UXCF500	U500A/15/75J	A13
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V1505	V1505	A5
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VA210P	K3073	B19
VA218B	K3069	B19
VA259	K3114	A21
VA508	K3071	B18
VCCA12	UF12/20/40	A15
		D19

Type to be replaced	EEV/M-OV replacement	Page no
VCCA25	UF25/20/40	A15
		D19
VCCA50	UF50/20/40	A15
		D19
VE966A	GU12	D5
VH550A	GU12	D5
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	UC250/30/ 150JD	A15
		D19
VMMHC450*	UC450A/30/ 150	A15
		D19
VMMHC1000*	UC1000A/20/ 150	A15
		D19
VOS20K	P874	C10
VOS20M	P882	C10
VOS25H	7389C	C10
VOS25M	P872	C10
VOS40K	P875	C10
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VOS50M	P873	C10
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VQ3	VQ3	D35
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VT46A	GU12	D5
VT123	5586	B20
VVC50-42-20*	U50/20/40	A13
		D17
VVC100-42-20*	U100/20/40	A13
		D17
VVC200-42-7.5	U200/10/40	A13
		D17
VVC200-42-15*	U200/15/40	A13
		D17
VVC300-42-7.5*	U300/10/40	A13
		D17
VVC300-42-15*	U300/15/40	A13
		D17
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		D17
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WF402L	BS816	B12
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WF404L	BS814	B12
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Type to be replaced	EEV/M-OV replacement	Page no
WF409	BS452	B11
WF412L	BS826	B12
WF415	BS440	B11
WGC405H	WGC405H	A24
		B32
WGC1100	WGC1100	A25
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WGC2100	WGC2100	A25
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		B32
WGC4200	WGC4200	A25
		B32
WGC4300	WGC4300	A25
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WGI6100	WGI6100	A23
WGI7100	WGI7100	A23
WGI8050	WGI8050	A23
WGI9020	WGI9020	A23
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WJ367*	N10007	B29
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WL652	BK448/5551A	D6
WL655	BK486/5553B	D6
WL681*	BK66/5550	D6
WL857B*	AH205/857B	D5
WL866A	GU12	D5
WL5550	BK66/5550	D6
WL5551A	BK448/5551A	D6
WL5552A	BK484/5552A	D6
WL5553B	BK486/5553B	D6
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WL5822A	BK5822A	D6
WL7669	BK492/7669	D6
WL7671	BK494/7671	D6
WL7672	BK5822A	D6
WL7681	BK544	D6
WT210-0008	GU12	D5
WT210-0051	0A2	D31
WT210-0056	5559	D7
WT210-0070	BK66/5550	D6
WT210-0071	BK448/5551A	D6
WT210-0072	BK484/5552A	D6
WT210-0073	BK486/5553B	D6

Type to be replaced	EEV/M-OV replacement	Page no
WT210-0147	BK484/5552A	D6
WT210-0149	BK448/5551A	D6
WT210-0152	BK486/5553B	D6
WT210-0158	BK448/5551A	D6
WT210-0159	BK484/5552A	D6
WT210-0165	BK486/5553B	D6
WT210-0170	BK5822A	D6
WT210-0246	BK544	D6
WT210-0249	BK448/5551A	D6
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WT210-0274	BK492/7669	D6
WT210-0275	BK494/7671	D6
WT210-0281	BK544	D6
WT210-0285	BK494/7671	D6
WT210-0290	BK492/7669	D6
WT210-306	BK482	D6
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WTJ9	WTJ9	A25
		B32
WTS4	WTS4	A25
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WTT111	5559	D7
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WTX8	WTX8	A25
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X-6.25	UF6/15/7	A15
		D19
X-10	UF10/15/7J	A15
		D19
X1100	N1029	A18
XE1-3	XL615/4/3	D30
XG1-2500	5559	D7
XG2-12*	BT29	D7
XG2-500	BT19	D7
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XH3-045	FX227	B6
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XH8-100	FX2505	B6
		D8
XH16-200	8503	B6
		D8
XH25-500	FX2519A/	B6
	5949A	D8
XL601	XL601	D30
XL603	XL603	D30
XL604	XL615/10/5.5	D30
XL605	XL615/10/6.5	D30
XL606	XL615/13/6.5	D30
XL608	XL615/9/4	D30

