Strand Lighting

PRODUCT DATA

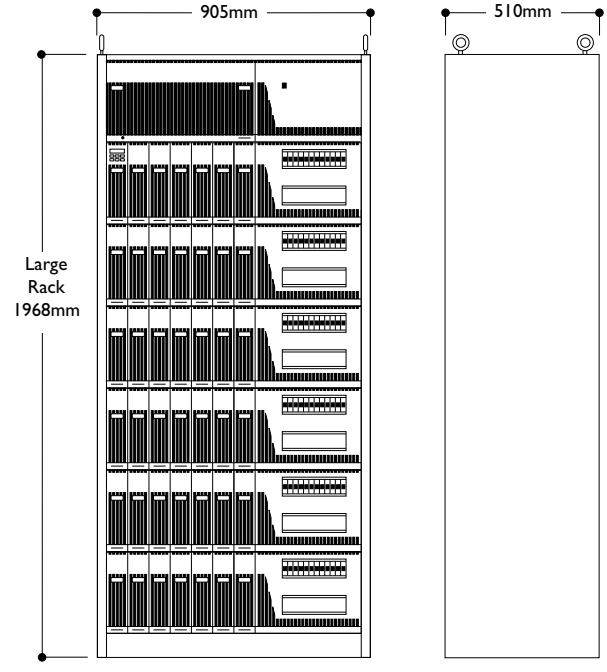
# 7.4.3

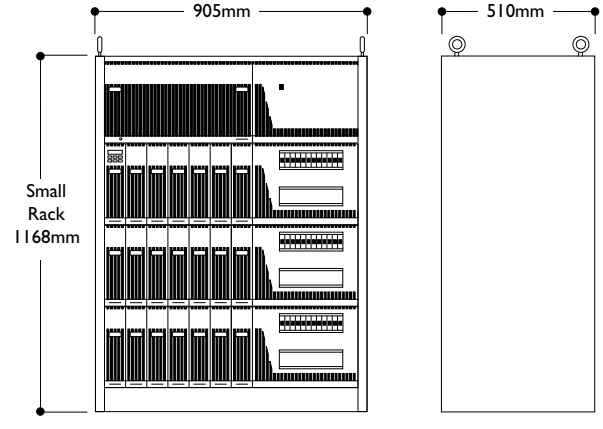
DIMMING

# EC90 SUPERVISOR™

## *Modular Digital Dimming with Reporter™ Option*

- Plug-in modular digital dimming system for mid to high specification applications
- Two rack sizes: Large - with up to 72 x 3kW, 36 x 6kW or 18 x 10kW dimmers per rack; Small - with 36 x 3kW, 18 x 6kW, 9 x 10kW dimmers per rack
- Dual electronics option for full redundant tracking backup with selectable auto-switchover
- 4 levels of dimmer performance are available: Standard, Standard with Status Reporting, High-specification, and High-specification with Status Reporting
- 3kW contactor module options to switch motors, HMI ballasts and other non-dimmable equipment
- Status Reporting modules (including contactors) detect: No load, Overload, Over temperature, Excess DC, Internal fault, MCB trip, Thyristor short circuit, Load profile errors, live status reporting of RMS output voltage and current, module temperature and DC output voltage, per dimmer
- Reporting modules, including non-dims, can detect a load change, down to 10% of the dimmer's power rating, detecting failure of an individual element of a paralleled load
- Reporting modules may perform Load Cable Compensation, using the programmed cable resistance (per circuit) and load characteristic to continuously compensate for voltage drop
- Racks may contain a mixture of dimmer types including reporting and non-reporting
- Load status reporting to PC using the Reporter™ PC software
- "Panic" function, to bring selected dimmers to full, operational without processor and can be actuated manually or automatically (e.g. by a fire alarm system)
- Precision line voltage regulation to minimise output changes when the supply voltage fluctuates
- Two opto-isolated Mux inputs with individual patches provided as standard
- DMX 512, SMX, AMX 192 and D54 control protocols supported
- Up to 32 analogue +/- 10V inputs per rack, patchable to any dimmer
- 99 System Wide Control, SWC™ memories for additional preset and backup use, using simple "snapshot" recording
- Direct circuit and preset control by hand-held System Wide Control (SWC™) programmer with specialised riggers functions
- 16 room (zone) by 8 preset Outlook™ architectural lighting control for auditorium, front of house and other "zoned" uses
- Library of 6 fixed and 5 down-loadable dimmer curves, programmable per dimmer
- 16 bit digital fade processing to ensure smooth fades with 8 bit protocol
- LED Outputs for remote Overtemp/Fan fail, Panic and Active processor (dual systems)
- 12 independent fully programmable +10V analogue signal outputs (large processor only)
- Complies with all mandatory European safety and EMC regulations




