Power supply

Ballast

BC-575E

INSTALLATION AND OPERATION MANUAL

MAN01417E/2

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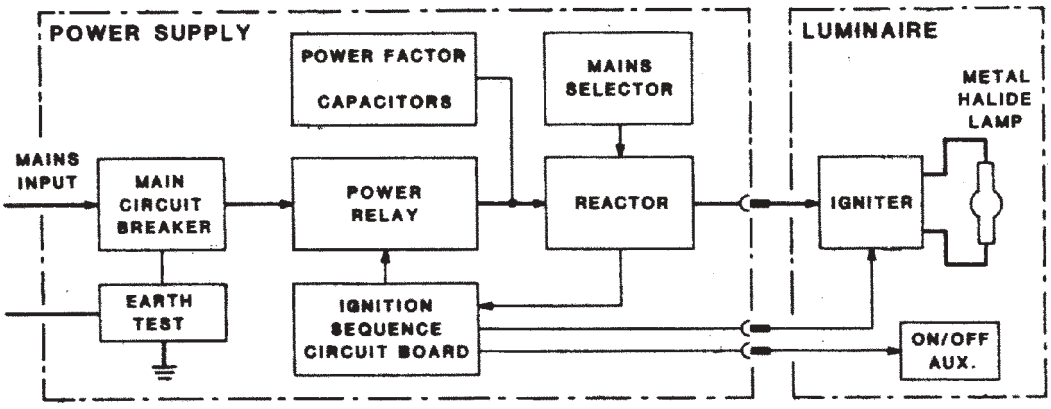
General description

This power supply has been designed to feed a 575W metal halide lamp.
It consists of a reactor in series to the input, a battery of power factor improving capacitors and a power relay for the remote ignition of the power supply. A control board provides the automatic ignition sequence in order to grant the proper operation of the lamp. The short circuit and overload protections are built-in using a circuit breaker, accessible from the front panel, as well as the mains selector which sets the unit for the mains input voltage.

Block diagram



Specifications

Electrical characteristics (Ballast)

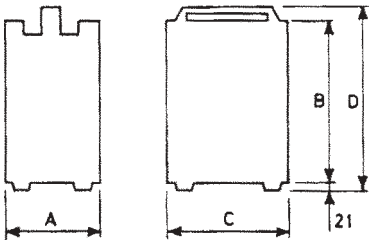
Input voltage	220V 50/60Hz 240V 50Hz ±10%
Input current (max.)	3.5A max
No-load input current (power supply ON lamp OFF)	7A approx.
Frequency	50/60Hz
Surge current	7A approx.
Power factor at 220V 50Hz	1
Efficiency	90%
Earth leakage current	less than 0.5mA
No-load output voltage	220/240V
Rated current	7A
Power regulation	±13% with ±10% input variation
Auxiliary fuse rating	2A time delay

Environmental characteristics (Ballast)

Operating temperature	-20°C to +40°C
Storage temperature	-20°C to +70°C

Physical (Ballast)

Housing material	stainless steel
Degree of protection	IP32 (as per IEC 526)
Volume	12 litres
Weight	14 kg



Dimensions (expressed in mm)

	A	B	C	D
BC-575E	170	330	216	376

Specifications

Electrical characteristics (Lamp)

Half wave peak current during ignition	*65A
Max. value for warm-up	*9.7/9.5A
Min. value for warm-up	*8/9A
Max. value	*630W
Rated value	*575W
Min. value	*490W
Min. lamp supply voltage for stable operation	*198V
Min. peak value of surge voltage for ignition in any cooling stage	*25kV
Min. no. of sparks per main half wave (Standard mode)	*20
Min. operating time of ignition device (Standard mode)	*1 s

Remark: the figures with asterisk refer to the effective rating of the unit and not to the operating extremes of the lamp. The supply does not exceed those limits.

Operating information

Installation

(refer to the wiring diagram)

a) The power supply is normally delivered without input connector. Connect a 3 pole plug with: blue wire to the neutral, brown wire to the phase and yellow-green wire to the earth.

b) If the power supply has no output connector, mount a 7-ways connector (J/P1) rated 15A min.

c) Set the mains selector S6 to the proper input voltage.

d) Select the ignition mode: Standard or Low Noise, by acting on the switch placed above the output connector.

e) Select the power supply operation mode: Normal or Remote.

f) Set QF1 main breaker to “ON”.

g) Check the ground by means of the earth test switch. The orange lamp lights up when the power supply is earth-connected.
REMARK: the earth test shows if there is any earth connection. This test is not suitable to measure the earth value.

