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DEB 6k/12k

Electronic Flicker Free Ballast

MOD. 2555

INSTRUCTION AND MAINTENANCE MANUAL





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SECTION 1

1.1 - GENERAL

This new DEB range of electronic ballasts are designed to provide a compact, lightweight, flicker free power source for metal halide discharge lamps. The control circuit are managed by microprocessors (PIC) to reduce the components number and improve performances. In the ballast front panel there is a 16 characters led display to give various information like: ballast correct operation, failure and more. New cooling system performed by double speed fans with heat sink inside the ballast body and overtemperature protection. New circuit with output short circuit and arc to ground protection. Dual power output with automatic selection. Power factor corrected input circuit to reduce the input current. Constant output power circuit to reduce the variations due to different lamp characteristics (different lamps brand and age). Low noise and flicker free mode. Safety mains breaker. Very small size and weight. CE approved.

1.2 - CONTROLS

The controls for the ballast are all mounted on the front plate and comprise on the left hand side from the top: the two green and red buttons for on and off, the 16 characters display with three command buttons, the three control knobs for local/remote/DMX, low noise/flicker free and dimmer, the mains breaker, the input mains connector and the output lamp connector.



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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. And the ground wire connected to a good ground.

CONNECTORS: 220 V - 75A

2.1.2. Ensure that the LOCAL – REMOTE - DMX 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.
- DMX = Lamp fixtures will operate accordingly with the commands received via DMX channel.
- **2.1.3.** Ensure that the ballast should be put in a place with a good ventilation and possibly protect from the direct sun and rain and with the air inlets free.
- **2.1.4.** Ensure that the lamp fixtures is fitted with an operational lamp.

2.1.5. 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 90% and then come positively to a stop.





2.1.6. Connect the ballast to the power supply and switch the power supply on.

2.1.7. Lift the mains circuit breaker from the off position into the ON position. CAUTION If remote has been selected the lamp fixtures will operate after about two seconds, 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, now the display

after the start messages will show "READY 12kW" or "READY 6kW" in function of the lamp connected.

2.1.8. If the ground connection isn't good the display will show "EARTH MISSING" for some seconds and after will go back to previous message.

2.1.9. The system is now ready for use and operation can be initiated from the on switch on the lamp fixtures or ballast.

2.1.10 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 counterclockwise 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, in particular from the air inlets.

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.



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SECTION 3

DISPLAY MESSAGES

FAULT MESSAGES:

SUPPLY TOO HIGH SUPPLY TOO LOW EARTH MISSING OVERTEMPERATURE BALLAST FAIL HEAD FAULT OUTPUT FAULT IGN. BREAKER OFF LAMP VOLT. HIGH LAMP ON FAILURE LAMP OFF BALLAST BLOCKED MAINS VOLTAGE TOO HIGH MAINS VOLTAGE TOO LOW EARTH CONNECTION MISSING OVERTEMPERATURE IN THE INTERNAL HEAT SINK PFC CIRCUIT FAIL LAMP ON FAILED FOR PROBLEM IN THE HEAD OUTPUT FAULT IGNITER BREAKER OFF LAMP VOLTAGE TOO HIGH LAMP ON FAILED IF THE LAMP SWITCH OFF ITSELF BALLAST MUST BE SWITCHED OFF

OPERATIONAL MESSAGES

LAMP NOT CONN. .. or LENS OPEN READ * TURNING ON LAMP HEATING LAMP ON 6 KW LAMP ON 12 KW FIRMWARE UPGRADE HEAD NOT CONNECTED OR LENS OPEN : ... THE BALLAST CANNOT SWITCH ON BALLAST READY IGNITER WORKING TIME LAMP HEATING TIME WITH DIMMER COMMAND INHIBIT BALLAST SWITCH ON WITH 6 KW LAMP BALLAST SWITCH ON WITH 12 KW LAMP FIRMWARE UPGRADE IN PROGRESS

LOG MESSAGES

TOT. HRS (6): TOT. HRS (12): HOURS (6 kW): HOURS (12 kW): STRIKES OK: FAIL. STRKS: TOTAL HOURS WITH 6 KW LAMP TOTAL HOURS WITH 12 KW LAMP RESETTABLE HOURS WITH 6 KW LAMP RESETTABLE HOURS WITH 12 KW LAMP RESETTABLE SUCCESSFUL STRIKES NUMBER RESETTABLE FAILED STRIKES NUMBER



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The <> will blink if the DMX stream is currently present.





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Display Brightness Change

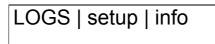
The Display Brightness can be changed by acting upon the following keys:

- key \rightarrow to increase
- key \leftarrow to decrease

The modified level of brightness is automatically saved permanently if the user enters and then exits the Setup menu (no action is required).

<u>Main Menu</u>

All menus are only operating while the Ballast is in READY status. Press the **SEL** key. The following will display:



As in all other menus, the selection must be made by acting upon the keys \rightarrow and \leftarrow : only one of the items is selected and will appear in UPPERCASE.

When the desired item is selected, press the **SEL** key: either the **LOGS** or the **SETUP** menu or INFO data, will display.

