

## SPP SCRimmer II Dimmer Packs:

### General

The unit shall be constructed of aluminum, finished with black epoxy paint. All nomenclature shall be permanently silk-screened in white. The unit shall measure 24" D x 22" W x 11" H.

All load wiring shall be stranded, tinned, copper wire rated at 200° C and sized in accordance with the National Electric Code.

The unit shall be forced-air cooled by continuous duty, low-noise fans and be capable of continuous full load operation in ambient temperatures up to 104° F (40° C).

There shall be pressure-type terminals for input power and ground. The unit shall be able to operate from single-phase, 3-wire, 120/140 VAC, or three-phase, 4-wire, 120/208 VAC input power. Available in 220-240 VAC, 50 Hz configurations.

The front panel shall have an input power indicator which shall light when voltage is detected between the neutral and ground conductors.

Any control setting shall result in the same dimmer output regardless of the direction of control movement. Response time shall not exceed 100 milliseconds.

The dimmer unit shall be listed by Underwriters Laboratories.

The unit shall be the SCRimmer II with Multi-Link as manufactured by Electronics Diversified, Inc.

(choose one dimmer module)

### 2 x 2 Dimmer Modules

The 2.4kw Dimmer Modules shall consist of:

The dimmer module shall be constructed of aluminum and aluminum extrusion and shall have a pull handle on the front panel. The module shall be painted in black epoxy, with permanent, white screened markings.

The front panel of each module shall be marked with the manufacturer's name, model number, quantity and capacity of dimmers, power line voltage and frequency.

The solid-state switch devices shall be mounted in a substrate material for maximum heat dissipation. The substrate shall be encapsulated in an epoxy filled high-impact plastic case along with an optical isolator, a snubbing network and all required gating circuitry on the high voltage side of an integral opto-coupled control voltage isolator providing a minimum of 2500V RMS isolation between line and control in the switch device. A 2.4kw module shall have a minimum capacity of 40 amps, with a rating of 500 Amp peak single cycle surge current and 600V transient capacity. Dimmers that make use of solid-state switching devices that are proprietary, and available from a single source manufacturer will not be approved.

In addition to the optical isolation provided internally in the power cube device, additional protection shall employ a combination of Metal Oxide Varistors (MOV's), Pico fuses and/or transzors to provide the highest level of protection to control inputs, shall be available. Dimmers using Triacs or power cube isolation systems external to the dimmer module shall not be acceptable.

The module shall contain fully magnetic circuit breakers, filter chokes, heatsink with thermal sensor, and silicon controlled rectifiers. Except for circuit breakers, the module shall contain no moving parts.

All load connections to the module shall be by oversized pin connectors, which allows the capability of "hot patching" cold, incandescent loads up to its rated capacity without malfunction with the control signal at full on.

All internal load circuit wiring shall be constructed of tin coated stranded copper wire with extruded fluorinated propylene insulation, rated at 392° F. (200° C), and sized in accordance with the National Electric Code.

The dimmer shall be protected against overcurrents and shall withstand inrush currents, hot patches and short circuits of 0.02 ohms or more without damage. The module shall have a fully magnetic primary circuit breaker rated at 100% capacity, listed at 10,000 AIC, with a "must trip" capacity of 125%.

The dimmer module shall include a circuit which shall shut down the module when the heatsink temperature exceeds 185° F. (85° C). When temperatures return to safe levels, the module shall restart automatically. If a dimmer module overheats, provisions shall be made in the system to signal the console operator that a dimmer module has shut down. Dimmer modules without individual thermal sensors shall not be acceptable.

The solid-state relays shall be mounted to an extruded aluminum heatsink with a minimum of 300 square inches of radiating surface. A dedicated heatsink shall contain the maximum SCR heat generation extrusions to less than 75° C. Dimmers utilizing the chassis as a heatsink shall not be acceptable.

Dimmer module control connectors shall be designed so that modules of a greater capacity cannot be operated within the rated capacity of the wired position.

The dimmer shall operate over an input voltage range of 90 to 140 VAC, 50/60 Hz. Nominal input voltage shall be 120 VAC, 50/60 Hz, unless otherwise specified.

The power efficiency of the dimmer shall be a minimum of 97%. The maximum heat loss for each 2.4 kw dimmer shall be no greater than 59 watts per dimmer or 100 BTU's per hour per connected kilowatt of load.

The dimmer shall function properly with any incandescent load from 25W to the full rated capacity.

The dimming curve shall conform to the Square Law.

Any given control setting shall result in the same dimmer output regardless of the direction of control movement.

