Mazda LAMP DATA SHEET

Mercury Discharge
Medium Pressure
Type MA

General Description

250W and 400W Types MA/V—MA/H—MA/U

Mercury Vapour discharge lamps with glass arc tubes loaded above 10 watts/cm of arc length and operating at about atmospheric pressure. These lamps are manufactured with outer bulbs of either soft or hard glass. MA/H - hard glass only.

Hard glass, besides having a lower co-efficient of expansion, is chemically more stable than soft glass. Bulbs made of hard glass are thus better able to withstand thermal shock and chemical attack.

They are therefore more suitable for use in exposed conditions and chemically charged atmospheres.

A version of the 400-watt MA/V lamp, with an outer bulb of a glass selected for its high transmission of ultra-violet radiation is made for blue-printing purposes.

All the above lamps are tubular shape (see line drawing).

400W Type MAF/V

This lamp is similar in general construction to the MA lamps described above, with the exception of the shape of the outer bulb which is isothermal, the object being to obtain as uniform temperature over its surface as possible.

In addition, the outer bulb has an internal fluorescent coating which is excited by the radiation from the arc tube to produce some degree of colour correction.

The inclusion of a small amount of cadmium in the arc tube results in the red content of the light being increased to about 5% as compared with 1% of the MA type lamps.

1000W Type MA/H

This lamp consists of a tubular hard glass bulb in which the discharge through mercury vapour takes place. The lamp is loaded above 10 watts/cm and operates at about atmospheric pressure. It is of double-capped tubular design and is designed for operation in the horizontal position only.

Normal operation of all the foregoing lamps is from a.c. mains supply, in conjunction with suitable control gear, particulars of which are given later in this data sheet.

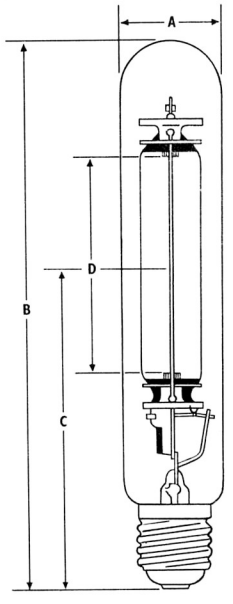
General Applications

250 and 400 watt MA/V - MA/H - MA/U — Industrial and Streetlighting.

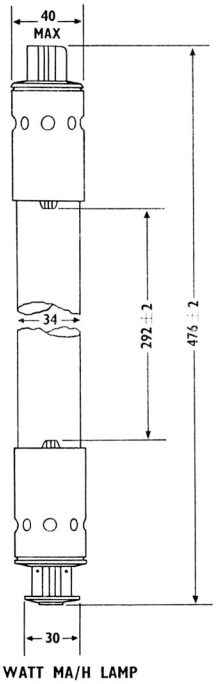
400 watt MAF/V — Industrial and Streetlighting.

1000 watt MA/H — Industrial Lighting.

250 AND 400 WATT — MA/V — MA/H — MA/U



DIMENSIONS				
WATT RATING	A (mm.)	B (mm.)	C (mm.)	D (mm.)
250	48 ± 3	290 ± 8	170 ± 8	120 ± 5
400	48 ± 3	330 ± 8	190 ± 8	160 ± 5



1000 WATT MA/H LAMP

A.E.I. Lamp and Lighting Co. Ltd.
Melton Road, Leicester

1/DIS/MA/1
September 1958

Standard Ratings, Types and Outer Glass

Rating		Type	Outer Glass
Watts	Volts		
250W	100, 110, 120, 130	MA/V	Soft
"	" " " "	"	Hard
250W	200/220, 230/240, 250	MA/V	Soft
"	" " "	"	Hard
250W	200/220, 230/240, 250	MA/U	Soft
"	" " "	"	Hard
250W	200/220, 230/240, 250	MA/H	Hard
400W	100, 110, 120, 130	MA/V	Soft
"	" " " "	"	Hard
400W	200/220, 230/240, 250	MA/V	Soft
"	" " "	"	Hard
400W	200/220, 230/240, 250	MA/U	Soft
"	" " "	"	Hard
400W	200/220, 230/240, 250	MA/H	Hard
"	" " "	MAF/V	Soft
1000W	200/220, 230/240, 250	MA/H	–

