

Control Gear for Fluorescent Lamps

To operate a tubular fluorescent lamp it is necessary to include the correct auxiliary gear in the circuit. Full details of the gear required to operate fluorescent lamps on normal supply voltages, 50 cycles frequency, are given in this leaflet, together with circuit diagrams.

Chokes and Ballast Units

The following prefixes apply: MRJ or MRL for chokes, MKL for ballasts and either MB or MC for transformers.

Construction is brick type and air cooled. Recent modifications to the design have decreased the weight by as much as one third in some cases. The chokes and ballast are not intended for use out of doors without extra protection.

To ensure sound electrical connections, pinch screw terminal blocks are used. It is important that correct connections to control gear units are made; full details are given in the accompanying tabular.

Capacitors

A suitable capacitor should be employed, its position in the circuit varying as shown in the accompanying diagrams to raise the inherent low power factor to a minimum of 0.85 lagging. PL capacitors, as illustrated, are of the permitol impregnated paper dielectric type. The cases are aluminium welded at the joint, between the lid and the case. All are fitted with a discharge resistor, most types are fused. Fixing straps are available.

For bulk power factor correction larger capacitors (prefix C) may be used. These are the paper dielectric petroleum jelly impregnated type enclosed in a corrosion proof metal case which also contains a discharge resistor. The capacitor case incorporates fixing lugs.

Starter Switches

A miniature 2-pin glow starter for universal lamp operation is included in the list of starters overleaf. The list includes starters of glow and thermal type for a.c. and d.c. operation.

Fixing Arrangements

Normally slots at either end of the base casting or pressing facilitate easy fixing for ballasts, chokes and transformers. PL capacitors utilize special fixing straps as illustrated and C capacitors have fixing lugs as part of the case. It should be noted that the suffix/s on the cat. number of the capacitor indicates supply of capacitor complete with fixing strap.

Ventilation

Ventilation of fittings should be such that the surface temperature does not exceed 85°C for Chokes, Ballasts and Transformers, 70°C for PL Capacitors and 50°C for C Capacitors.

Work Tests

Before despatch from works, each choke and transformer is tested and subjected to high voltage test of 2000 volts for one minute. The capacitors are subjected to a 2000 volt flash test between terminals and case and 1000 volt test between terminals.

Supply Variations

Details of control gear available for d.c. supplies and frequencies other than 50 cycles can be obtained on request.

A step up transformer Cat. No. MC 236 is available for Low voltages Input 105/127V Output 210/250V.

This transformer should be placed in the circuit before the power factor correction capacitor. See circuit diagram 8.

Ordering

Control gear should be ordered by the appropriate catalogue numbers listed in the tables.



MRL Choke



MKL Choke



Starters



Capacitors

Control Gear for Switch Start Lamps

Single Lamp

Lamp	Choke						Capacitor	Starter	Circuit No.
	200V	210V	220V	230V	240V	250V			
125W 8'				MRL103	MRL103	MRL103	PL51	ST43	5
80W 5'	MRL301	MRL301	MRL301	MRL104	MRL104	MRL301	PL11C/2*	STB26	1
40W 4'	MRL201	MRL201	MRL201	MRL202	MRL202	MRL203	PL12A/3	STB26	1
30W 3'	MRL202	MRL202	MRL202	MRL203	MRL203	MRL205	PL12A/3	STB26	1
20W 2'	203	204	204	205	205	206	PL12A/3	STB26	1
15W 18"	205	205	206	206					
8W 12"			MR580 (200/250V)					STB26	6
6W 9"									
4W 6"									

Twin Lamp

Lamp	Choke						Capacitor	Starter	Circuit No.
	200V	210V	220V	230V	240V	250V			
125W 8'				Two MRL103	Two MRL103	Two MRL103	Two PL51	2 x ST43	5 + 5
80W 5'	Two MRL301	Two MRL301	Two MRL301	Two MRL103(B) + MRL104(A)	Two MRL103(B) + MRL104(A)	Two MRL301	PL51	2 x STB26	2
40W 4'	Two MRL201	Two MRL201	Two MRL201	2 x MRL202	2 x MRL202	Two MRL203	PL11C/2*	2 x STB26	3
40W 2'	MRL301	MRL301	MRL104	MRL104	MRL301		PL11C/2*	2 x ST23	4
30W 3'	Two MRL202	Two MRL202	Two MRL202	Two MRL203	Two MRL203	Two MRL205	PL11C/2*	2 x STB26	3
20W 2'	MRL201	MRL201	MRL202	MRL202	MRL204	MRL204	PL12A/3	2 x ST25	4
15W 18"	MRL202	MRL202	MRL204	MRL205	MRL206	MRL206	PL12A/3	2 x ST25	4