Type to be replaced	EEV/M-OV replacement	Page no
XL611	XL615/7/3	D30
XL615/4/2	XL615/4/2	D30
XL615/4/3	XL615/4/3	D30
XL615/7/1.75	XL615/7/1.75	D30
XL615/7/2	XL615/7/2	D30
XL615/7/3	XL615/7/3	D30
XL615/7/6	XL615/7/6	D30
XL615/7/6.5	XL615/7/6.5	D30
XL615/7-2/1.75TW	XL615/7-2/	
	1.75TW	D30
XL615/9/4	XL615/9/4	D30
XL615/9/10	XL615/9/10	D30
XL615/10/5.5	XL615/10/5.5	D30
XL615/10/6.5	XL615/10/6.5	D30
XL615/10/12	XL615/10/12	D30
XL615/10/40	XL615/10/40	D30
XL615/13/6.5	XL615/13/6.5	D30
XL615/13/9	XL615/13/9	D30
XL615/13/12	XL615/13/12	D30
XL627	XL627	D30
XL630	XL630	D30
XL631	XL631	D30
XL632	XL632	D30
XL639/4/1.75	XL639/4/1.75	D30
XL639/4/2.75	XL639/4/2.75	D30
XL641	XL641	D30
XQ1003*	P849D	C6
XQ1004*	8541	C6
XQ1007	P849D	C6
XQ1008	8541	C6
XQ1020*	P8001	C5
XQ1020B*	P8001B	C5
XQ1020G*	P8001G	C5
XQ1020L*	P8001L	C5
XQ1020R*	P8001R	C5
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XQ1023L	P8003AL	C5
XQ1023R	P8003AR	C5
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XQ1050*	8572A	C6
XQ1052*	8507A	C6
XQ1053*	8507	C6
XQ1054	P8031	†
XQ1060	P8031X	†
XQ1061*	8541A	C6
XQ1062	P8031	†

* † Please refer to page E1.

Type to be replaced	EEV/M-OV replacement	Page no
XQ1063*	P8031	†
XQ1064	P8031	†
XQ1065*	P844	C6
XQ1066	P8031F	†
XQ1067	P8031F	†
XQ1070	P8021	C5
XQ1120*	8134V1/4811	C8
XQ1121*	8134	C8
XQ1160*	P831	C7
XQ1161*	P831	C7
XQ1180*	P8034A	C6
XQ1181*	P8034A	C6
XQ1240	8541	C6
XQ1241	P849D	C6
XQ1280	P842X	C6
XQ1290	P842X	C6
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XQ1292	8541	C6
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XQ1294	P849D	C6
XQ1295	P844	C6
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YD1150	BR1195	A6 D10
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Type to be replaced	EEV/M-OV replacement	Page no
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YD1161	BW1196	A7 D11
YD1162	BW1196J3	A7 D11
YD1202	BW1184J2	A7 D11
YD1212	BW1185J2	A7 D11
YD1230	BR1126	A6 D10
YD1240	BR1512	A6 D10
YD1244	BR1512A	A6 D10
YD1400	YD1400	D16
YJ1040*	8356	B24
YJ1060	6027H	B24
YJ1070	M537A	B23
YJ1071	M597	B24
YJ1110	M513B	B24
YJ1111	M5024	B24
YJ1112	M5025	B24
YJ1120	M515	B24
YJ1121	M5022	B24

Type to be replaced	EEV/M-OV replacement	Page no
YJ1123	M5089	B24
YJ1124	M5068	B24
YJ1200	M5005	B24
YJ1250	M5042S	B26
YJ1290	M581	B25
YJ1300	M5043	B23
YJ1390	M5021	B23
YK1000*	K365	A20
YK1040*	K351	B18 D21
YK1046*	K391	B18
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YL1430	CR1501	A10 D13
YL1440	CR1502	A10 D13
YL1460	C1136	A9 D14
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ZT1011	ZT1011	D7
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ZX1052	BK484/5552A	D6
ZX1053	BK486/5553B	D6
ZX1061	BK502	D6
ZX1062	BK544	D6
ZX1063	BK482	D6

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Wir sind ständig darum bemüht, unsere Adressenkarteien auf dem laufenden zu halten. Wir danken Ihnen für Ihre Mitarbeit, die es uns ermöglicht, Ihnen auch weiterhin von Nutzen zu sein. Bitte füllen Sie diese Postkarte aus und senden Sie sie an uns zurück, wenn Sie an den Produkten von EEV/M-OV interessiert sind.

Verwenden Sie bitte die anderen Postkarten, wenn Sie weitere Informationen wünschen. Bitte benutzen Sie die betreffenden Karten für ein EEV- oder M-OV-Produkt.