Operating information

Operation

(refer to the wiring diagram)

a) Stand-by position: when QF1 main breaker is set to “ON” and the luminaire is connected to the power supply, the power supply is ready for use.
The main breaker feeds S3 earth test, HL3 and HL1 lamps.

b) Lamp ON : push the I green button (S2). When S2 is closed, it supplies with the line voltage (by means of wires 6 and 9 of AP1 circuit, through S5 and SQ1 safety switch placed on the luminaire) S1 of AP1, K1 power relay which self retains. The latter supplies:
C1 battery of power factor improving capacitors and ZC reactor.
K1 power relay supplies the following circuits:

- the Low Noise/Standard ignition systems and the igniter inside the luminaire through F and D of J/P1 output connector;
- the timer (made up of K2, C3, R5, D1, R6 placed on AP1 circuit board) which sets the operating time of the igniter and R7-C6 lamp ignition supporting system.
The igniter may be operated in two different modes: Standard or Low Noise.

Standard:
The igniter is powered setting (S4) Ignition Mode to Standard position (15-16 of AP1 closed). The igniter is powered directly by the mains voltage through FU3 fuse and the normally closed contact of K2 relay that opens after 1 second about and cuts off the igniter and R7-C6 ignition supporting circuit.
The standard mode system allows the ignition of the lamp in any cooling stage.

Low Noise
The igniter is powered setting (S4) Ignition Mode to Low Noise position (16-17 of AP1 closed). The voltage between pins C and D of J/P1 output connector supplies the igniter through SG1 spark gap, FU3 fuse, the contact of K2 relay and pin F of JP/1. When the lamp strikes, the no-load voltage between C and D of J/P1 drops under the value set by the spark gap (SG1) threshold and the powering to the igniter is switched off. In this way the operation of the igniter is reduced to the minimum time necessary to strike the lamp, and the acoustical noise generated by the igniter itself is contained in a very short time. The duration of the ignition, if the lamp does not start, is determined by K2 relay (1 second approx.).

Operating information

Operation

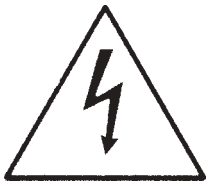
c) After the lamp ignition cycle, the warm-up time of the lamp starts. After a few minutes, the lighting system reaches the nominal power, and the lamp its nominal colour temperature.

d) Lamp 0FF: push O red button (S1) cutting off K1 relay. K1 relay cuts off the feeding of all the power components and the lamp. The “O” red push button is now lit (stand-by position).

e) Remote control operation: push “I” green button thoroughly; then rotate the ring of the same counter-clockwise for 1/4 turn till it stops.
When the unit is set to remote operation, the ignition sequence starts when the mains is applied.

f) Suggested output connections for 575W luminaire (refer to the wiring diagram): the drawing shows that it is possible to switch on/off the lamp from the luminaire, acting on S4 and S5.
SQ1 is showing the normally open contact. During the normal operation it must be closed, due to its function which is to turn off the light if U.V. protection in front of the lamp is removed.

g) Reignition lamp operation: before the reignition of the lamp, wait a few seconds to allow K2 relay to open.



h)Safety instructions for power supply use and maintenance (for qualified personnel only): Warning: dangerous voltage are present in this power supply if power is applied to it and the mains switch is set to ON. Before attempting to replace components, disconnect the unit from the power source and allow at least 2 minutes for capacitor discharge.

a) Always connect the green wire to a low resistance earth terminal.
b) Always connect the luminaire to the power supply by means an earth conductor.
c) Do not obstruct air circulation around the power supply.
d) Remove hot components (e.g. reactor) making use of suitable gloves, or allow components to cool down.

Troubleshooting directions

Suggested troubleshooting equipment

1) DMM (Digital Multimeter) rated for true rms measurement. For ex. John Fluke mFg. type 8010A or type 8050A or equivalent.

2) For current measurement: ammetric clamps John Fluke type Y8101 range 2-150A or type 009I08 or equivalent, or moving iron ammeter, 0,5 class meas. error rated at least 10A range.

3) RLC bridge for capacitor measurement (rated for 200μF and 1 MΩ at least).

AP1 Board

Voltage data across the main components during the normal operation at nominal voltage and frequency (refer to AP1 control board).

1) AP1 control board in stand-by condition at 220V 50/60Hz (240V)
   Voltage to be read on HL1 red lamp ("O" push button lit): 200V (240V).
   Earth test lamp (HL3) voltage with S3 closed: 40V (43V) DC approx. in presence of any phase connection: R N respectively connected to neutral or to phase and with the yellow-green earth conductor connected.