Logs Menu

The LOGS menu can only be accessed by authorized personnel, who know the Personal Identification Number, made up by 5 digits and hereafter called **PIN5** (please note that PIN5 must be entered only one time, until the Ballast will be switched off).

The Enter PIN message will appear:



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ENTER PIN5

Then the User must select, for five times, a digit in the following display:

$$0 \, {\scriptstyle 1\,2\,3\,4\,5\,6\,7\,8\,9} \, {\scriptstyle \rightarrow}^{\,\ast\,\,\ast\,\,\star\,\,\star\,\,\star}$$

- the keys \rightarrow and \leftarrow will select a digit, which will appear magnified
- the SEL key must be pressed

- an asterisk will appear in the right side. The default PIN value is (02468).

At the fifth digit, if the entered PIN is correct, the choice of viewing or resetting the logs data is displayed:

VIEW | clear

Select an item and then press SEL.

View Logs

The keys \rightarrow and \leftarrow will allow the change of the log item displayed. The **SEL** key will exit the Log display. The following items are displayed:

1 - total Ballast hours @ 6 kW

TOT.HRS(6): nnnn

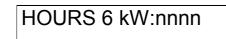
2 - total Ballast hours @ 12 kW

TOT.HRS (12): nnnn



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3 - hours @ 6 kW since last clear



4 - hours @ 12 kW since last clear

HOURS 12 kW: nnnn

5 - number of successful lamp strikes since last clear

STRIKES OK : nnnn

6 - number of failed lamp strikes since last clear

FAIL. STRKS : nnnn

Items 1- and 2- are total Ballast data and cannot be cleared. Items 3 -, 4 -, 5 - and 6 - can be cleared by user as explained below.

<u>Clear Logs</u>

A confirmation request is displayed:

SEL to clear log

If the user presses the **SEL** key, logs are cleared and then is displayed the confirm message:

Logs cleared !

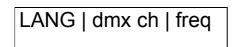


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<u>Setup Menu</u>

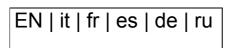
The Display Setup purpose is to allow the choice of selecting user preferred options.

The current display brightness level is automatically saved. The Setup menu currently offers tree choices:



Lang Setup

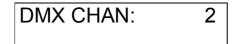
The available languages are shown:



and one of them can be selected: English, Italian, French, Spanish, German, Russian.

DMX channel Setup

The DMX channel can be selected (range 1 – 512):



The DMX channel can be changed by acting upon the following keys:

- key \rightarrow to increase selected channel number

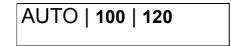
- key $\ \leftarrow \$ to decrease selected channel number

The number will advance / decrease continuously by keeping pressed the key $\,\rightarrow\,$ or the key $\,\leftarrow\,$



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Freq Setup



The output frequency can be chosen between:

- AUTO : output frequency will adjust automatically based on input mains frequency
- 100 Hz : output frequency always at 100 Hz
- 120 Hz : output frequency always at 120 Hz

Info Menu

One of that INFO data is shown, depending on current operating mode and status.

DMX operation selected:

DMX channel current value (useful for installation and test purposes), Mains Voltage, PFCCHP software release.

LOCAL/REMOTE operation, READY status: MAINS VOLTAGE current value (Volt), PFCCHP software release.

LOCAL/REMOTE operation, LAMP ON status: MAINS VOLTAGE current value (Volt), LAMP voltage value (Volt), PFCCHP software release.



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BALLAST FAULT ANALYSIS

SYMPTOM	POSSIBLE CAUSE	REMEDY
 Lamp fixtures fails to light up and make one flash for a short time. And the display message is "LAMP ON FAILURE". 	 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. And the display message is "HEAD FAULT". 	 Igniter in the lamp fixtures failed. High voltage cable damaged. Lamp holder damaged. Inverter circuit failure 	 Replace igniter. Replace high voltage cables. Replace lamp holder. Check the inverter circuit
 Red button light fails to light up when is all the system is connected and is in " ON " position the Main Breaker. And the display message is "LAMP NOT CONN.". 	 Failed termination within the mains cable connector Indicator red lamp failure. Safety circuit failure(lens door switch in the lamp fixtures) 	 Re-make terminations- Replace either the MAIN BREAKER Mains switch. or the mains filter. Check into the lamp fixture if the safety circuit is close perfectly.



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SECTION 4

SPECIFICATION & MAIN FEATURES OF DESIGN AND OPERATION.

4.1	TECHNICAL SPECIFICATION.
4.1.1	Electrical Performance.
Input voltage	185 – 265 V
Nominal effective input current	59 A (12kw) - 30 A (6kw)
Efficiency (Average) Power factor	> 0.93 > 0.95
(Average) Dimmer range On /Off control	30 %
On/Off control	Local. Remote or DMX
4.1.2	Dimensions and Weight
Dimensions	Width 265 mm. Height 420 mm. Depth 515 mm.
Weight Working position Ambient temperature	42 kg. Ballast with control panel facing front. -20+45° C
& Humidity allowed	IP23



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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) Power Factor Corrector (PFC circuit)
- (b) Current Generator (Chopper circuit)
- (c) DC AC Converter (Inverter circuit)