**EC90 Supervisor™ is a high-specification dimming system that incorporates advanced electronic and mechanical design concepts to meet the most demanding requirements. All dimmer modules are available with *Reporter*™ functions, enabling load characteristics to be measured and reported to a remote PC. EC90 Supervisor dimmer racks are available configured to an exact specification from components described below, or with a standard complement of dimming modules as listed.**

## A GUIDE TO SYMBOLS AND ABBREVIATIONS

**GENERAL** Supply voltage Current rating in amps Weight of product Overall dimension of product Packed weight Packed volume ✔ Compliance with international standards Quantity of dimmers Typical memory capacity Plan dimension (footprint) Control protocol as follows:
Analogue: Wire-per-dimmer. 0V is off, +10V is full on. D54: Strand European Analogue multiplex standard.
DMX: USITT DMX512 SWC: System Wide Control. For direct communication between digital dimmer processors. DNC: Digital Network Control. For Outlook range of architectural control stations.
SMX: Strand Multiplex for high speed bi-directional transmission of dimmer status data. EMC Electro Magnetic Compatibility EC European Community

## EC90 Supervisor Racks

Two sizes available - large for 6 crates; small for 3 crates. The maximum capacity of a small rack is 36 x 3kW, or 18 x 6kW or 9x10kW. Large racks can accommodate a maximum of 72 x 3kW, or 36 x 6kW or 18 x10kW. Crate types can be mixed in any rack, and there is top and bottom cable access.

## EC90 Supervisor Crates

Crates are available for six dual 3kW modules or six single 6kW modules or 3x10kW. Each crate version is available with Single Pole, Single Pole (Neutral Disconnect) or Double Pole protection.

## EC90 Supervisor Modules

Dimmer modules are available in five module categories: dual 3kW Economy dimmers; dual 3kW Hi-Spec dimmers; single 6kW Hi-Spec dimmers; 3kW Hi-Spec dimmer/contactor modules and double width 10kW dimmers. All dimmer and contactor modules are available in standard or *Reporter*™ versions.

### 3kW Dimmer Module

Economy module with two 3kW firm-fired thyristor dimmers and standard filtering.

### 3kW High Specification Dimmer Module

High specification module with two 3kW hard-fired thyristor dimmers and Broadcast TV-standard filtering.

### 6kW High Specification Dimmer Module

High specification module with a single 6kW hard-fired thyristor dimmer and Broadcast TV-standard filtering.

### 10kW High Specification Dimmer Module

High specification module with a single 10kW hard-fired thyristor dimmer and Broadcast TV-standard filtering.

### Hybrid Contactor Modules

Three modules which offer dual contactor, dimmer/contactor or contactor/dimmer (left/right positions) versions. Both dimmers and contactors are rated at 3kW, and the dimmers are hard-fired thyristors with Broadcast-standard filtering.

### EC90 Supervisor and Reporter™ Functions

All versions of EC90 *Supervisor* module can be supplied as standard or with *Reporter* features which operate with a remote PC.

Standard Supervisor functionality from a remote PC includes:

- Dimmer setup functions (library and user programmable curves, max/min outputs, dimmer response times, etc.)
- Patch setup for Mux A, Mux B and analogue inputs
- Direct dimmer and preset control
- Rack fan fail warning
- MUX failure A, B
- Master/Backup active or tracking

**Additional *Reporter* Features Include**

- Memorised load per dimmer.
- Warning if load deviates from memorised value.
- No load.
- Dimmer fault.
- Breaker trip: thyristor (or contactor) short circuit plus thyristor (or contactor) open circuit
- No control of dimmer.
- Excess DC voltage output.
- Overheat per dimmer.
- Overload current per dimmer.

