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SCRimmerette IIATM
Dimmer Pack

USER'S MANUAL

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DESCRIPTION

SCRimmerette IIA dimmer packs provide many dimmers in a limited space. Packs can be portable or wall-mounted. They accept either analog or digital control input, so they can be used with any EDI controller. Analog control voltage may be calibrated for a range of 2-7.6 VDC or 0-10 VDC. Packs using digital control input may be daisy-chained for separate address of up to 255 dimmers. Multiple packs may be assigned the same address and will work in parallel.

The front panel contains primary circuit breakers (one per dimmer), analog and digital control input connectors, a digital control output connector, an optional one-step phase change block and wheels for setting dimmer address assignments. There are also phase indicator lights and fuses, an input power error light, an overheat light, and a digital signal LED. The small cover plate (with two screws) provides access to the calibration change switch and lo set, high set, gain and offset pots.

The back panel contains load connectors, a 20 Amp convenience outlet with breaker, a load test outlet and optional load breakers. Back panels are interchangeable for conversion from one load outlet type to another, if necessary. Two 55 CFM cooling fans are mounted inside the power pack. Their intake and exhaust vents on each side MUST NOT BE BLOCKED.

INPUT POWER CONNECTION

Before connecting input power, turn off the breaker controlling the power source and turn off all breakers on the front of the dimmer pack.

Remove the two screws on each side of the pack cover. If the pack has load circuit breakers, also remove the two screws on top of the cover, near the back. Lift off the cover, by pulling up and slightly forward. Route the feed cable through the cable clamp, and make the required connections to the terminal strip inside. Snug down all terminal screws firmly, watching for stray wire strands, which could cause shorts. Replace the cover and tighten the cable clamp.

The SCRimmerette IIA dimmer pack can run on input power which is 1 \emptyset , 3-wire, 120/240 VAC or 3 \emptyset , 4-wire, 120/208 VAC. Each is connected in a slightly different way, as shown on the next page.

NOTE: If SCM II unit has the optional phase change block, make sure it is in either single phase (1 \emptyset or triple phase (3 \emptyset position, as appropriate. (Refer to page 6).

1 \emptyset , 3-wire, 120/240 VAC

1. Connect GROUND to the lug next to the terminal block. Ground MUST be connected.
2. Connect NEUTRAL to the N terminal.
3. Connect LINE 1 to the L1 terminal, and LINE 2 to the L2 terminal. Connect nothing to no connection terminal.

When this input power is used, all three phase indicator lights will come on.

3 \emptyset , 4-wire, 120/208 VAC

1. Connect GROUND to the lug next to the terminal block. Ground MUST be connected.
2. Connect NEUTRAL to the N terminal.
3. Connect PHASE A (LINE 1) to the $\emptyset A$ terminal, PHASE B (LINE 2) to $\emptyset B$ terminal, and PHASE C (LINE 3) to $\emptyset C$.

When this input power is used, all three phase indicator lights will come on.

The Input Power Error light, on the front panel, comes on if power is wired in wrong. For example, line and neutral may have been reversed. Even if the proper phase lights are lit, there is something wrong, if the Input Power Error lamp also comes on. The Input Power Light will light even if all the circuit breakers on the SCM II are off.

INPUT POWER CABLE SELECTION

Maximum current draw per phase depends on which SCRimmerette II model is being used, as shown in the chart below.

| MODEL | 1Ø, 3-wire | 3Ø, 4-wire |
|----------------------------|------------|------------|
| SCM II 24-1 SCM II 12-2 | 120 A | 80 A |
| SCM II 6-6 | 150 A | 100 A |
| SCM II 6-7 SCM II 12-3 | 180 A | 120 A |
| SCM II 3-12 | N/A | 100 A |

Solid-state dimmers are sensitive to resistance and the resulting voltage drop in the power feed cable. An excessive voltage drop will cause the dimmers to interact and flicker. This is especially true of the neutral conductor in three-wire systems. The neutral conductor must be the same size or larger than the largest line conductor.