Physical Characteristics

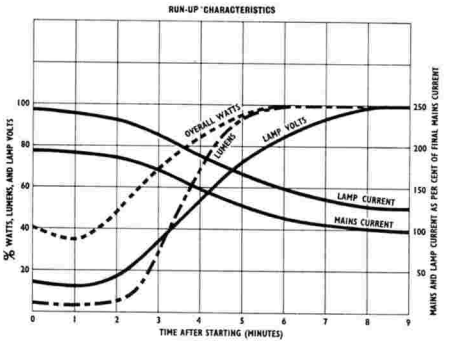
Rating	Cap	Dimensions in mm		
		Diameter	Overall length	L.C.L.
250W (all voltages and types)	E40/45 (GES)	48±3.0	290±8.0	170±8.0
400W (all voltages and types)	E40/45 (GES)	48±3.0	330±8.0	190±8.0
400W MAF/V	E40/45 (GES)	165±1.5	335±7.5	195 nominal
1000W MA/H	S22/19 and S22,S/21 with locating ring	40 max.	476±2.0	-

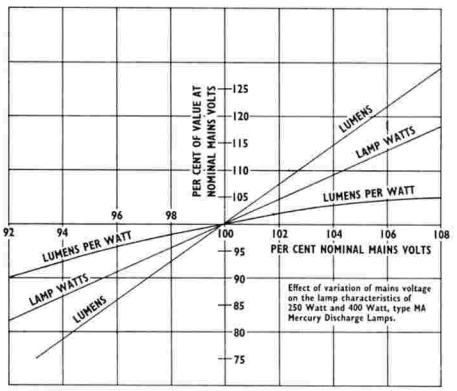
NOTE The E40/45 cap conforms to BS. 98.

Electrical Characteristics

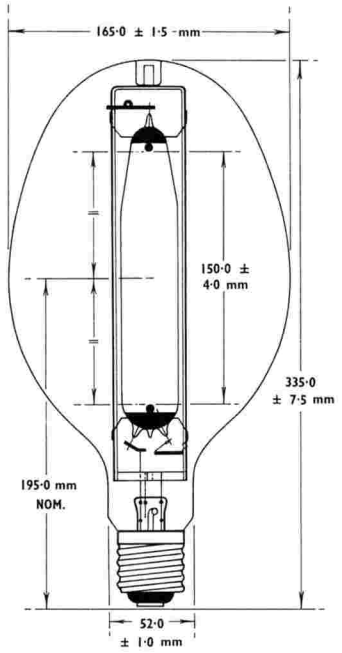
Type	Rating		Lamp operating volts	Lamp operating current (amps.)	Starting current (amps.)	Apparent power factor
	Watts	Volts				
MA/V	250	100	55/65			
		110	60/70	4.6	7.0	0.92 nom.
		120	65/75	to	to	
		130	70/80	3.6	5.5	
MA/V		200/220	107/125	2.4	5.0	0.91 nom.
&	250	230/240	125/150	to	to	
MA/U		250	135/160	1.8	4.0	
MA/H	250	200/220	95/115		5.0	0.91 nom.
		230/240	"	3.8	to	
		250	"		4.0	
MA/V	400	100	60/67			
		110	65/75	6.8	12.0	0.93 nom.
		120	70/80	to	to	
		130	75/85	5.4	9.0	
MA/V		200/220	110/130	3.7	6.5	0.92 nom.
MAF/V	400	230/240	130/155	to	to	
MA/U		250	140/165	2.8	4.5	
MA/H	400	200/220	95/115		12.0	0.92 nom.
		230/240	"	4.2	to	
		250	"		9.0	
MA/H	1000	200/220	110/130	9.0	16.0	0.92 nom.
		230/240	130/155	to	to	
		250	140/165	7.1	11.0	

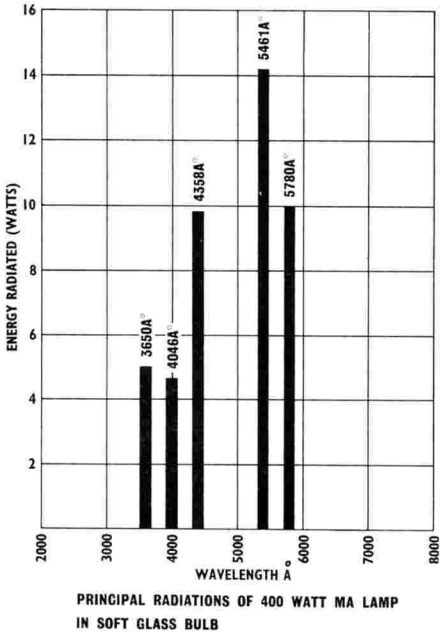
NOTE: The starting current values given above represent the short-circuit current at nominal supply voltage of the standard chokes used to operate the lamps. The incorporation of power-factor correction capacitors in the lamp circuits would result in these values being lowered.