## EC90 Supervisor 72 x 3kW

Standard configuration large rack with 36 dual 3kW dimmer modules. Racks available with standard specification or high specification modules, and with or without Reporter™ options (see general details). Racks also may be configured to special order.

V 230V phase/neutral TNS, 50/60Hz A 600A (three phase) W 72 x 3kW ▶| 72 ◔ 99 ▮▮▮▶ DMX 512, D54, SMX, SWC, DNC, analogue 0 - 10V (+/-) ▞ 1964 x 910 x 510mm 🔒 310kg (370kg with hi-spec modules) ☑ 910 x 510mm ✔ EN50081-1, EN55014, EN50082-1, IEC 1000-2-2, EN60950, EN60439 Part 1 (also part 12, BS5486), IP20 to EN60529

| Cat. No. | Description |
|---|---|
| 74461 | EC90SV, 72 x 3kW, standard, Reporting |
| 74462 | EC90SV, 72 x 3kW, standard |
| 74471 | EC90SV, 72 x 3kW, hi-spec, Reporting |
| 74472 | EC90SV, 72 x 3kW, hi-spec |

## EC90 Supervisor 36 x 3kW

Standard configuration small rack with 18 dual 3kW dimmer modules. Racks available with standard specification or high specification modules, and with or without Reporter™ options (see general details). Racks also may be configured to special order.

V 230V/240V phase/neutral star supply, 50/60Hz A 300A W 36 x 3kW ▶| 36 ◔ 99 ▮▮▮▶ DMX 512, D54, SMX, SWC, DNC, analogue 0 - 10V (+/-) ▞ 1162 x 910 x 510mm 🔒 185kg (215kg with hi-spec modules) ☑ 910 x 510mm ✔ EN50081-1, EN55014, EN50082-1, IEC 1000-2-2, EN60950, EN60439 Part 1 (also part 12, BS5486), IP20 to EN60529

| Cat. No. | Description |
|---|---|
| 74463 | EC90SV, 36 x 3kW, standard, Reporting |
| 74464 | EC90SV, 36 x 3kW, standard |
| 74473 | EC90SV, 36 x 3kW, hi-spec, Reporting |
| 74474 | EC90SV, 36 x 3kW, hi-spec |

## EC90 Supervisor 36 x 6kW

Standard configuration large rack with 36 single 6kW dimmer modules. Racks include high specification modules, with or without Reporter™ options (see general details). Racks also may be configured to special order.

V 230V/240V phase/neutral star supply, 50/60Hz A 600A W 36 x 6kW ▶| 36 ◔ 99 ▮▮▮▶ DMX 512, D54, SMX, SWC, DNC, analogue 0 - 10V (+/-) ▞ 1964 x 910 x 510mm 🔒 310kg (370kg with hi-spec modules) ☑ 910 x 510mm ✔ EN50081-1, EN55014, EN50082-1, IEC 1000-2-2, EN60950, EN60439 Part 1 (also part 12, BS5486), IP20 to EN60529

| Cat. No. | Description |
|---|---|
| 74481 | EC90SV, 36 x 6kW, hi-spec, Reporting |
| 74482 | EC90SV, 36 x 6kW, hi-spec |

## EC90 Supervisor 18 x 6kW

Standard configuration small rack with 18 single 6kW dimmer modules. Racks include high specification modules, with or without Reporter™ options (see general details). Racks also may be configured to special order.