2) AP1 control board during lamp ignition cycle (before K3 switching) and mains voltage 220V 50/60Hz- (240V) AC:
   Voltage to be read on HL2 green lamp ("I" push button lit): 220V (240V) AC.
   Across supporting circuit (R7-C8): 220V (240V) AC max., 20VAC approx. min. with cold lamp ignition.
   Between pins 4 and 14 of J/P2 output connector on AP1 circuit board: the same supply voltage of the igniter, according to the operating mode, that is:
   a) 220V (240V) AC max., 20V AC approx. with cold lamp ignition when the power supply is set to Low Noise operation
   b) 220V (240V) AC when the power supply is set to Standard operation
   The same values will be found between pins F and D on J/P1 output connector.

Troubleshooting directions

3) AP1 control board during normal operation (after K1 switching) and mains voltage 220V AC 50/60Hz (240V):
   Voltage on HL1 red lamp: none;
   Voltage on HL2 green lamp: 220V (240V) AC;
   Voltage on D1 diode: 144 VDC (162VDC);
   Voltage on R5 resistor: 58VDC (66VDC);
   Voltage on R6 resistor, C3 capacitor and K2 relay: 86 VDC (96VDC);
   Voltage across C6-R7: no voltage after C6 discharge;
   Voltage on C4: the lamp voltage (90 to 130VAC approx.).
   Voltage on C5 capacitor: 220V AC (240V AC) with mains phase on R brown lead

4) Power components voltage at 220VAC 50/60Hz (240V AC):
   C1 capacitor: 220V AC (240V AC)
   K1 relay: 220V AC (240V AC)

Troubleshooting directions

Troubleshooting procedure

a) The lamp does not ignite.
The causes may be the following:

1) the lamp could be damaged. Check:
   a) if there are any cracking or blackening on the lamp;
   b) the tightening of the lamp clamps;
   c) the lamp life on PT hourmeter.

2) There is no discharge of the igniter in the lamp.
   In order to check this failure, remove the power supply front panel and leave the luminaire connected. Set the “I” button to ON.
   There is no voltage between pins F-D of J/P1 output connector.
   The measure must be done immediately after setting the switch to “ON” because K2 timing relay suddenly cuts off the igniter.
   a) if there is no voltage between pins F-D of J/P1, check:
      - the fuses FU2 and FU3 and wires 3,11 and 14, contacts 3,11, 14 of J/P2 output connector placed on AP1 control board;
      - the operation of K1 power relay;
      - the operation of K2 relay and its normally closed contact that cuts off the igniter through wire 14 on J/P1
      - the operation of SG1 spark gap on AP1 that glows when the ignition mode is set to Low Noise
      - the Ignition Mode switch.

   b) if the mains voltage is present between pins F and D of J/P1 output connector but the igniter does not work, check:
      - the cable and the connection to the luminaire, and verify if there is any mains voltage on the terminal board of the igniter (G and 1);
      - if even in this case the igniter does not work, replace it.

   c) there is high voltage discharge in the lamp but it does not ignite:
      - check the internal connections (pins C and D of J/P1 output connector);
      - check the value of the mains (it could be lower than -10% nominal);
      - at Low ignition Mode, it may be necessary to leave the lamp to cool down before restrike, especially with lamps out of their electrical characteristics.

b) The lamp turns off.
if the lamp turns off, the causes may be the following:

1) the lamp has finished its life time; check PT hourmeter;
2) the input voltage is too low; check the value of the mains;
3) the reactor is connected to the socket corresponding to the voltage higher than the nominal (check the mains selector);
4) the input frequency is higher than the nominal (check the mains selector).

Troubleshooting directions

Troubleshooting procedure

c) The lamp ignites but the light is not steady and the igniter continues to be powered. The causes may be the following:

1) the normally closed contact of K2 relay does not break (it must open after 1" approx.);
2) K2 coil could be interrupted or burned;
3) D1 diode and R5 resistor could be damaged; C3 capacitor could be shorted; C3 capacitor, as well as wires 3-1 1, could be interrupted;
4) C6 electrolytic capacitor could be shorted;
Replace the defective components.

d) The lamp ignites but the light is not steady during the lamp operation.
The causes may be the following:

1) the lamp is very old: check the hourmeter on the luminaire;
2) the lamp has a very high voltage: check the voltage between pins C and D of the output connector.

e) QF1 main breaker trips immediately when it is set to "ON" (reset position).