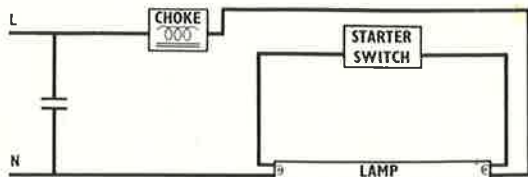
* Alternatively PL11D/1 or PL11F/1

THE FOLLOWING CONNECTIONS SHOULD BE MADE IN ACCORDANCE WITH SUPPLY VOLTAGE

Connections for Tapped Units	Supply Voltage	Supply Leads to	Link Terminals
Circuit No. 1 MRL301	200/210 220/230 240/250	1 and 4 1 and 3 1 and 3	2 and 3 2 and 3 2 and 4
Circuit No. 2 MRL301 (Choke A)	200/210 220/230 240/250	1 and 4 1 and 3 1 and 3	2 and 3 2 and 3 2 and 4
MRL301 (Choke B)	200/210 220/230 240/250	1 and 3 1 and 3 1 and 4	2 and 4 2 and 3 2 and 3
Circuit No. 4 MRL301	200 210/220 230/240	1 and 4 1 and 3 1 and 3	2 and 3 2 and 3 2 and 4
Circuit No. 16 MB563	200 210 220 230 240 250	3 and 4 2 and 4 1 and 4 3 and 5 2 and 5 1 and 5	Cold Cathode see page 4

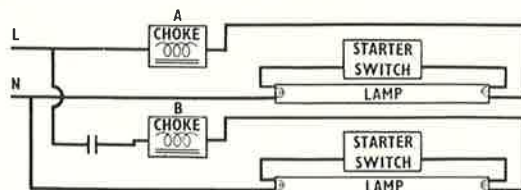
Fluorescent Lamp Circuits 1-8

1



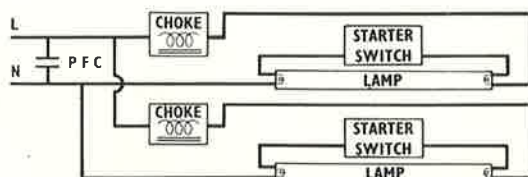
80W 5"
40W 4" Switch start single lamp choke con-
30W 3" trolled circuit. Shunt/Power factor
20W 2" correction to 0.85 lagging.
15W 18"

2



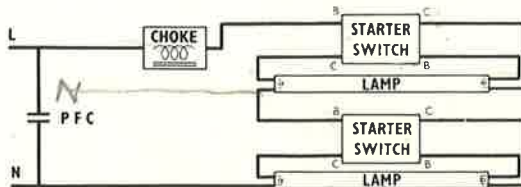
80W 5" Switch start phase displaced twin lamp
lead/lag circuit with near unity power
factor. Anti stroboscopic circuit.

3



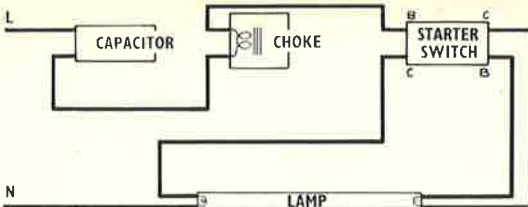
40W 4" Switch start twin lamp choke controlled
30W 3" circuit. Shunt power factor correction
to 0.85 lagging.

4



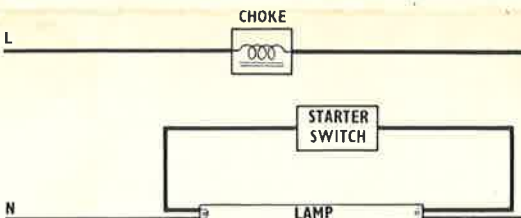
40W 2" Switch start circuit for two lamps in
20W 2" series controlled by one choke with
15W 18" shunt power factor correction to
0.85 lagging.