V 230V/240V phase/neutral star supply, 50/60Hz A 300A (three phase) W 18 x 6kW ▶| 18 ◔ 99 ▮▮▮▶ DMX 512, D54, SMX, SWC, DNC, analogue 0 - 10V (+/-) ▞ 1162 x 910 x 510mm 🔒 185kg (215kg with hi-spec modules) ☑ 910 x 510mm ✔ EN50081-1, EN55014, EN50082-1, IEC 1000-2-2, EN60950, EN60439 Part 1 (also part 12, BS5486), IP20 to EN60529

| Cat. No. | Description |
|---|---|
| 74483 | EC90SV, 18 x 6kW, hi-spec, Reporting |
| 74484 | EC90SV, 18 x 6kW, hi-spec |

## General Specifications

| | |
|---|---|
| **Rack** | Large takes 6 crates (36 single-width modules).<br>Small takes 3 crates (18 modules).<br>Welded steel construction finished in dark grey (BS4800 "Storm Grey") powder paint.<br>Over temperature warning on rack, remote console or PC.<br>Phase OK neon indicators provided. |

## Mechanical

| | |
|---|---|
| **Installation** | Racks designed for adjacent mounting or back to back (front access only required).<br>Racks can be bolted to floor.<br>Module removal requires use of a tool. |
| **Ventilation** | Max ambient temperature 40°C.<br>Dual tangentil cooling fans. A single fan failure forces the second fan to full. Variable or continuous fan speed control for minimum acoustic noise, and maximum fan-life. |

## Electrical

| | |
|---|---|
| **Rack Power Input** | 220V to 240V 3 phase, neutral + earth TNS<br>600A per phase maximum, 50Hz/60Hz. |
| **Bus Bars** | Bus bars rated at 50kA fault current. |
| **Standard Load Wire Terminal Size** | 10mm2 for 3kW, 16mm$^2$ for 6kW, and 25mm$^2$ for 10kW dimmers. |
| **Phasing** | Single phase by strapping busbars, with max. current 600A per rack.<br>3-phase Delta to special order.<br>Crates are normally 3-phase, Single phase available to special order.<br>Most requirements for custom dimmer phasing are possible to special order. |
| **Standards** | Conforms to all mandatory European safety and EMC standards, including EN60950, EN50081, EN50082. All High Specification modules comply with BBC noise specifications PID/171. |
| **Protection** | A rack can be supplied with most power and protection combinations including RCD's on most crates.<br>Provision for optional 4-pole rack isolator. |

## Control Logic

All or individual dimmers may be programmed to conform to a selection of control logic rules.

## Rack Dimensions and Weights

| | Large rack | Small rack |
|---|---|---|
| **Height** | 1,964mm | 1,162mm |
| **Width** | 910mm | 910mm |
| **Depth** | 510mm | 510mm |
| **Weight (full)** | | |
| **Standard Modules** | 310kg | 185kg |
| **High spec. Modules** | 370kg | 215kg |
| **Weight (empty)** | 205kg | 135kg |

## Power Modules

| Type | Firing | Rise Time (10-90%) | Current |
|---|---|---|---|
| **Dual 3kW** | Firm | 100 µs | 2 x 16A |
| **Dual 3kW** | Hard | 450 µs | 2 x 16A |
| **6 kW** | Hard | 450 µs | 32A |
| **Double width 10kW** | Hard | 450 µs | 50A |
| **3kW dimmer & contactor** | Hard + c | 450 µs | 2 x 16A |
| **3kW contactor & dimmer** | c + Hard | 450 µs | 2 x 16A |
| **Dual contactor** | - | - | 2 x 16A |

## Miscellaneous Power Modules

| Type | Current |
|---|---|
| **Constant** | 2 x 16 A |

Note: Blank modules must be used wherever dimmer modules are not installed to maintain adequate air flow.

## Power Modules - General

| | |
|---|---|
| **Indicators** | All modules have POWER ON and proportional OUTPUT mimic LED's.<br>Status Reporting modules have flashing red ERROR LED indicators. |
| **Safety** | Power modules are class 2, double insulated and fully enclosed to prevent exposure of live parts if a module is removed from the rack.<br>Each module shuts down automatically under an overheat condition |
| **Efficiency** | Dimmer power efficiency at least 97% at full load.<br>No-load loss of 3V RMS for standard 3kW dimmers. |
| **Non-Dims** | Contactors are used for Non-Dims modules - not thyristors. |
| **Interchangability** | Modules are keyed preventing wrong type insertion.<br>Any 3kW dimmer (including reporting) can fit in any 3kW crate, any 6kW in 6kW crate etc. |
| **Protection** | Each circuit is protected by a MCB with 10,000A fault current rating.<br>MCBs conform to European standard EN60 898 'C' characteristic. |
| **Power Devices** | Firm Fired (standard) or Hard Fired thyristors (high-specification).<br>DC component of output is normally less than 0.5V. |