The wire ampacity table is included as a guide for selecting the minimum wire size to be used.

| Amps | THW 3 conductors in cable or raceway | THW single conductor free air | S, SJ, SO | ground |
|------|--|-------------------------------------|-----------|--------|
| 40 | 8 | 10 | 6 | 10 |
| 60 | 6 | 8 | 4 | 10 |
| 80 | 4 | 6 | 2 | 10 |
| 120 | 1 | 4 | | 8 |
| 140 | 1 | 3 | | 8 |

Source: 1981 NEC

LOAD CONNECTION

Load outlet connectors are on the back panel of the dimmer pack. They are one of four types, as shown on the next page. If necessary, connector types may be changed by removing the back panel and replacing it with one containing different connectors. The load test outlet on the back panel is identical to the connectors. Use it to check out a potential load without affecting any of the dimmers. A load may be from 1 watt to the rated capacity of each dimmer in that pack.

Be sure all circuit breakers are off before connecting loads to the pack.

**PARALLEL BLADE
RECEPTACLE**
5-20R (20 Amp)

Neutral

120V (Hot)

Ground

120 V (Hot)

Neutral

**TWIST-LOCK
RECEPTACLE**
L5-20R (20Amp) or
L5-30R (30Amp)

Ground

**GROUNDING STAGE PIN
RECEPTACLE**
20 Amp

30, 60, 100 Amps

**TERMINAL STRIP
RECEPTACLE**
(Any Amperage)

120 V (Hot)

Ground

120 V (Hot)

Neutral

Neutral

Ground

Ground

ANALOG CONTROL CONNECTION

Plug the cable leading from the controller into the dimmer pack front panel, where appropriate. For analog control, units with 24 dimmers have two 15-pin connectors. All other models have one 15-pin connector. The pins are assigned as follows:

| MODEL | PIN | FUNCTION |
|--------------------|------|---|
| SCM II 24-1 | 1-12 | dimmers 1-12 (connector 1) dimmers 13-24 (connector 2) |
| | 13 | +5-25 VDC fan control |
| | 15 | ground |
| SCM II 12-3 | 1-12 | dimmers 1-12 |
| SCM II 12-3 | 13 | +5-25 VDC fan control |
| | 15 | ground |
| SCM II 6-6, 6-7 | 1-6 | dimmers 1-6 |
| | 13 | +5-25 VDC fan control |
| | 15 | ground |
| SCM II 3-12 | 1-3 | dimmers 1-3 |
| | 13 | +5-25 VDC fan control |
| | 15 | ground |

15 Pin Jones Socket Channel Output Connector Diagram

For Analog control, packs may be calibrated for a range of 2-7.6 VDC or for a range of 0-10 VDC. The selection switch is located behind the small plate (with two screws) on the control module faceplate. Simply set the switch at 0-10 or 2-7.6 setting. The controller and the dimmer pack(s) must be calibrated alike.

DIGITAL CONTROL CONNECTION

Plug the cable leading from the controller into the dimmer pack front panel, where appropriate. Packs using digital control may be daisy-chained. Use the accessory cable(s) to connect packs, making sure control is coming OUT of the first pack and INTO the next and so on. For digital control, the pins are assigned as follows:

| PIN | FUNCTION | PIN | FUNCTION |
|-----|---------------------|-----|---------------------|
| 1 | AS--Address Strobe | 9 | AD0--Address/Data 0 |
| 2 | AD1--Address/Data 1 | 10 | AD2--Address/Data 2 |
| 3 | AD3--Address/Data 3 | 11 | AD4--Address/Data 4 |
| 4 | AD5--Address/Data 5 | 12 | AD6--Address/Data 6 |
| 5 | AD7--Address/Data 7 | 13 | DS--Data Storage |
| 6 | Over Temp | 14 | Over Temp |
| 7 | Ground | 15 | Ground |
| 8 | Fan | | |

"D" Connector
Channel OUTPUT Diagram

"D" Connector
Channel INPUT Diagram

SCM IIA OPERATION

FOR FIRST TIME USE: READ CONNECTION AND OPERATION INFORMATION CAREFULLY BEFORE ATTEMPTING TO USE EQUIPMENT.

The basic power-up procedure for the SCRimmerette IIA is as follows:

1. With all circuit breakers off, connect input power, loads, and controller. (As directed on page 4).
2. Turn on all circuit breakers.
3. Turn on the controller, checking to be sure the fans start. DO NOT block the air vents on each side of the dimmer pack.

There is a circuit breaker on the front panel for each dimmer in the pack. Circuit breaker 1 controls power to the fans as well as to dimmer 1.

There is a separate firing circuit for each phase; therefore certain dimmers also switch power to each of the firing circuits.