5



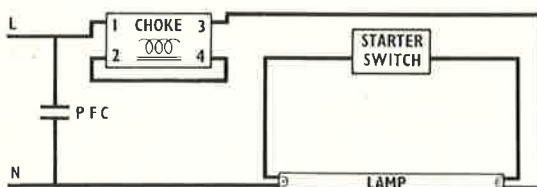
125W 8" Switch start single lamp circuit for
125 watt 8 ft. lamps power factor 0.65
leading.

6



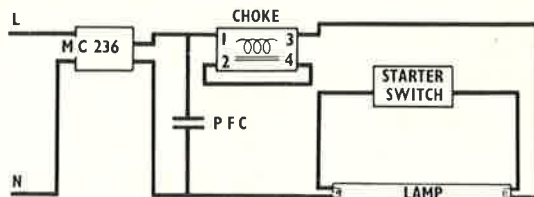
8W 12" Switch start single lamp circuit for
6W 9" 4, 6 and 8 watt lamps with no power
4W 6" factor correction.

7



80W 5" This circuit is similar to Circuit 1,
but demonstrates the use of fully tapped
choke Cat. No. MRL301. The choke is
shown suitably connected for a 240/250
volt supply.

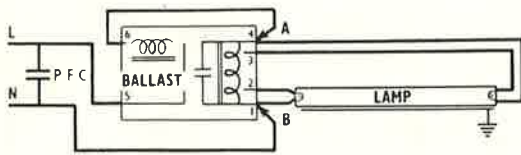
8



Circuit shows use of additional transformer Cat.
No. MC 236 to step up supply volts from 105/127V
to 210/250V. Diagram is shown correctly wired
for 1-80W lamp supply voltage 120/127V. This
transformer can be applied to any circuit
diagram provided the transformer does not
supply more than 1-80 watt lamp or its
equivalent.

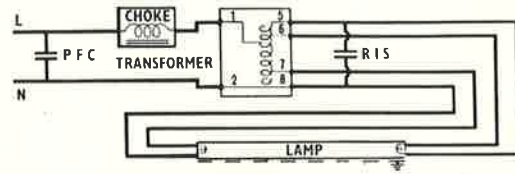
Fluorescent Lamp Circuits 9-16

9



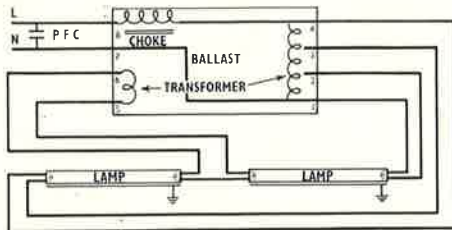
80W 5' Instant start single lamp circuit employing combined choke/transformer ballast unit.
40W 4' Shunt power factor correction to 0.85 lagging.
30W 3'

10



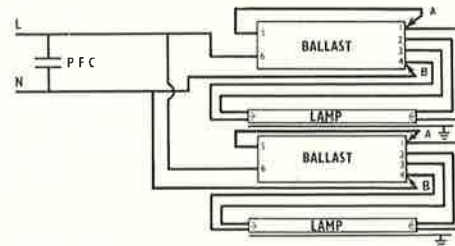
125W 8' Instant start single lamp circuit employing separate choke and starting transformer, shunt power factor correction to 0.85 lagging.

11



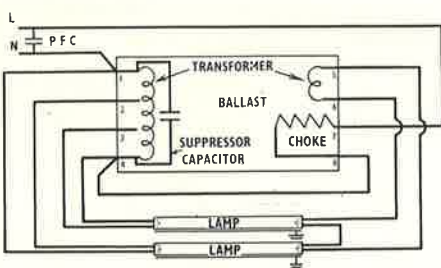
40W 2' Instant start circuit for 2-40 watt 2 ft. lamps in series controlled by one combined choke/transformer ballast unit. Shunt power factor correction to 0.85 lagging.

12



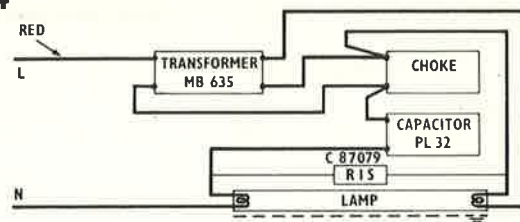
40W 4' Instant start twin lamp circuit employing combined choke/transformer ballast unit. Shunt power factor correction to 0.85 lagging.