Each dimmer shall have a toroidal, copper-wound, iron-core high performance choke. Rise time ratings shall be as noted in the manufacturer's oscilloscope data, but in no case shall be less than the following:

Watts	Rise Time
1000	400 microseconds
1500	450 microseconds
2400	500 microseconds

All measurements are 10% to 90%. The alternative manufacturer must provide either high performance chokes or supply certified test data assuring compliance with the above.

Each 120V dimmer module shall be a recognized component of Underwriters Laboratories, and shall be listed for continuous duty at 100% of its ratings.

When used with EDI memory controllers, this dimmer may function as a non-dim. When functioning as a non-dim, this module shall function with both incandescent and inductive loads.

The dimmer module is the SPI 2x2 2.4Kw series as manufactured by Electronics Diversified, Inc.

## 2 x 2 Pro Dimmer Modules

The 2.4kw Dimmer Modules shall consist of:

The dimmer module shall be constructed of aluminum and aluminum extrusion and shall have a pull-handle on the front panel. The module shall be painted with black epoxy and permanent screened markings in white.

The front panel of each module shall be marked with the manufacturer's name, model number, quantity and capacity of dimmers, power line voltage and frequency.

The solid-state switch devices shall be mounted in a substrate material for maximum heat dissipation. The substrate shall be encapsulated in an epoxy filled high-impact plastic case along with an optical isolator, a snubbing network and all required gating circuitry on the high voltage side of an integral opto-coupled control voltage isolator providing a minimum of 2500V RMS isolation between line and control in the switch device. A 2.4kw module shall have a minimum capacity of 40 Amps, with a rating of 500 Amp peak single cycle surge current and 600V transient capacity.

In addition to the optical isolation provided internally in the power cube device, additional protection shall employ a combination of Metal Oxide Varistors (MOV's), Pico fuses and/or transzors to provide the highest level of protection to control inputs, shall be available.

Dimmers using Triacs or power cube isolation systems external to the dimmer module shall not be acceptable.

The module shall contain fully magnetic circuit breakers, filter chokes, heatsink with thermal sensor, and silicon controlled rectifiers. Except for circuit breakers, the module shall contain no moving parts. Dimmer modules without individual thermal sensors shall not be acceptable.

All load connections to the module shall be by pin connectors, which allows the capability of "hot patching" cold, incandescent loads up to its rated capacity without malfunction with the control signal at full on.

All load circuit wiring shall be constructed of tin-coated stranded copper wire with extruded fluorinated propylene insulation, rated at 392° F. (200° C), and sized in accordance with the National Electric Code.

The dimmer shall be protected against overcurrents and shall withstand inrush currents, hot patches and short circuits of 0.02 ohms or more without damage. The module shall have a fully magnetic primary circuit breaker rated at 100% capacity, listed at 10,000 AIC, with a "must trip" capacity of 125%.

The dimmer module shall include a circuit which shall shut down the module when the heatsink temperature exceeds 185° F. (85° C). When temperatures return to safe levels, the module shall restart automatically. If a dimmer module overheats, provisions shall be made in the system to signal the console operator that a dimmer module has shut down.

The solid-state relays shall be mounted to an extruded aluminum heatsink with a minimum of 300 square inches of radiating surface. A dedicated heatsink shall contain the maximum SCR heat generation extrusions to less than 75° C. Dimmers utilizing the chassis as a heatsink shall not be acceptable.

Dimmer module control connectors shall be designed so that modules of a greater capacity cannot be operated within the rated capacity of the wired position.

The dimmer shall operate over an input voltage range of 90 to 140 VAC, 50/60 Hz. Nominal input voltage shall be 120 VAC, 50/60 Hz, unless otherwise specified.

The power efficiency of the dimmer shall be a minimum of 97%. The maximum heat loss for each 2.4 Kw module shall be no greater than 59 watts per dimmer or 100 BTU's per hour per connected Kw of load.

The dimmer shall function properly with any incandescent load from 25W to rated capacity. The dimming curve shall conform to the Square Law.

Any given control setting shall result in the same dimmer output regardless of the direction of control movement.

Each dimmer shall have a toroidal, copper-wound, iron-core high performance choke.

Dimmers shall have a current rise time at any point on the curve of not over 0.75% of the dimmer RMS current rating (milliamperes per second). For example, a 20Amp dimmer would have a maximum rating of 100 mA/μS. This specification meets the established industry standard.

Each 120V dimmer module shall be a recognized component of Underwriters Laboratories. When used with EDI memory controllers, this dimmer may function as a non-dim. When functioning as a non-dim, this module shall function with both incandescent and inductive loads.

The dimmer module is the 2x2 Pro Dimmer SPI series as manufactured by Electronics Diversified, Inc., Hillsboro, Oregon 97124.