1) There is insulation leakage toward earth (in the power supply or in the luminaire).
2) Remove the earth connection.
3) Reset the circuit breaker.
4) if there is no short-circuit, check the leakages.

f) QF1 main breaker trips when "I" button is pressed.
The causes may be the following:

1) there is insulation leakage in a connection in the power supply or in C,D, F power connections of the luminaire.
2) there is insulation leakage in the capacitors of C1 battery of power factor improving capacitors;
3) there is a short-circuit between power leads 3-4, which could be caused by:
- short circuit of winding turns in ZC impedance;
- partial or total short-circuit of C1 battery of power factor improving capacitors;
4) there is an insulation leakage in ZC impedance. Check:
- connections or components with insulation leakage;
5) the C1 battery of power factor improving capacitors could have one or more capacitors shorted between the two supplying terminals.
6) The main breaker could be defective.
Replace the defective components.

REMARK: after a short circuit, check the contact of K1 power relay.

Troubleshooting directions

Troubleshooting procedure

g) QF1 main breaker trips when “I” button is pressed.
The causes may be the following:
1) capacitors of C1 battery of power factor improving capacitors could be shorted. Measure the capacitors and eventually replace them;
2) check the value of the mains voltage set through the mains selector.

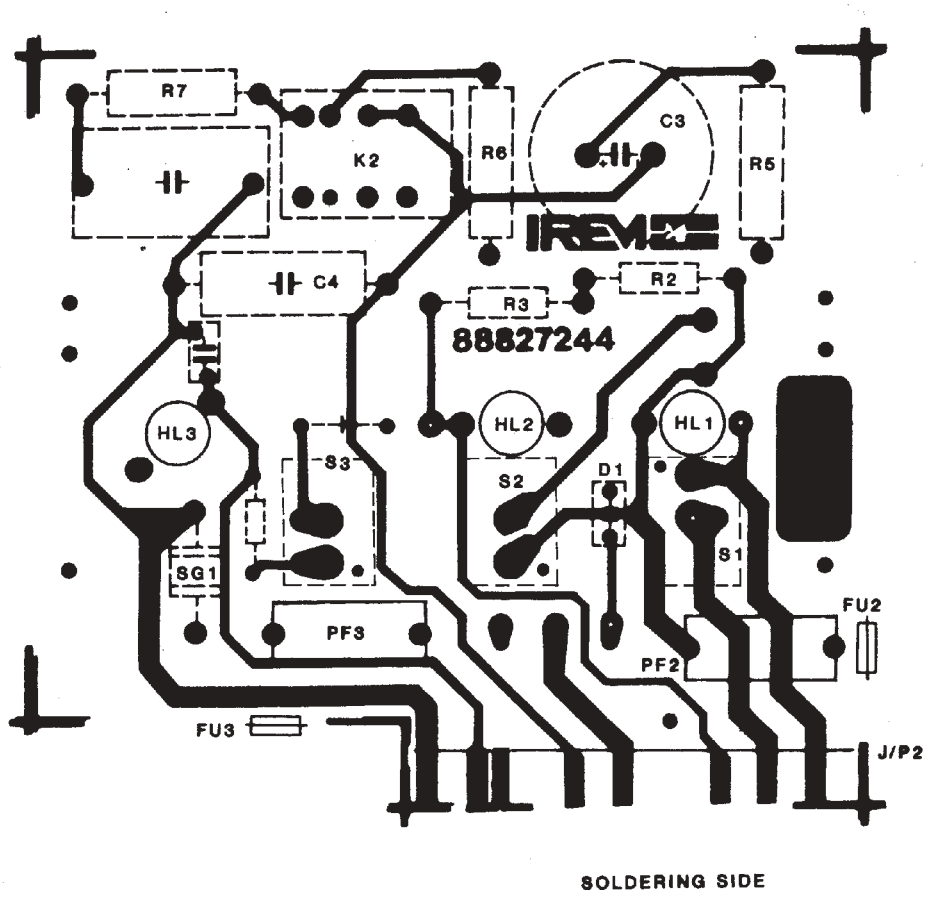
h) K1 relay does not close down when “I” button is pressed.
The causes may be the following:

1) the coil of K1 relay is interrupted or burned;
2) “I” push button is defective in the power supply or in the luminaire;
3) “O” push button is defective in the power supply or in the luminaire;
4) SQ1 safety switch is defective;
5) FU2 is interrupted.

Replace the defective components.