13



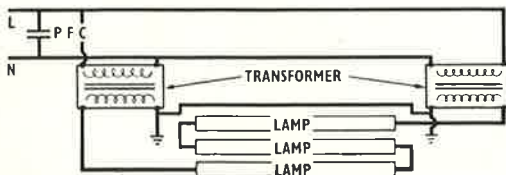
20W 2' Instant start circuit for 2-20 watt lamps in series controlled by one combined choke/transformer ballast unit. Shunt power factor correction to 0.85 lagging.

14



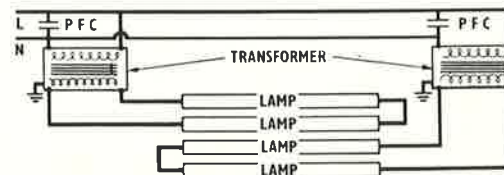
80W 5' Switchless start single lamp circuit, power factor correction to near unity.

15



120 MA Circuit for 3 - cold cathode lamps controlled by two transformers in tandem
8' 6" Cold operating the lamps in series at 120 MA
Cathode Shunt power factor correction to 0.85 lagging.

16



120 MA Circuit for 4 - cold cathode lamps
8' 6" employing two transformers each
Cold operating a pair of lamps in series at
Cathode 120 MA. Shunt power factor correction
to 0.85 lagging.

Control Gear for Instant Start Lamps

Single Lamp

Lamp	Ballast						Capacitor	R. I. S.	Circuit No.
	200V	210V	220V	230V	240V	250V			
125W 8'				MRJ306 USE MC208 TRANSFORMERS	MRJ307	MRJ307	PL26A/2	C88507	10
80W 5'	MKL101	MKL101	MKL101	MKL102	MKL102	MKL103	PL11C/2*	-	9
40W 4'	MKL201	MKL201	MKL201	MKL202	MKL202	MKL203	PL12A/3	-	9
30W 3'	MKL201	MKL202	MKL202	MKL203	MKL203	MKL203	PL12A/3	-	9

Twin Lamp

Lamp	Ballast						Capacitor	R. I. S.	Circuit No.
	200V	210V	220V	230V	240V	250V			
125W 8'				Two MRJ306	Two MRJ307	Two MRJ307	Two PL26A/2	Two C88507	10+10
80W 5'	Two MKL101	Two MKL101	Two MKL101	Two MKL102	Two MKL102	Two MKL103	Two PL11C/2*	-	9+9
40W 4'	Two MKL201	Two MKL201	Two MKL201	Two MKL202	Two MKL202	Two MKL203	Two PL11C/2*	-	12
40W 2'				MKL104	MKL104		PL11C/2*	-	11
30W 3'	Two MKL201	Two MKL202	Two MKL202	Two MKL203	Two MKL203	Two MKL203	PL11C/2*	-	12
20W 2'				MKL204	MKL204		PL12A/3	-	13

* Alternatively PL11D/1 or PL11F/1

THE FOLLOWING CONNECTIONS ARE NECESSARY FOR INSTANT START BALLASTS

Ballast		Lamp	Lead A to	Lead B to
Circuit No. 9	MKL101	80W 5'	Omit	6
	MKL102		4	2
	MKL103		4	1
Circuit No. 9+12	MKL201	40W 4'	3	2
	MKL202		4	1
	MKL203		4	1
Circuit No. 9+12	MKL201	30W 3'	3	2
	MKL202		3	2
	MKL203		3	2

Switchless Circuit

Lamp	Choke		Transformer	Capacitor	Radio Suppressor	Circuit No.
	230/240V	250V				
80W 5'	MRL101	MRL302	MB635	PL32A/1	C87079	14

Control Gear for Cold Cathode Lamps

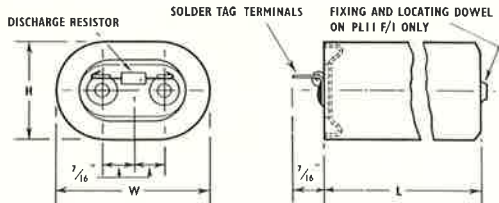
Lamp	Transformer	Capacitor	Circuit No.
8 ft. 6 in. lamps @ 120 MA	3 lamp 230/240. Two MB 562	PL28A/2	15
8 ft. 6 in. lamp @ 120 MA	4 lamp 200/250. Two MB 563	Two PL26A/2	16

Connections for MB563 are given on page 2

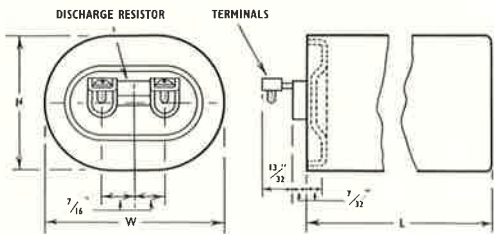
Capacitors

Where terminals are marked 'L' and 'N' on fused capacitors the terminal marked 'L' should be connected to the 'line' side of the supply and the terminal marked 'N' to the neutral.