The "lead" circuit breaker for each phase is the first one for that phase, as listed in the chart below. When one of these breakers is turned off, the indicator lamp for that phase will go out and all dimmers on that phase will go out.

On a 12-pack, for example, breaker 1 controls power to dimmers 1, 4, 7, and 10; breaker 2 controls power to dimmers 2, 5, 8, and 11; breaker 3 controls power to dimmers 3, 6, 9, and 12. If these "lead" breakers are off, all dimmers controlled by them will be off. Remaining breakers control power only to their own dimmers. Dimmers are distributed among phases as follows:

| | | | |
|-------|--|--------------------------|-------------|
| Phase | SCM II 24-1 | | |
| 3ØA | 1, 4, 7, 10, 13, 16, 19, 22 | | |
| B | 2, 5, 8, 11, 14, 17, 20, 23 | | |
| C | 3, 6, 9, 12, 15, 18, 21, 24 | | |
| 1ØA | 1, 2, 4, 7, 8, 10, 13, 14, 16, 19, 20, 22 | | |
| B | 3, 5, 6, 9, 11, 12, 15, 17, 18, 21, 23, 24 | | |
| Phase | SCM II 12-2 SCM II 12-3 | SCM II 6-6 SCM II 6-7 | SCM II 3-12 |
| 3ØA | 1, 4, 7, 10 | 1 and 4 | 1 |
| B | 2, 5, 8, 11 | 2 and 5 | 2 |
| C | 3, 6, 9, 12 | 3 and 6 | 3 |
| 1ØA | 1, 2, 4, 7, 8, 10 | 1, 2, 4 | Not |
| B | 3, 5, 6, 9, 11, 12 | 3, 5, 6 | Available |

If the pack has a phase change block on the front panel, check to be sure it is set for the proper input power. Either "1Ø" or "3Ø" will be visible to the left or right of the block. To change this, simply pull the block out, reverse it and plug it back in. Our illustration shows the block set for 3Ø power.

When control is turned on, the fans will start (providing, of course, that breaker 1 is also on). DO NOT block intake and exhaust vents on the sides of the pack. When control is turned

off, the fans will stop. For extended periods of inactivity, it's best to turn off the circuit breakers.

The dimmer pack has an overheat protection circuit for each power phase. Should a dimmer overheat, all or part of the pack will shut down automatically and the overheat light on the front panel will come on. (The overheat light will also come on for approximately 1/4 of a second, when power is applied to or removed from the pack.) The dimmer(s) will re-set automatically when cooled.

Dimmers receiving digital control must each be assigned to a control channel. Remember that packs may be daisy-chained for separate address of up to 255 dimmers. Multiple packs may be assigned the same address number and will then work in parallel. Assignments are made using the thumb wheels on the front panel of each dimmer pack.

For packs containing up to 12 dimmers, only the FIRST dimmer ("dimmer 1") receives a code assignment. The others automatically follow in sequence. Packs containing 24 dimmers require a second assignment for the 13th dimmer. (See Example 2 below.)

Note: If, using digital, you assign the code "0 0 0", this turns off the pack.

Example 1: Your pack contains six dimmers, which you want to assign to dimmers 73-78.

Turn wheel 1 until 0 appears; turn wheel 2 until 7 appears; and turn wheel 3 until 3 appears. Your thumb wheels should now look like those in the illustration.

Remember that setting the first code number automatically codes the remaining dimmers, too. Note that if another dimmer pack is to follow this one in sequence, its first dimmer assignment (for dimmer 79) would be 079.

Example 2: Your pack contains 24 dimmers which you want to assign as dimmers 1-24. You must make one assignment for dimmers 1-12 and another for dimmers 13-24.

There are two pairs of thumb wheels on the 24 pack; use the top pair for setting the first dimmer assignment, and the bottom pair for

setting the second assignment.

Using only the top row of thumb wheels, turn wheel 1 to 0; turn wheel 2 to 0; and turn wheel 3 to 1. This automatically assigns dimmer numbers 1-12 to the first 12 dimmers in the pack. Another assignment must now be made for dimmers 13-24. Using only the bottom row of thumb wheels, turn wheel 1 to 0; turn wheel 2 to 1; and turn wheel 3 to 13. Your thumb wheels should now look like those in the illustration.