Tarjetas

Siempre estamos actualizando nuestras listas de información regular por Correo y agradeceríamos mucho nos prestaran su asistencia a fin de poder seguir sirviéndoles. Tengan la amabilidad de rellenar y volver a enviarnos esta tarjeta, con constancia de su interés en los productos EEV/M-OV.

Las tarjetas restantes están previstas para ser utilizadas cuando se precise información adicional; por favor, empleen la tarjeta apropiada para el producto EEV ó M-OV.

Talloncini Allegati

E' nostra intenzione mantenere costantemente aggiornata la distinta dei clienti; preghiamo pertanto di aiutarci a servirvi meglio compilando e ritornandoci questo talloncino, indicando il campo d'interesse verso i prodotti EEV/M-OV.

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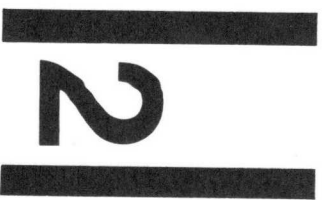
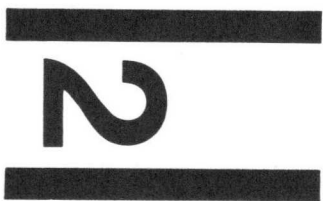
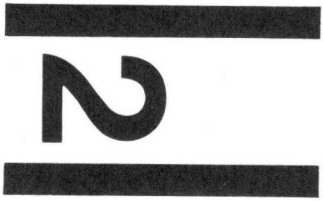
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Italy	Marconi Italiana S.p.A., Via A. Negrone 1A, 16153 Genova Cornigliano. Tel: 4108 Telex: Marconit 27386
Japan	Cornes and Co. Ltd., C.P.O. Box 158, Tokyo 100-91, Tel: 272-5771 Telex: 222-2987 Cornes J
Jordan	Hammad & Kamal Trading Co., P.O.B. 621, Amman. Tel: 25331, 44340 Telex: HKT JO 1249
Kenya (also Tanzania)	Technical and Industrial Representations Ltd., P.O. Box 45375, Nairobi. Tel: 26936/7
Korea	Camera Tubes: Korea Electric Company Ltd., P.O. Box 116, Kwang Wha Moon, Seoul. Tel: 74-4689, 73-5525, 74-7757
Kuwait	Fager Development Establishment, P.O. Box 1609, Kuwait. Tel: 813 209, 813 210, 813 447
Lebanon	Rizk Brothers, P.O. Box 4875, Beirut. Tel: 237 777, 259 535
Malaysia (West)	The General Electric Co. of Malaysia, Sendirian Berhad, P.O. Box 256, Magnet House, 2 & 4 Jalan Campbell, Kuala Lumpur. Tel: 84291 Telex: 30335
Mexico	ACOSA—Agencias Canadenses Y Occidentales S.A., Apartado Postal 8600, Mexico 1, D.F. Tel: (5) 46 46 46, 46 48 04/5
Netherlands	SAIT Electronics Nederland, Strevelsweg 700/507, Rotterdam 3021. Tel: 010-814 644, 010-814 841 Telex: 24315
New Zealand	EEV Products: Amalgamated Wireless (Australasia) N.Z. Ltd., Commerce House, P.O. Box 830, Wellington 1. Tel: 58-979 M-OV Products: GEC (New Zealand) Ltd., P.O. Box 2292, Wellington. Tel: 553-949 Telex: 3421
Nigeria	R. T. Briscoe (Nigeria) Ltd., P.O. Box 2104, 8-10 Yakubu Gowon Street, Lagos. Tel: 22735, 26009 Telex: 21249
Norway	Norsk Marconikompani A/S, Instrument & Components Dept., Ryensvingen 5, P.O. Box 50, Manglerud, Oslo 6. Tel: 67 04 86 Telex: 16218 NMK N M-OV Telephone line arresters only: British Imports A.S., P.O. Box 2582 Solli, Oslo 3. Tel: 41 59 35 Telex: 16743
Pakistan	General Products Group Ltd., 239 Staff Lines, P.O. Box 3987, Fatima Jinnah Road, Karachi 4. Tel: 513541-43