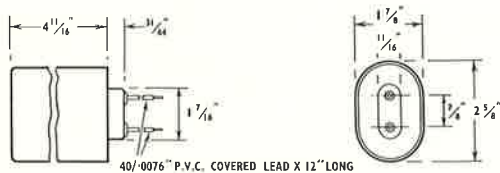
PL11D/1 PL11F/1



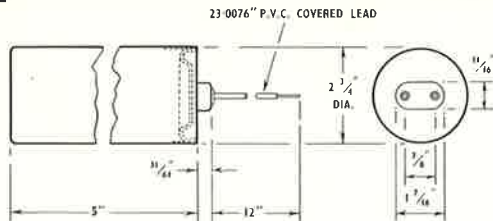
PL11G/2 PL12A/3 PL32A/1 PL51



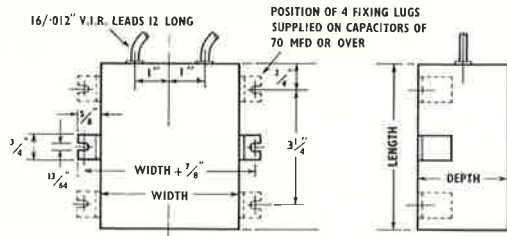
PL26A/2



PL28A/2



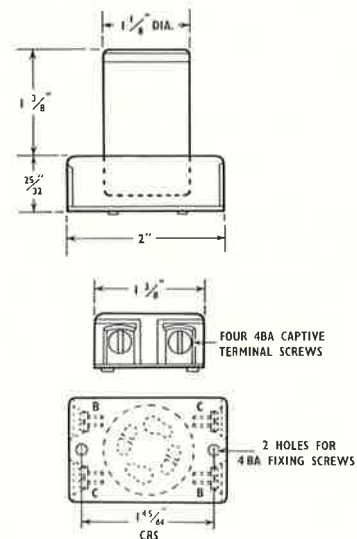
BULK POWER FACTOR CORRECTION



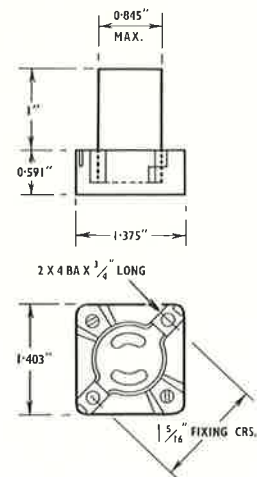
Starters

Terminal markings are shown as viewed from underneath.