400 watt MAF/V (Isothermal Bulb)





PRINCIPAL RADIATIONS OF 400 WATT MA LAMP IN SOFT GLASS BULB

Light Source Characteristics and Performance

Efficiency, luminous output, average life

Type	Rating		Lumens per watt			Lumens			Average life (hours)
	Watts	Volts	Initial	Average through life	Final	Initial	Average through life	Final	
MA/V	250	100-130	34	28	26.5	8500	7000	6625	1500
MA/V	"	200-250	37	35	33	9250	8750	8250	5000
MA/U	"	" "	33*	30*	28*	8250*	7500*	7000*	5000
MA/H	"	" "	33	30	28	8250	7500	7000	5000
MA/V	400	100-130	40	32	29	16000	12800	11600	1500
MA/V	"	200-250	42	39	36	16800	15600	14400	5000
MAF/V	"	" "	38	32	30	15200	12800	12000	5000
MA/U	"	" "	38*	33*	31*	15200*	13200*	12400*	5000
MA/H	"	" "	38	33	31	15200	13200	12400	5000
MA/H	1000	" "	47	43	40	47000	43000	40000	5000

* These figures are for horizontal operation: vertical operation will give approximately 10% greater efficiency with no shortening of life.
The time required for all these lamps to reach full brilliance is approx. 8 to 9 minutes.

Operating Conditions

The diagram of the spectral distribution of energy shows a series of line radiations, the strongest of which lie at 3650Å (long-wave u.v.), 4046Å and 4358Å (blue), 5461Å (green) and 5790Å (yellow). There is no continuum.

MA/H type lamps are to be operated horizontally
MA/V type lamps are to be operated vertically - cap up
MA/U type lamps will operate satisfactorily in any position

Circuit and Control Gear

The 250W, 400W and 1000W Type MA lamps are to be used in connection with appropriate control gear. On a.c. circuits this takes the form of a choke connected in series with the lamp, and also a capacitor for the correction of power factor connected across the mains, as shown in the circuit diagram.

Details of chokes and capacitors are as follows:

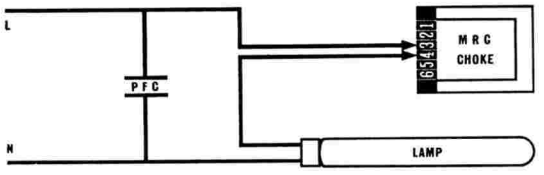
Lamp Type	Lamp Rated Watts	Supply Volts	Choke Cat. No.	Capacitor		
				Cat. No.	Capacitance	Volts Working
MA/V MA/H	250	*100-120	MRG 150	C82604	60 mfd	260
MA/U		190-250	MRG 517	PL 27	15 mfd	250
MA/V MA/H	400	*100-120	MRG 509	C82606	80 mfd	260
MA/U		200-250	MRG 516	PL 28	20 mfd	250
MA/H	1000	200-250	Two MRG 525 in parallel	C82602	40 mfd	250

Minimum power-factor correction - 0.85 lagging.
* Lamps for 100-120V supply are only made in Type MA/V.

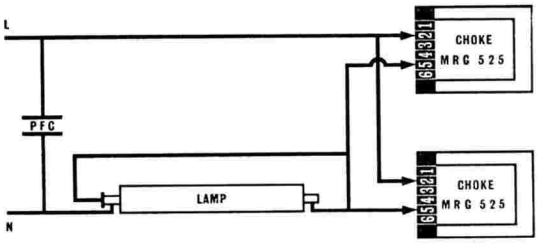
Circuit and Control Gear (cont'd)

Before putting the choke in service the tappings should be adjusted to the supply voltage, as shown below:-

Choke	Supply voltage and respective choke tappings								
MRG 509-510	100V 3-4	102.5V 2-4	105V 1-4	107.5V 3-6	110V 2-6	112.5V 1-5	115V 3-6	117.5V 2-6	120V 1-6
MRG 516-517	190V 3-4	200V 2-4	210V 1-4	220V 2-5	230V 1-5	240V 2-6	250V 1-6	-	-
MRG 525 Two in parallel	-	2-4	1-4	2-5	1-5	2-6	1-6	-	-



Circuit for 250W and 400W MA lamps.



Circuit for 1000W MA/H lamp.