## 2 x 6 Dimmer Modules

The 6.0kw Dimmer Modules shall consist of:

The dimmer module shall be constructed of aluminum and aluminum extrusion and shall have a pull-handle on the front panel. The module shall be painted in black epoxy, with permanent, white screened markings.

The front panel of each module shall be marked with the manufacturer's name, model number, quantity and capacity of dimmers, power line voltage and frequency.

The solid-state switch devices shall be mounted in a substrate material for maximum heat dissipation. The substrate shall be encapsulated in an epoxy filled high-impact plastic case along with an optical isolator, a snubbing network and all required gating circuitry on the high voltage side of an integral opto-coupled control voltage isolator providing a minimum of 2500V RMS isolation between line and control in the switch device. A 6.0kw module shall have a minimum capacity of 80 amps, with a rating of 1200 amp. peak single-cycle surge current and 600V transient capacity. Dimmers that make use of solid-state switching devices that are proprietary, and available from a single source manufacturer will not be approved.

In addition to the optical isolation provided internally in the power cube device, additional protection shall employ a combination of Metal Oxide Varistors (MOV's), Pico fuses and/or transzors to provide the highest level of protection to control inputs, shall be available.

Dimmers using Triacs or power cube isolation systems external to the dimmer module shall not be acceptable.

The module shall contain fully magnetic circuit breakers, filter chokes, heatsink with thermal sensor, and silicon controlled rectifiers. Except for circuit breakers, the module shall contain no moving parts.

All load connections to the module shall be by oversized pin connectors, which allows the capability of "hot patching" cold, incandescent loads up to its rated capacity without malfunction with the control signal at full on.

All internal load circuit wiring shall be constructed of tin-coated stranded copper wire with extruded fluorinated propylene insulation, rated at 392° F. (200° C), and sized in accordance with the National Electric Code.

The dimmer shall be protected against overcurrents and shall withstand in-rush currents, hot patches and short circuits of 0.02 ohms or more without damage. The module shall have a fully magnetic primary circuit breaker rated at 100% capacity, listed at 10,000 AIC, with a "must trip" capacity of 125%.

The dimmer module shall include a circuit which shall shut down the module when the heatsink temperature exceeds 185° F. (85° C). When temperatures return to safe levels, the module shall restart automatically. If a dimmer module overheats, provisions shall be made in the system to signal the console operator that a dimmer module has shut down. Dimmer modules without individual thermal sensors shall not be acceptable.

The solid-state relays shall be mounted to an extruded aluminum heatsink with a minimum of 300 square inches of radiating surface. A dedicated heatsink shall contain the maximum SCR heat generation extrusions to less than 75° C. Dimmers utilizing the chassis as a heatsink shall not be acceptable.

Dimmer module control connectors shall be designed so that modules of a greater capacity cannot be operated within the rated capacity of the wired position.

The dimmer shall operate over an input voltage range of 90 to 140 VAC, 50/60 Hz. Nominal input voltage shall be 120 VAC, 50/60 Hz, unless otherwise specified.

The power efficiency of the dimmer shall be a minimum of 97%. The maximum heat loss for each 6.0 kw dimmer shall be no greater than 148 watts per dimmer or 100 BTU's per hour per connected kw of load.

The dimmer shall function properly with any incandescent load from 100W to the full rated capacity.

The dimming curve shall conform to the Square Law.

Any given control setting shall result in the same dimmer output regardless of the direction of control movement.

Each dimmer shall have a toroidal, copper-wound, iron-core high performance choke. Rise time ratings shall be as noted in the manufacturer's oscilloscope data, but in no case shall be less than the following:

Watts	Rise Time
2000	500 microseconds
5000	519 microseconds
6000	520 microseconds

All measurements are 10% to 90%. The alternative manufacturer must provide either high performance chokes or supply certified test data assuring compliance with the above.

Each 120V dimmer module shall be a recognized component of Underwriters Laboratories, and shall be listed for continuous duty at 100% of its ratings.

When used with EDI memory controllers, this dimmer may function as a non-dim. When functioning as a non-dim, this module shall function with both incandescent and inductive loads.

The dimmer module is the SPI 2x6 6.0Kw series as manufactured by Electronics Diversified, Inc.

#### 1 x 12 Dimmer Modules

The 12.0kw Dimmer Module shall consist of:

The dimmer module shall be constructed of aluminum and aluminum extrusion and shall have a pull-handle on the front panel. The module shall be painted in black epoxy, with permanent, white screened markings.

The front panel of each module shall be marked with the manufacturer's name, model number, quantity and capacity of dimmers, power line voltage and frequency.