Peru	Fernando Ezeta B., Casilla 3061, Lima. Tel: 45-2335
Philippines	G. & S. Radiowealth Communications, 250 Buendia Avenue, P. Tamo, Rizal, Philippines. (P.O. Box 3130 Manila). Tel: 87-12-11, 86-49-51/3, 85-59-41/5 Telex: 7227496 (RCA)
Poland	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Portugal	MEDITROM — Comercial de Equipamentos Técnicos SARL, Avenida 5 de Outubro 89, Lisbon 1. Tel: 77 85 95, 76 21 89
Rumania	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Saudi Arabia	General Agencies Corporation, P.O. Box 1988, Jeddah. Tel: 5203
Singapore (also Brunei, East Malaysia)	The General Electric Co. of Singapore Private Ltd., Magnet House, P.O. Box 4046, Bukit Timah, Singapore 21. Tel: 663011 Telex: RS21508
South Africa (also Botswana, Lesotho, Mozambique, Swaziland)	Marconi (South Africa) Ltd., Private Bag X1038, Benoni. Tel: 52-7771/4 Telex: 43-0469 SA M-OV Telephone line arresters only: GEC Electrical Products (Pty) Ltd., 27 Heidelberg Road, P.O. Box 2777, Johannesburg. Tel: 869-5261, 869-8570 Telex: 436720
Spain	K370 series klystrons and image orthicons: Suministros Electricos Maldonado, Fernando el Catolico 63, Madrid 15. Tel: 449 0451/2 Telex: 23498 Other Products: Eurotronica SA, D. Ramon de la Cruz 90, Madrid 6. Tel: 401 52 00 Telex: 27284 EUROT E
Sweden	Svenska Radio AB, Agencies Division, S-102 20 Stockholm. Tel: (08) 22 31 40 Telex: 100-94 SRA S
Switzerland	Erno Electronic A.G., Restelbergstrasse 49, CH8044, Zurich. Tel: (051) 28 94 32 Telex: 52974
Syria	Attar Brothers Company Engineering, P.O. Box 2771, Damascus. Tel: 18100, 18555 Telex: 20023 Attars Damascus
Thailand	Siam Teltech Co. Ltd., 9th Floor, Olympia Thai Building, 956 Rama IV Road, Bangkok. Tel: 867293-7 Telex: BK2631
Trinidad & Tobago, and Guyana	CARTEL — Caribbean Telecoms Ltd., Post Bag 732, Port-of-Spain, Trinidad W.I. Tel: 62-37727, 38122
Turkey	Ratel Radio Telecommunication Co. Ltd., Okçu Musa Caddesi, Bankalar Sarayi Kat 3, Karaköy, Istanbul. Tel: 45 50 05, 45 50 06 Telex: 22648
United States of America	Camera Tubes: English Electric Valve North America Ltd., 1 America Drive, Cheektowaga, New York 14225. Tel: (716) 632 5871 TWX: 710 523 1862 General Distributors: Calvert Electronics International Inc., 220 East 23rd Street, New York, N.Y. 10010. Tel: (212) 679 1340 Telex: 223415
Uruguay	Pellmar S.A., Piedras 676-77, Montevideo. Tel: 8-14-47
Venezuela	Marconi de Venezuela C.A., Apartado 3923, Caracas, Postal Zone 101. Tel: 54-51-16/7/8 Telex: 22856
Vietnam	International Group Ltd., P.O. Box 1078, Saigon. Telex: 92682
Yugoslavia	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Zambia	GEC—AEI Zambia Ltd., Third Street, P.O. Box 1890, Ndola. Tel: 4251 Telex: ZA3376