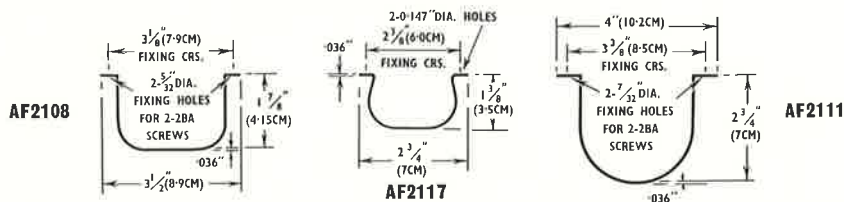
ST TYPE AND HOLDER G77900



MINIATURE BI-PIN STARTER AND HOLDER



Capacitor Fixing Straps



Capacitors

Cat. No.	Capacity mfd	Working Voltage	Fuse Fitted	Circuit No.	Length		Width		Depth		Weight		Fixing Strap Cat.No.
					in.	cm	in.	cm	in.	cm	oz.	kg	
PL11C/2	7.5	250	Yes	1,3,4,9,12,11	3	7.6	2 $\frac{5}{8}$	6.7	1 $\frac{7}{8}$	4.76	13	0.37	AF 2108
PL11F/1	7.5	250	No	1,3,4,9,12,11	3 $\frac{5}{8}$	9.3	2 $\frac{5}{8}$	6.7	1 $\frac{7}{8}$	4.76	15	0.42	AF 2108
PL11D/1	7.5	250	Yes	1,3,4,9,12,11	3 $\frac{1}{2}$	8.8	2 $\frac{1}{8}$	5.4	1 $\frac{3}{8}$	3.5	10	0.28	AF 2117
PL12A/3	3.25	250	Yes	1,4,9,12,13	2 $\frac{5}{16}$	5.9	2 $\frac{1}{8}$	5.4	1 $\frac{3}{8}$	3.5	5 $\frac{1}{2}$	0.16	AF 2117
PL26A/2	13	250	Yes	10,16	4 $\frac{11}{16}$	11.9	2 $\frac{5}{8}$	6.7	1 $\frac{7}{8}$	4.76	20	0.57	AF 2108
PL28A/2	20	250	Yes	15	5	12.7	2 $\frac{3}{4}$	7.0	Diameter		32	0.90	AF 2111
PL51	7	450	No	2,5	5 $\frac{1}{2}$	14.0	2 $\frac{5}{8}$	6.7	1 $\frac{7}{8}$	4.76	24	0.68	AF 2108
C87079	0.02	260	-	14									
C88507	0.02	370	-	10									
PL32A/1	12	250	Yes	14	4 $\frac{1}{4}$	10.8	2 $\frac{5}{8}$	6.7	1 $\frac{7}{8}$	4.76	18	0.51	AF 2108
CAPACITORS FOR BULK POWER FACTOR CORRECTION													
											(lb.)		
C82601	30	260	-	-	4 $\frac{3}{4}$	12.1	5 $\frac{1}{4}$	13.3	2 $\frac{5}{16}$	6.7	3.25	1.5	These Capacitors have their own fixing lugs.
C82602	40	"	-	-	4 $\frac{3}{4}$	"	6 $\frac{1}{2}$	16.5	2 $\frac{3}{4}$	7.0	5	2.26	
C82603	50	"	-	-	4 $\frac{3}{4}$	"	6	15.25	3 $\frac{3}{4}$	9.5	5.5	2.5	
C82604	60	"	-	-	4 $\frac{3}{4}$	"	6	15.25	4 $\frac{1}{4}$	10.8	6.5	2.94	
C82605	70	"	-	-	4 $\frac{3}{4}$	"	6	15.25	5 $\frac{1}{4}$	13.3	8.75	3.96	
C82606	80	"	-	-	4 $\frac{3}{4}$	"	6	15.25	6	15.25	10	4.54	
C82607	90	"	-	-	4 $\frac{3}{4}$	"	6	15.25	6 $\frac{3}{4}$	17.1	11	5.0	
C82608	100	"	-	-	4 $\frac{3}{4}$	"	9	22.9	5 $\frac{1}{4}$	13.3	12	5.44	
C82609	120	"	-	-	4 $\frac{3}{4}$	"	9	22.9	6	15.25	12.75	5.78	
C82610	140	"	-	-	4 $\frac{3}{4}$	"	9	22.9	6 $\frac{3}{4}$	17.1	14.5	6.56	
C82611	160	"	-	-	4 $\frac{3}{4}$	"	9	22.9	7 $\frac{1}{2}$	19.0	16	7.25	

Starters

Cat. No.	Type	MCF Lamp Usage
STB 26	Glow Small Canister 2-pin a. c.	80W 60"
		40W 48"
		30W 36"
		20W 24"
		15W 18"
		8W 12"
		6W 9"
4W 6"		
ST 26	Glow Large Canister 4-pin a. c.	80W 60"
		40W 48"
		30W 36"
		20W 24"
ST 23	Air Break Large Canister 4-pin a. c./d. c.	80W 60"
		40W 24"
ST 24	Air Break Large Canister 4-pin a. c./d. c.	40W 48"
ST 25	Air Break Large Canister 4-pin a. c./d. c.	30W 36"
		20W 24"
		15W 18"
ST 43	Air Break Large Canister 4-pin a. c./d. c.	125W 96"
For STB Starters use Starter Holder		A18281
ST	" " " "	C77900

