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DEB 200/400

Electronic Flicker Free Ballast

MOD. 2475.100

INSTRUCTION AND MAINTENANCE MANUAL

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SECTION 1

1.1 - GENERAL

The new DEB 200/400 and 575 electronic ballasts are designed to provide a compact, lightweight, flicker free power source for metal halide discharge lamps.
The new electronic circuit founded on the new MICROCHIP small microprocessors is very compact and with little components number. The input voltage is automatically switched between 110V and 220V. The inverter frequency is generated from a 4MHz quarz oscillator and is automatically switched between 100 or 120 Hz in accordance with the mains frequency. The output power is stabilized to compensate the lamp voltage variations due to the different maker or lamp aging.
Each ballast is contained within housing metal box comprising heat sink. The only one electronic board and power components are mounted on the heat sink, a top plate which contains all the cotrol and a lateral plate which contains the mains connector, mains fuse and mains power swich.
Each ballast is given a unique serial number which can be found on the identification plate riveted to the ballast.
The casing finish is a gray, anti scratch epoxy powder paint, with a gray plastic covered top plate.

1.2 - CONTROLS

The controls for the ballast are all mounted on the gray top plate and comprise the on / off button, the loc/rem selector and the dimmer potentiometer.

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SECTION 2

OPERATION & ROUTINE MAINTENANCE

2.1 - OPERATION

2.1.1 Ensure that a correctly sized connector has been fitted in relation to both the ballast output rating and the size of the mains supply.

CONNECTORS:	110 Volts (*)	3 Amp (200W)	6 Amp (400W)
	220 Volts	1.5Amp (200W)	3 Amp (400W)

2.1.2. Ensure that the LOCAL - REMOTE slide switch is set for the control mode required.

LOCAL =Control is from the ballast or the lamp fixtures using the appropriate on off buttons.
REMOTE = Lamp fixtures will operate immediately upon connection to the mains supply or operation of the MCB.

2.1.3. Ensure that the lamp fixtures is fitted with an operational lamp.
2.1.4. Connect the lamp fixtures to the ballast using the cable supplied with the lamp fixtures, ensuring that the groove of the military specification connector along the inner body aligns with the pin on the internal face of the outer housing of the outlet, (on the face of the ballast) and push home. Take a grip of the outer sleeve of the cable connector and rotate clockwise. The twist lock will rotate through approximately 90o and then come positively to a stop.
2.1.5. Connect the ballast to the power supply and switch the power supply on.
2.1.6. Lift the mains circuit breaker from the off position into the ON position. CAUTION If remote has been selected the lamp fixtures will immediately operate, therefore ensure that the barn doors are open and that the lamp fixtures is not in proximity of any combustible material and not facing any persons.
2.1.7. The system is now ready for use and operation can be initiated from the on switch on the lamp fixtures or ballast.
2.1.8. The lamp fixtures will ignite irrespective of the dimmer setting and will reach its stable position after approximately 1 - 2 minutes from cold when it will automatically

revert to the dimmer setting dialed up. Full clockwise rotation gives maximum rated output while full contraryclockwise rotation will dim the light output by nominally 30% of its maximum rated value.

2.2 ROUTINE MAINTENANCE

2.2.1. Isolate the ballast from the mains supply.
2.2.2. Clean the ballast casing, removing all dust and grime.
2.2.3. Check the condition of the mains input cable and connector for signs of visible damage .
2.2.4. Check the multipin output socket for signs of damage or deformation.
2.2.5. Check for the free rotation of the dimmer control.
2.2.6. Ensure that the selector switch is set to local.
2.2.7 Connect the ballast to the mains supply and switch on the MCB.
2.2.8 Switch off using the MCB.
2.2.9 Disconnect the ballast from the mains.