UK Stockists

Birmingham	Gothic Electronic Components Ltd., Beacon House, Hampton Street, Birmingham 19 3LP. Tel: Birmingham Central (021-236) 5060 Telex: 338731
Bristol	Black Arrow Electronics Ltd., Wirelect House, St. Thomas Street, Bristol BS1 6JW. Tel: (0272) 294313 Telex: 449150
Coventry	EEV Products: Coventry Factors Ltd., Coronet House, Upper Well Street, Coventry CV1 4AF. Tel: Coventry (0203) 24091-5 Telex: 311243
Liverpool	Smith & Cookson Ltd., 49/57 Bridgewater Street, Liverpool L1 0AU. Tel: Royal (051-709) 3154-7 Telex: 62592
London	EEV and M-OV Products: Edmundson Electronic Components Ltd., 30/50 Ossory Road, London SE1 5AN. Tel: 01-237-0404 Telex: 887212 M-OV Products: Lugton & Co. Ltd., P.O. Box 182, Cross Lane, Hornsey, London N8 7SB. Tel: 01-348-8247 Telex: 25618

International

Information about EEV and M-OV products may be obtained from the following:

Albania	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Argentine Republic	English Electric Marconi Argentina S.R.L., Casilla Correo Central No. 4476, Paseo Colon 669-4 Piso, Buenos Aires. Tel: 34-3071/78 Telex: 0122253 Buenos Aires
Australia	GEC Automation and Control, Electron Tube Division, 373 Horsley Road, Milperra N.S.W. 2214. P.O. Box 27, Revesby, N.S.W. 2212. Tel: 77 0551 Telex: AA20807 M-OV Telephone line arresters only: GEC Telecommunications, 9 Bibby Street, Chiswick N.S.W. 2046 Tel: 83 4011 Telex: AA20265
Austria	William Pattermann, Rudolfinerstrasse 18, P.O. Box 101, 1190 Vienna XIX. Tel: 363 647, 363 595 Telex: 7-4532
Bangladesh	The General Electric Company of Bangladesh Ltd., Magnet House, 72 Dilkhusha Commercial Area, Motijheel. P.O. Box 123, Dacca 2. Tel: 281859, 252011-13
Barbados	Balmoral Ltd., Hastings, Barbados, W.I. Tel: 7763
Belgium, Luxembourg, Zaire, Katanga, Rwanda	SAIT Electronics, 66 Chaussée de Ruisbroek, 1190 Brussels. Tel: 02/376 20 30 Telex: 21601
Brazil	IGB-Staub Eletronica S.A., Caixa Postal 30-318, Sao Paulo. Tel: 247-3539, 247-3630, 247-9611 Telex: (011) 23135 SAO PAULO Brazil
Bulgaria	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Canada	English Electric Valve North America Ltd., 24 Ronson Drive, Rexdale, Ontario M9W 1B4. Tel: 416 249 8548 Telex: 06 965864 M-OV Telephone line arresters only: AEI Telecommunications (Canada) Ltd., 419 Notre Dame Avenue, Winnipeg Manitoba R3B 1R3 Tel: 204 942-7221 Telex: 07-57588
Chile	Gibbs Y Cia S.A.C., Providencia 1050-Torre D., Casilla 16254, Santiago. Tel: 231061 Telex: Gibbs SG0309
China and Hong Kong	Marconi (China) Ltd., G.P.O. Box 186, Hong Kong. Tel: 221189 Telex: HX74141 MARFE
Colombia	Repro Ltda., Apartado Aereo 5660, Bogota D.E. Tel: 344 140 Telex: 441271 Riam Co.
Czechoslovakia	F.A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Denmark	Classen-Smidth Import A-S, Herlev Hovedgade 201C, 2730 Herlev-Copenhagen. Tel: (01) 91 30 66 Telex: 19434 CSI
Finland	EEV Products: Aseko Oy, Vuorikatu 22, 00100 Helsinki 10. Tel: 659577 Telex: 122242 M-OV Products: Carlo Casagrande Oy, P.O. Box No. 3, SF-00101, Helsinki 10. Tel: 64 07 11, 64 06 41 Telex: 12 1677
France	GEC Composants s.a., Département Tubes Electroniques, Tour d'Asnières, 3 Avenue Laurent Cély, 92 606 Asnières. Tel: 791.44.44 Telex: 61471 Inelmec
German Democratic Republic	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
German Federal Republic	Nucletron Vertriebs - G.m.b.H., Gärtnerstrasse 60, 8 Munich 50. Tel: (089) 146 081-85 Telex: 5215297
Ghana	Benarvey Trading Agencies Ltd., P.O. Box 2466, Accra - Ghana, West Africa.
Greece	EEV Products: Telectrotec, 18 Voullis Street, Athens 126. Tel: 322 72 67 M-OV Products: Christodoulou Brothers Ltd., 72 3rd September Street, Athens 103. Tel: 83 30 78, 81 05 82, 81 19 76 Telex: 21 5163
Hungary	F. A. Bernhardt G.m.b.H., D-8170 Bad Toelz, Anton Roth Strasse 26, German Federal Republic. Tel: (08041) 8576
Iceland	Orka Ltd., P.O. Box 360, Laugavegur 178, Reykjavik. Tel: 38000 Telex: 2095
India	Aimil Sales and Agencies Private Ltd., B5 Gillander House, P.O. Box 2136, Calcutta 700 001. Tel: 223304 Telex: 021 7731
Indonesia	P. T. Tawison Ltd., Jalan Kopi No. 2., Jakarta-Kota.
Iran	Telecom Ltd., Dr. Amid Building, 5th Floor, 325 Avenue Iran Novin, Tehran. Tel: 633384, 637847 Telex: 212664

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