The solid-state switch devices shall be mounted in a substrate material for maximum heat dissipation. The substrate shall be encapsulated in an epoxy-filled high-impact plastic case along with an optical isolator, a snubbing network and all required gating circuitry on the high voltage side of an integral opto-coupled control voltage isolator providing a minimum of 2500V RMS isolation between line and control in the switch device. A 12.0kw module shall have a minimum capacity of 125 amps, with a rating of 1400 amp peak single-cycle surge current and 600V transient capacity.

In addition to the optical isolation provided internally in the power cube device, additional protection shall employ a combination of Metal Oxide Varistors (MOV's), Pico fuses and/or transzors to provide the highest level of protection to control inputs, shall be available.

Dimmers using Triacs or power cube isolation systems external to the dimmer module shall not be acceptable.

The module shall contain fully magnetic circuit breakers, filter chokes, heatsink with thermal sensor, and silicon controlled rectifiers. Except for circuit breakers, the module shall contain no moving parts.

All load connections to the module shall be by oversized pin connectors, which allows the capability of "hot patching" cold incandescent loads up to its rated capacity without malfunction with the control signal at full on.

All internal load circuit wiring shall be constructed of tin-coated stranded copper wire with extruded fluorinated propylene insulation, rated at 392°F. (200°C), and sized in accordance with the National Electric Code.

The dimmer shall be protected against overcurrents and shall withstand in-rush currents, hot patches and short circuits of 0.02 ohms or more without damage. The module shall have a fully magnetic primary circuit breaker rated at 100% capacity, listed at 10,000 AIC, with a "must trip" capacity of 125%.

The dimmer module shall include a circuit which shall shut down the module when the heatsink temperature exceeds 185°F. (85°C). When temperatures return to safe levels, the module shall restart automatically. If a dimmer module overheats, provisions shall be made in the system to signal the console operator that a dimmer module has shut down. Dimmer modules without individual thermal sensors shall not be acceptable.

The solid-state relays shall be mounted to an extruded aluminum heatsink with a minimum of 300 square inches of radiating surface. A dedicated heatsink shall contain the maximum SCR heat generation extrusions to less than 75°C. Dimmers utilizing the chassis as a heatsink shall not be acceptable.

Dimmer module control connectors shall be designed so that modules of a different capacity cannot be operated within the rated capacity of the wired position.

The dimmer shall operate over an input voltage range of 90 to 140 VAC, 50/60 Hz. Nominal input voltage shall be 120 VAC, 50/60 Hz, unless otherwise specified.

The power efficiency of the dimmer shall be a minimum of 97%. The maximum heat loss for each 12.0kw module shall be no greater than 352 watts per dimmer or 100 BTU's per hour per connected kw of load.

The dimmer shall function properly with any incandescent load from 25W to rated capacity. The dimming curve shall conform to the Square Law.

Any given control setting shall result in the same dimmer output regardless of the direction of control movement.

Each dimmer shall have a toroidal, copper-wound, iron-core high performance choke. Rise time ratings shall be as noted in the manufacturer's oscilloscope data, but in no case shall be less than the following:

Watts    Rise Time

6000      343 microseconds

9000      382 microseconds

12000    390 microseconds

All measurements are 10% to 90%. The alternative manufacturer must provide either high performance chokes or supply certified test data assuring compliance with the above.

Each 120V dimmer module shall be a recognized component of Underwriters Laboratories. When used with EDI memory controllers, this dimmer may function as a nondim. When functioning as a non-dim, this module shall function with both incandescent and inductive loads.

The dimmer module is the SPI 1x12 12.0Kw series as manufactured by Electronics Diversified, Inc.

#### Control Module:

The control module shall slide into the front of the rack and all wiring shall terminate in plug connectors.

The control unit shall properly receive USITT DMX-512 digital multiplex, AMX-192 analog multiplex, or RS422 digital multiplex via a 5-pin XLR-type connector. The multiplex format may be changed by a single front-panel-mounted switch.

Upon receipt of a valid multiplex signal, a yellow indicator shall light. A maximum two-second pause in any portion of the multiplex transmission shall be tolerated without adversely affecting the dimmer output.

The dimming system shall be able to operate simultaneously on a multiplex signal and analog 0-10 volt signal.

The system shall illuminate a pilot light for each power phase during operation. Input power to the control module shall be fused.

The control module shall support individual output test buttons for each dimmer. The test buttons shall bump the output of the dimmer to FULL momentarily or lock to an ON position

without a signal from a console present. The test button shall indicate status of the dimmer by proportionally illuminating when the dimmer is addressed.

The control module shall support a diagnostics routine to confirm operational status.

All dimmer control electronics shall be contained on a double-sided, through-hole plated-fiberglass circuit board.

The control module shall be a recognized component of Underwriters Laboratories and so labeled.

The unit shall be the Multi-Link series as manufactured by Electronics Diversified, Inc., Hillsboro OR 97124 USA.