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SECTION 3

BALLAST FAULT ANALYSIS

SYMPTOM	POSSIBLE CAUSE	REMEDY
• Lamp fixtures fails to light up and make one flash for a short time.	• Lamp not fitted or blown. • Connector not mated correctly or with oxidation in the contacts. • Ballast fails to operate	• Fit operational lamp • Re-make connection. • Clean the oxidation from the contacts .
• The lamp fails to light up and a noise is audible inside the housing of the lamp fixtures.	• Igniter in the lamp fixtures failed. • High voltage cable damaged. • Lamp holder damaged.	• Replace igniter. • Replace high voltage cables. • Replace lamp holder.
• The lamp turns on but it never reach full power and the ballast emits an high pitch noise. • The lamp turns on but shuts off after it has warmed up.	• Ballast fails to operate.	• Inverter circuit failure
• The lamp fails to light up and there is no noise audible inside the housing of the lamp fixtures.	• Ballast fails to operate	• Refer to dismantling, operate and test procedures: there may be some power components in short circuit inside the ballast on the chopper stage.

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SECTION 4

SPECIFICATION & PRINCIPALS OF DESIGN AND OPERATION.

4.1 TECHNICAL SPECIFICATION.

4.1.1 Electrical Performance.

Input voltage automatic selection	95 – 135V 185 – 265 V
Nominal effective input current	3/6 A (RMS) at 110 V 1.5/3 A (RMS) at 220V
Efficiency (Average)	93 %
Power factor (Average)	0,65
Dimmer range	30 %
On/Off control	Either local or remote

4.1.2 Dimensions and Weight

Dimensions	Width 200 mm. Height 190 mm. Depth 105 mm.
Weight	2.6 kg.
Working position	Ballast with control panel facing top.
Max. Ambient temperature & Humidity allowed	45° C Not condensing

4.2 - GENERAL

4.2.1 Electronic ballasts have been designed to power Metal Halide Discharge and equivalent type discharge lamps.
4.2.2 Such lamps after the ignition and warm up period, work similarly to a bi-directional Zener diode, i.e. they fix the voltage at a constant value irrespective of the current they receive. Therefore to operate stability they require a current generator, a BALLAST.
4.2.3 The lamps steady (optimum) working voltage is lower than at the cold strike ignition and warm up period and is achieved approximately 2 minutes after a cold strike.
4.2.4 - A special igniter circuit is used to provide HIGH VOLTAGE (in the range of 15KV to 70KV dependent upon the lamp size) pulses for a few seconds to generate the arc between the lamps electrodes.

4.3 – BALLAST STRUCTURE

4.3.1 The structure of the DEB electronic ballasts can be sub-divided into three major elements, being :

(a) AC - DC Converter and automatic voltage selector (Input circuit)

(b) Power control circuit (Chopper circuit)

(c) DC - AC Converter (Inverter circuit)

4.4 – SUMMARY INPUT CIRCUIT DESCRIPTION

4.4.1 The function of the "AC - DC" converter is to transform the A.C. mains voltage (110 (*) /220/240V - 50/60Hz) input, to a continuous voltage of nominally 310V at the output.
The converter features .
4.4.2 A mains filter to prevent ballast generated noise from entering the mains.
4.4.3 A bridge rectifier
4.4.4 And a leveling electrolytic capacitor.
This circuit also works as a "voltage doubles" when the input voltage is set to 110V (*) (activated by the automatic voltage selector circuit) to provide the nominal 310V.

4.5 – SUMMARY CHOPPER CIRCUIT DESCRIPTION

4.5.1 The chopper is the circuit regulating the power supplied to the lamp. It works at high frequency and uses as a switch, a power Mosfet.

4.6 – SUMMARY INVERTER CIRCUIT DESCRIPTION

4.6.1 The DC - AC converter is a square wave inverter working at 100 or 120 Hz. The frequency is generated from a 4 MHz quarz oscillator and the final frequency of 100 or 120 Hz is achieved with a microprocessor and automatically switched in accordance with the mains frequency, Like power switch are used last generation and power IGBT.

4.7 – FLICKER FREE

4.7.1 Compared with conventional wire wound magnetic ballasts, electronic ballasts offer considerable advantages :
4.7.2 Flicker Free performance, lamp power and frequency stabilization (the lamp is properly supplied independent from mains fluctuations).
4.7.3 The possibility to regulate (dim) the light intensity by approximately 30% from its maximum value.
4.7.4 The size and weight of these units is considerably less than those of conventional units.
4.7.5 The same electronic ballast will operate from different mains voltages.