## Control Electronics Specification

| | |
|---|---|
| **General** | |
| **Processing** | Completely digital dimmer processing. |
| **Controls** | 6 button keypad to program all rack functions on processor module.<br>Local switch for single rack PANIC function. |
| **Indicators** | 2 line by 8 character back lit LCD display on processor module. |
| **Languages** | English, Spanish, French, German. |
| **Data Port** | Connector on rack front for configuration, control and Operating Software upgrades. |

## Control Inputs

| | |
|---|---|
| **Dimmer Control** | Mux A: DMX512 or AMX192 or D54 or SMX.<br>Mux B: DMX512 or SMX.<br>Analogue: 32 inputs, +/- 10V (72 dimmer processor and dual electronics processor).<br>16 inputs, +/-10V (36 dimmer processor). |
| **Remote Control (system-wide)** | Control of Circuits and SWC™ presets using hand held programmer unit.<br>Up to 25 SWC™ 8 or 16 button preset panels to record and playback presets*.<br>Outlook™ 16 room (zone) by 8 preset stations to provide integrated architectural control*.<br>*Outlook and SWC stations require 1 optional power supply per system, located in a rack. |
| **Reporting** | Windows® based Reporter™ PC program for remote configuration and status reporting. |
| **Local Control (per rack)** | Rack processor keypad and LCD display with full functionality, and optional keypad lock.<br>Switch for rack PANIC control. |
| **RS232 Port for Local PC Control** | Rack configuration using the Reporter PC program.<br>Library and backup rack set-up storage on PC, via Reporter PC program.<br>Operating software upgrades via DOS PC program. |
| **External Dry Contacts** | Select main or backup processor (dual processor systems).<br>Select mux A or mux B (with appropriate control logic mode).<br>Set or Reset PANIC.<br>SWC preset 1 GO.<br>Next SWC preset GO. |

## Control Outputs

| | |
|---|---|
| **Analogue** | 12 analogue +10V output signals (72-way processor only). |
| **External LED Drive Signals** | Processor Active (dual electronics systems only).<br>Panic active.<br>Fan Fail/Overtemp<br>(Overtemp for Status Reporting dimmers only). |
| **Electrical** | Signal wire termination at one easily accessible point.<br>Signal wire termination on two-part plug-in connectors.<br>Loop-out connectors for daisy chaining signals between racks. |
| **Status LEDs** | 5V opto isolation power ok.<br>Auxiliary power supply ok.<br>PANIC active.<br>Fan fail/module overtemp. (reporting dimmers only). |
| **Presets** | 99 user programmable SWC presets, plus preset 0 (blackout).<br>Snapshot recording of SWC presets from any remote preset station, hand held programmer or Reporter Program.<br>Individual SWC preset crossfade time recording.<br>One user assignable SWC backup preset on loss of both Mux inputs<br>16 rooms (independent zones), each with 8 Outlook presets, plus on/off, per room. |

## Control Electronics - Performance

| | |
|---|---|
| **Dimmer Update Rate** | 16 ms (60 Hz) or 20 ms (50 Hz). |
| **Response Time to Signal Changes** | 16 ms (60 Hz) or 20 ms (50 Hz). |
| **Line Regulation** | Maintains dimmer output levels to within +/- 1V of set output within the range of the control electronics (200V to 240V nominal), providing that the set level is not higher than the power input voltage less the dimmer voltage loss.<br>Automatically compensates for frequency variations 45 Hz to 62 Hz.<br>Line regulation acts on each individual dimmer and maintains dimmer curve parameters (set curve, max level and min level). |
| **Fade Smoothing** | Up to 8 point interpolation between DMX values to smooth console fade steps. |

## Control Electronics - Programmable Features

| | |
|---|---|
| **Patching** | User programmable patches for Mux A and B inputs.<br>User programmable rack start address with following dimmers automatically sequenced.<br>Free format patching - any dimmer to any Mux input and address for total flexibility.<br>User programmable 4-digit ID for sequential numbering of systems larger than 512 circuits.<br>Patch any analogue 10V input to any circuit(s)<br>"Room" to channel to dimmer patch for Outlook architectural control. |