Chokes—Instant Start Ballasts—Transformers

Cat. No.	Lamps	Voltage	Description	Circuit No.	Length in.	Width in.	Depth in.	Fixing Centres in.	Weight lb.
MB 635	80W 60"	230/250	Switchless start Circuit transformer	14	3 $\frac{3}{8}$	4.5	1 $\frac{5}{8}$	2 $\frac{7}{8}$	1 0.45
MC 208	125W 96"	230/250	Instant start transformer	10	6 $\frac{3}{4}$	7.9	2 $\frac{1}{2}$	6 $\frac{1}{8}$	7 $\frac{1}{2}$ 3.4
MC 236	1 - 80W MCF/U or Equivalent	Input Output 105/127V 210/250V	Step up transformer	8	6 $\frac{1}{4}$	7.9	2 $\frac{9}{32}$	5 $\frac{9}{8}$	4 $\frac{1}{2}$ 2.0
MKL101	80W 60"	200/220	Choke/transformer Unit	9	10 $\frac{1}{2}$	7.8	2 $\frac{9}{32}$	9 $\frac{5}{8}$	7 $\frac{1}{2}$ 3.4
MKL102	80W 60"	230/240	"	9	8 $\frac{11}{16}$	7.8	2 $\frac{7}{32}$	8 $\frac{1}{16}$	6 $\frac{3}{4}$ 3.1
MKL103	80W 60"	250	"	9	8 $\frac{11}{16}$	7.8	2 $\frac{7}{32}$	8 $\frac{1}{16}$	6 $\frac{3}{4}$ 3.1
MKL104	2 - 40W 24"	230/240	"	11	10 $\frac{1}{2}$	7.8	2 $\frac{9}{32}$	9 $\frac{5}{8}$	7 $\frac{1}{2}$ 3.4
MKL201	40W 48"	200/220	"	9,12	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MKL202	30W 36"	200	"	"	"	"	"	"	"
MKL203	40W 48"	230/240	"	9,12	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MKL204	40W 36"	210/220	"	"	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MKL205	40W 48"	250	"	"	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MKL206	30W 36"	230/250	"	13	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MKL207	2 - 20W 24"	230/240	"	"	8 $\frac{9}{16}$	6.4	2	7 $\frac{15}{16}$	20.2 4 $\frac{1}{2}$ 2.2
MRJ306	125W 96"	230	Lagging Circuit Choke	10	6 $\frac{3}{4}$	17.1	2 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$ 3.4
MRJ307	125W 96"	240/250	"	10	6 $\frac{3}{4}$	17.1	2 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$ 3.4
MRL101	80W 60"	230/240	Choke (Switchless start circuit)	14	6 $\frac{3}{8}$	15.6	2 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$ 3.4
MRL103	125W 96"	230/250	Leading Circuit Choke	5	6 $\frac{1}{8}$	15.6	2 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$ 3.4
MRL104	80W 60"	230/240	Lagging Circuit Choke	1, 2	6 $\frac{1}{8}$	15.6	2 $\frac{1}{2}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$ 3.4
MRL201	40W 48"	200/220	"	1, 3	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL202	40W 48"	200/210	"	1, 3	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL203	40W 48"	230/240	"	1, 3	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL204	20W 24"	210/220	"	1	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL205	30W 36"	240/250	"	4	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL206	20W 24"	230/240	"	1, 3	5 $\frac{3}{4}$	14.6	2 $\frac{1}{16}$	5 $\frac{1}{8}$	3 1.4
MRL301	80W 60"	200/250	Fully Tapped Choke	1, 2	6 $\frac{1}{8}$	15.6	2 $\frac{5}{16}$	5 $\frac{1}{2}$	4 $\frac{1}{2}$ 2.0
MRL302	80W 60"	200/240	"	4	6 $\frac{1}{8}$	15.6	2 $\frac{5}{16}$	5 $\frac{1}{2}$	4 $\frac{1}{2}$ 2.0
MR 580	8W 12"	240/250	Choke (Switchless start circuit)	14	6 $\frac{1}{8}$	15.6	2 $\frac{5}{16}$	5 $\frac{1}{2}$	4 $\frac{1}{2}$ 2.0
MB 562	3 - 8' 6"	200/250	Lagging Circuit Choke	5	2 $\frac{1}{2}$	6.4	4.0	2 $\frac{1}{16}$	5.2 1 0.45
MB 563	4 - 8' 6"	230/240	Transformer tapped	15	6	15.2	11.6	3 $\frac{5}{16}$	8.4 14 6.35
		200/250	Transformer tapped	16	6 $\frac{1}{4}$	15.9	14.3	4 $\frac{1}{4}$	19 8.6

The Company reserve the right to change without notice the design or the specification of equipment included in this publication and supplied by them.