

## Strand Lighting Specification

### I. 3PACK – 6PACK DIGITAL DIMMER PACK(S)

#### A. GENERAL

1. The dimmer packs shall be fully digital, rugged, and designed specifically for entertainment lighting control. Each pack shall have 3 – 25A dimmers or 6 – 10A dimmers.
2. A wide variety of dimmer pack output configurations shall be available, including Terminal strip, UK 15 amp, CEE17 and Schuko.
3. Dimmer packs shall CE marked.
4. Pack setup shall be, as standard, fully user programmable.

#### B. MECHANICAL

1. The dimmer pack shall be suitable for use as a free standing, wall mounting or rack mounted enclosure. The dimmer pack shall have a main structural chassis, a removable cover for access to all components, and a front connector panel with dual output connectors, where connectors are fitted. The front panel shall have an integral LED display for set up and operator controls.
2. The pack shall be properly treated, primed and finished in fine texture, scratch resistant, Gray powder coat epoxy paint.
3. Dimmer packs shall not exceed 178mm H x 485mm W x 250mm D.
4. The dimmer pack shall weigh 14 kg, depending on pack configuration.
5. Packs shall be designed to be fully portable, rack mountable, or stackable (maximum of three in stack).

#### C. COOLING AND ENVIRONMENTAL

1. No fans shall be required to cool the dimmer pack.
2. A heat sink shall maintain the temperature of all components at proper operating levels with dimmers at any load, providing the ambient temperature of the dimmer room is within 0 to 35°C degrees C. Air shall flow over the surfaces of the heat generating components using a combination of convection and fan assisted air flow.
3. In the event of triac heatsink overheat, over temperature indication will appear on a front panel LED indicator and the pack will shut down.
4. Dimmer Packs which do not incorporate an overtemperature warning system are not equal and are not acceptable.
5. The Dimmer Pack shall operate in an environment with a relative humidity of 10-95%, non-condensing.

#### D. ELECTRICAL

1. Load terminations shall be clearly marked with the pack circuit number. Neutral and ground shall be labeled adjacent to each respective termination. Signal terminations shall be by pre-wired connectors to facilitate contracting and servicing and shall be clearly labeled.
2. The supply voltage and frequency of the pack shall be:
  - a. Three phase, 230/440V, 50/60Hz or single phase, 230/240volts 50/60Hz.
3. Maximum current of the pack shall be:
  - a. 25A for 3 phase 4 wire and 60A for single phase.
4. Each dimmer shall be protected by a thermal magnetic circuit breaker with Neutral disconnection.

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5. Dimmer packs that do not incorporate thermal magnetic circuit breakers are not equal and are not acceptable.

### E. ELECTRONICS, PHYSICAL

1. The dimmer control electronics shall be completely digital without employing any digital to analog demultiplexing schemes or analog ramping circuits.
2. All pack setup shall be achieved through front panel controls and an integral LED display.
3. The Pack Controller shall have six test buttons with LED's that shall allow users to switch on loads with accessing a control console. In addition LEDs shall be provided to indicate that power is present, dimmer control levels, overtemp status and system set up operation.
4. The Pack Controller shall have the following connectors for dimmer data: 1 each male and female 5 pin XLR connectors for DMX input and output. DMX connectors are opto-isolated from dimmer electronics.
5. The Pack Controller shall be fully configurable from the front panel and offer the following set up and operations functions:
  - a. DMX start address
  - b. DMX patch
  - c. Back up enable/disable
  - d. Min/Max level per dimmer
  - e. Dimmer fade curve
  - f. Test routines
6. The Pack Controller shall allow local control of all dimmers for test and set up purposes.
7. The dimmer pack electronics shall feature an LED display to support set up and pack operation. The display shall provide system status information including DMX start address, DMX OK and Over temperature information.
8. The dimmer pack electronics shall be fuse-protected with an accessible fuse holder on the front panel.

### F. ELECTRONICS: CONTROL AND COMMUNICATIONS

1. The control electronics shall provide the following control and communication inputs as standard:
  - a. One optically isolated DMX512 input.
2. The control electronics shall provide the following outputs as standard:
  - a. 6 phase controlled signals to control the dimmer thyristors.
  - b. One DMX512 output.
3. There shall be a DMX termination switch with LED indicator on the front panel.
4. Dimmer packs that do not feature a DMX switch are unequal and shall not be acceptable.

### G. DIMMERS, PHYSICAL

1. The dimmers shall be factory wired.

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2. One triac shall be provided for each dimmer, rated for the dimmer power rating, and mounted on a common heat sink anchored to the bottom of the housing. Each triac shall be easily field replaceable. One torroidal choke for each dimmer shall be mounted in a common assembly adjacent to the heat sink.

### H. DIMMERS, ELECTRICAL

1. One primary, circuit breaker for each dimmer is mounted to the front panel and provides for protection of individual dimmers.
2. Dimmer electronics shall be completely solid state. They shall use a single triac power device. The full load of the circuit is to be carried and controlled by each triac.
3. The circuit breaker shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current and shall disconnect the power to the dimmer module before damage can be done to the dimmer power components. The circuit breakers shall be rated for 100 percent switching duty applications and shall be a CE recognized device.

### I. DIMMERS, POWER DEVICES

1. Triac devices shall be fully encapsulated, with optically isolated firing circuits. There shall be a minimum of 2,500 volts RMS of isolation between the AC line and the control lines of the triac.
2. The triac shall be in an industry standard format that is easily field replaceable without removing any other electrical or electronic devices.

### J. DIMMERS, FILTERING

1. Each dimmer module shall have an integral inductive filter to reduce the rate of current rise time resulting from the SCR switching on. The filter shall limit objectionable harmonics, reduce lamp filament sing and limit the radio frequency interference on line and load conductors.
2. Stage dimmers shall have a rise time of not less than 110  $\mu$ s (6Pack) and 140  $\mu$ s (3Pack)

### K. DIMMERS, PERFORMANCE

1. The dimmer module shall be capable of "hot patching" cold, incandescent loads up to its full rated capacity without malfunction with the control signal at full ON.
2. Each 230/240VAC dimmer module, with circuitry in the Digital Controller, regulates output voltage with changes in the AC line from 220 to 250 volts RMS.
3. The dimmer output levels shall be regulated for incoming line voltage variations. Dimmers will maintain output RMS voltage within +/-2% with changes in load from 10 watts to full rated load at any point on the dimming curve.
4. Output RMS voltage versus setting follows a modified square law dimming curve by default. A total of four fade curves shall be available and user selectable.
5. Output waveform is a variable conduction angle 230VAC sine wave.
6. Output response time (from control signal change) is less than 0.1 seconds.
7. The power efficiency of the dimmer is a minimum of 95% at full load.