## Dimmer Characteristics

| | |
|---|---|
| **Settings** | Set max output voltage, 50V to 250V in 1V steps.<br>Set min output level, 0 to 100%.<br>Override dimmer level, 0 to full. |
| **Library Curves** | Square, S-curve, Linear power output, User programmable curves, Non-Dim trigger level 0 to 99%, Fluorescent - electronic ballast, Fluorescent - magnetic ballast, 5 user defined curves. |
| **Response Time** | Fast (30 ms), Normal (100 ms), Slow (300 ms). |
| **Reporting** | Dimmer status reporting enabled or disabled (Reporter modules only). Cable resistance in mΩ, for use with Reporting dimmers, and Cable Compensation feature. |

## Security Features

| | |
|---|---|
| **Dual Electronics** | Redundant tracking backup using an optional second plug-in processor.<br>Backup processor activated by remote switching or automatically.<br>Set-up data is automatically transferred between main and backup processors in case of replacement of either processor. |
| **Set-up Data Storage** | Non-volatile storage of set-up data on removable memory pcb<br>Memory pcb can be moved on exchange of processors.<br>Set-up data can be saved and restored using the Reporter PC program. |
| **Mux Fail Options** | Hold forever (status quo). User programmable "hold" period before fade to user assigned SWC backup preset. |
| **PANIC Function** | Any of the 72 or 36 dimmer and 12 analogue outputs (not on the 36 dimmer processor) may be user selected to go fully ON on activation of the rack PANIC switch or an external switch, or failure of the processor if programmed.<br>Activation is by hardware only - no processor needed.<br>AUTO PANIC on processor failure (requires optional power supply).<br>PANIC operation forces cooling fans on at full. |

## Thermal Control

| | |
|---|---|
| **Cooling** | All power components fan cooled.<br>High capacity heat sink in each module.<br>2 fans for redundancy in case of one fan failure. |
| **Overheat Protection** | Fan fail warning on rack, remote console or PC.<br>Fan fail warning forces cooling fans on at full.<br>Individual module shutdown.<br>Reporting modules warn of O/T before module shut down and forces fans to full. |

## Opto-Isolation

| | |
|---|---|
| **Inputs** | All digital inputs are opto-isolated to 2,500V RMS:<br>Mux A and Mux B - DMX512, SMX, SWC input, Outlook input, Reporter input, External switch inputs. |

## Reporter PC

The Reporter PC program is available to run on an IBM compatible desktop or laptop PC.

| | Minimum PC | Preferred PC |
|---|---|---|
| **Function** | Specification | Specification |
| **Processor** | Intel486DX2®-50 | Intel Pentium® Processor |
| **Memory** | 8 Mb RAM | > 8 Mb RAM |
| **Monitor** | VGA 640 x 480 monochrome | SVGA 800 x 600 colour |
| **Operating System** | Windows® 3.1 | Windows® 3.1, 3.11 or Windows 95® |

## Reporter PC

| | |
|---|---|
| **Configuration** | System, rack and dimmer configuration.<br>System define or upload.<br>Dimmer type / slot assignment.<br>Mux and analogue control input patching.<br>Outlook room/channel/dimmer assignments.<br>Circuit ID configuration.<br>Max voltage and min level per dimmer.<br>Dimmer response time.<br>Dimmer curve.<br>SWC preset recording.<br>Outlook preset recording.<br>User curve definition. |
| **Rack Status Reporting** | Dimmer level (%).<br>Input line voltage per phase.<br>Mux A or B input failure.<br>Fan fail warning.<br>Master/backup active or tracking. |
| **Load Status Reporting (Reporter modules only)** | Memorised load per dimmer (W).<br>Warning if load deviates from memorised value.<br>No load.<br>Dimmer fault.<br>Circuit breaker trip. Thyristor or contactor open or short circuit.<br>Excess DC voltage output.<br>Overheat per dimmer.<br>Overload current per dimmer. |





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