Again, this configuration takes care of all remaining dimmers in the pack. Note that another dimmer pack following this one in sequence would receive code number 025 (for dimmer number 25). If this pack also contained 24 dimmers, it would receive a second code assignment of 037, representing dimmer 37.

Example 3: To run two separate packs in parallel, simply set thumb wheels for both SCRimmerette IIA packs to the same dimmer configuration (sample configurations shown in example 1 and 2) and connect the output cable from one pack into the input connector of the other pack.

SCM II SPECIFICATIONS

GENERAL: SCR phase-control dimmers with firing circuits and all connectors in one unit. All control electronics on plug-in control module. All calibration controls front panel accessible. Forced-air cooling by two 55 CFM fans. Wall-mounting or portable.

CABINET: All heavy-duty, code-gauge materials, finished with black epoxy paint. Front and back panels anodized with all markings silk-screened in white.

DIMENSIONS: Portable Unit-9" x 22 5/8" x 20" (23 x 57.5 x 51cm)
Wall-Mounted Unit-(without rubber feet)-8 1/2" x 22 5/8" x 20" (21.5 x 57.5 x 51 cm)

WEIGHT: 82 lbs (370Kg) for SCM II 6-7 with load breakers. Weights vary +/- 10 lbs depending on model and presence of load breakers.

ENVIRONMENT: MAXIMUM ambient operation and storage temperature is 104°F (40°C) with 90% humidity, non-condensing.

ANALOG CONTROL INPUT: 2-7.6 VDC or 0-10 VDC.

DIGITAL CONTROL INPUT: 8-bit address/data bus, address strobe and data strobe.

INDICATORS: Input power error light, power light per phase, overheat light, and digital signal light.

PROTECTION: Magnetic primary circuit breaker for each dimmer, optional load breakers. (SCM II 24-1 models have thermal breakers.)

LOAD: 1 watt to rated incandescent capacity.

DIMMING CURVE: Square Law.

EFFICIENCY: 97% or better.

FILTERING: Toroidal, copper-wound, iron-core inductor per dimmer. Dimmers have current rise at any point on the curve of not over 0.75% of dimmer rms current rating (milliamps per microsecond).

INPUT VOLTAGE RANGE: 90-140 VAC, 50/60Hz.

POWER REQUIREMENTS: Refer to chart on page 2.

LOAD CONNECTOR OPTIONS: Standard parallel blade, NEMA 5-20R (20 Amp); Twist-lock, NEMA L5-20R (20Amps) or L5-30R (30 Amp); Grounded stage pin (20, 30, or 60 Amp); Terminal Strip (20, 40, 60 or 100 Amp) with line, neutral and ground per dimmer.

ANALOG CONTROL CALIBRATION

NOTE: a calibrated ANALOG CONTROLLER must be used during the following procedure. If an analog controller is not available, apply volts to the analog back-up pin instead. For 2-7.6 systems, use 2 volts for 0 level and 7.6 for full on level. For 0-10 systems, use 0.5 volts for 0 level and 10 volts for full on level.

The SCRimmerette IIA can be calibrated for 2-7.6 or 0-10 VDC. (The selection between 0-10 and 2-7.6 is determined by the position of the calibration switch-behind the small face plate with two screws). The calibration of the controller used determines the calibration of the dimmer pack. For this reason the controller calibration and the position of the calibration selection switch should be verified before calibrating the dimmer pack.

Voltage measurements in this procedure are made at the 120VAC dimmer output connectors at the rear panel. Many voltmeters cannot accurately measure the output waveforms of a solid-state dimmer. Use either a true RMS voltmeter such as an iron-vane type, or, preferably, an oscilloscope. All work inside the console should be done by a qualified service technician.

1. Disconnect digital cable (if connected).
2. Remove front plate on dimmer module tray. (First remove the two screws and lift the cover away).
3. The row of calibration controls is now visible. (Refer to illustration on the following page for calibration pot identification).