AP1 control board

Component layout



S1	O red button
HL1	220V neon lamp
S2	I green button
HL2	220V fluorine lamp
S3	⏚ orange button
HL3	110V neon lamp

AP1 control board

Component layout

Ref.	Description	Type	Q.	Item no.
R2-R3	Resistor 68kΩ ±5% 1W		2	88205682
R4	Resistor 680kΩ ±5% 1/2W		1	88206680
R5	Resistor 4.7kΩ ±5% 6W	5CS	1	88204476
R6	Resistor 15kΩ ±5% 6W	6CS	1	88205152
R7	Resistor 15Ω ±5% 5W	5CS	1	88202152
C3	Capacitor 220μF 200Vdc	NM200VSn2204R	1	88321005
C4	Capacitor 0.0220μF 1500Vdc	1.72	1	88310040
C5	Capacitor 2200pF 400Vdc	KC 222	1	88310013
C6	Capacitor 2μF 400Vdc	MKP .71	1	88312220
D1	Diode 1A 1300Vdc	SKea 1/13	1	88110035
D2	Diode 1A 700Vdc	NN 4007	1	88110010
K2	Relay 110Vdc 10A	5512-9110-0000	1	88441400
	Fuse holder		2	88511000
F2-F3	Fuse 2A T	5x20	2	88521021
SG1	spark gap	KAS02 69x5566	1	88911050
S1	NC push button	4A 250V	1	88401320
S2-S3	NO push button	4A 250V	2	88401320
HL1	Pilot lamp 220V (neon)	T2132	1	88530203
HL2	Pilot lamp 220V (fluorine)	T2132	1	88530210
HL3	Pilot lamp 110V (neon)	T2132	1	88530213

INFORMATION ABOUT DISPOSAL OF THE APPLIANCE

Do not treat the appliance as unsorted municipal waste.
The disposed appliance must be consigned to the authorized treatment facilities for proper recycling/reuse and disposal.
An incorrect disposal may cause harmful effects on environment and human health.

Garanzia - Warranty

Questo prodotto è garantito per 24 mesi
This product is guaranteed for 24 months

Made in Italy

I prodotti ***IREM*** sono garantiti contro difetti di materiali e di costruzione.
Il periodo di garanzia decorre dalla data di consegna. La garanzia prevede la riparazione o sostituzione gratuita delle parti riconosciute difettose nel materiale o nella fabbricazione.
Le operazioni oggetto della garanzia si effettuano presso lo stabilimento ***IREM*** o presso i centri assistenza autorizzati, alle seguenti condizioni:
- Le spese di trasporto, imballo e rispedizione sono sempre a carico dell'acquirente. Il prodotto dovrà essere spedito alla ***IREM*** o ai centri assistenza autorizzati in porto franco, adeguatamente imballato. Il prodotto viaggia a rischio e pericolo dell'acquirente.
- La garanzia non è efficace qualora il prodotto sia stato smontato, riparato o comunque manomesso da personale non autorizzato, o qualora il numero di matricola risulti alterato o asportato.
- Non sono coperti da garanzia i danni derivanti da negligenza,uso improprio,errato collegamento.
  E' fin d'ora escluso qualsivoglia indennizzo per eventuali danni a persone o cose derivanti dall'uso proprio o improprio del prodotto, per l'inattività di apparecchiature collegate al prodotto ***IREM*** o per danni diretti ed indiretti ad esse causati.
- Tutte le controversie derivanti dalle presenti condizioni o in relazione con le stesse saranno risolte in via definitiva secondo quanto previsto dal Foro di Legge.

IREM products are guaranteed against defects in material or workmanship.
The warranty runs from the delivery date. During the warranty period,***IREM*** will repair or replace, free of charge, defective parts due to defects in material or manifacturing.
All repairs, alterations and/or replacements shall be carried out at ***IREM*** plant or at the authorized after-sales service centres at the following conditions:
- Transport, packing and freight costs are always at buyer's charge.
  The product shall be returned to ***IREM*** or to the authorized after-sales service centre, carriage free, duly packed. The product is carried at buyer's risk.
- The warranty does not apply to products which have been disassembled, repaired or tampered with by not authorized personnel, or when the serial number has been forged or removed.
- No compensation or indemnity under any kind will be acknowledged for damage resulting from negligence or misuse, for injury and damage due to use or misuse of the product, for poor operation of the appliances connected to ***IREM*** product or for immediate or indirect damage caused to the powered equipment. No compensation will be as well acknowledged for damage caused to the buyer due to production stops.
- All disputes arising out of or in connection with the present terms shall be finally settled by the competent Court.