-A load of at least 100W must be used.
4. Set the controller for full intensity (100%) on dimmer 1 and measure the output. Adjust the High Set on the card for maximum output. Do not advance the control beyond maximum; set it just at the threshold of maximum output.
5. Set the controller for minimum intensity (0%) and measure the output. Adjust Phase A's Low Set (A Low Set) for 8V rms or 80V peak-to-peak. If the Low Set will not calibrate, check that the High Set is not advanced too far.
6.
 - A. To finish calibration for 30 models, repeat steps 4 and 5 using dimmer 2 and repeat again for dimmer 3. All dimmers in the pack will be calibrated.
 - B. To finish calibration for 10 models, repeat steps 4 and 5 using dimmer 3. All dimmers in the pack will be calibrated.

| | | | | | | | |
|---------|---------|-----|------|------|-------|--------|--------|
| A | B | C | High | 0-10 | 2-7.6 | 0-10 | 2-7.6 |
| Low Set | Low Set | Set | Set | Gain | Gain | Offset | Offset |

Front View of Calibration Controls

DIGITAL CONTROL CALIBRATION

Note: to calibrate a digital control you MUST use a DIGITAL CONTROLLER during calibration procedure. There is no interaction between the 0-10 and 2-7.6 range; each range must be calibrated separately.

1. Perform analog calibration first.
2. Connect digital controller and digital cable.
3. Disconnect analog cable.
4. Connect meter + to D1 (Dimmer 1) and - to GND (Ground).
5. Set dimmer 1 to 0 and adjust the OFFSET pot for minimum intensity. (0.2V for 0-10 system or 1.6V for 2-7.6 system.)
6. Set dimmer 1 to full and adjust the GAIN pot for full intensity. (9.6V for 0-10 system or 7.2V for 2-7.6 system.)
7. Repeat until the adjustments are balanced for minimum and maximum output.
8. Repeat steps 4 through 7 using dimmer 13 (for 24 dimmer packs).

TROUBLE-SHOOTING GUIDE

If the unit is under warranty, do not attempt to service; opening the console may void the warranty. Consult with EDI's Customer Service Department before doing any maintenance or repair on a unit under warranty. All work inside the console should be done only by a qualified service technician.

For any malfunctions, first check for physical damage, broken or pinched wires, broken sliders, or loose connections.

Problems not listed in the trouble-shooting guide or caused by physical damage to components or wiring imply a faulty circuit card. The cards can be easily removed and exchanged.

PROBLEM:

CAUSE:

Input Power Error Light on:

A voltage has been applied between the neutral and ground input power terminals. Check that the neutral conductor has been installed in the neutral terminal, and not exchanged with one of the 120V conductors.

Phase A, Phase B, or Phase C indicator lamps go out:

Power has not been applied to either input power terminal Ø A (Line 1) or Ø B (Line 2), or Ø C (Line 3).

Entire console non-functional:

- Circuit Breaker 1 off.
- Fuse 1 blown.
- Input power wired wrong or absent.
- Power Switch off.
- Input power terminal L1 not used.
- Console overheated.

Dimmers 4, 5, and 6 only non-functional:

- Circuit Breaker 4 off.
- Fuse 2 blown.
- Input wiring error. If 1Ø, 2-wire power is used, check whether internal wire 2 has been moved to terminal L1.

Dimmers interact or flicker:

-Bad digital cable. (Try a spare cable.)

There is excessive voltage drop in the input power cables or the lamp cables (a problem in 3-wire power systems). Refer to the Cable Selection Guide and check that the input power cables are neither too small nor too long. The neutral conductor must be at least as large as the largest 120V conductor. Check that each lamp has a separate neutral conductor, equal in size to the 120V conductor. Check all power connectors in the system; a dirty or loose connector can cause this problem. Measure the voltage between neutral and ground at the console power terminals, not the power source; it should be zero.

Dimmers do not go up or down smoothly:

-Bad digital cable.

Lamps go off before sliders reach zero:

-Check calibration of controller and Low Set. Refer to calibration instructions.

Lamps glow slightly with sliders at zero:

-High Set advanced too far.

Lamps full on before sliders reach 10:

-Check calibration of controller and High Set. Refer to calibration instructions.

Lamps less than full on with sliders at 10:

-Check Calibration of controller and High Set. Refer to calibration instructions.

Single dimmer full on at any control setting:

-SSR faulty.

Single dimmer off:

- Circuit breaker off.
- SSR faulty.
- Faulty control cable.

Overheating:

- Blocked cooling vents.
 - Overloaded dimmers.
- The console will shut down automatically when overheated and reset when cooled.

Fan does not start:

- Analog: No +10-25V on pin 13.
- Controller turned off.
 - Faulty control cable.
 - Circuit Breaker 1 off.
 - Blown fuse.