# LD90™
Digital dimmers

LD90 is a compact, convection-cooled cabinet designed for wall or floor mounting. It incorporates a single processor module controlling three power blocks, which are chosen from a range of 8 x 2.5kW or 4 x 5kW dimmers, for mixing dimmer ratings and specifications within one cabinet.

LD90 offers a number of programmable software features to match the dimmer's performance to the precise requirements of the installation:

❑ Rack start address number

❑ Individual dimmer patch per Mux input

❑ 99 programmable SWC presets

❑ Suitable for use with Outlook™ architectural control stations

❑ 8 Outlook presets, on and off per room, for up to 16 rooms

❑ Maximum and minimum output voltage

❑ Selection of non-dim operation for dimmers

❑ Non-dim switch-on level

❑ Fast, medium or slow dimmer response times
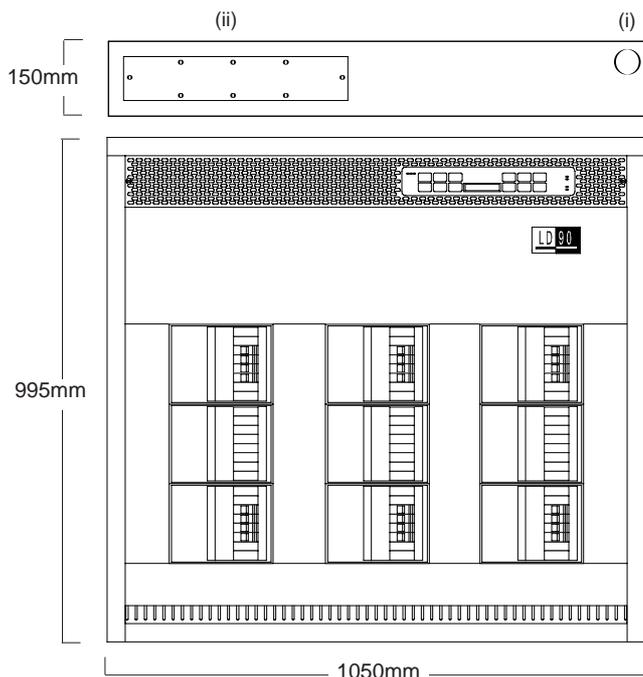
(i) - Mains and load cable cover plate: 505mm x 135mm
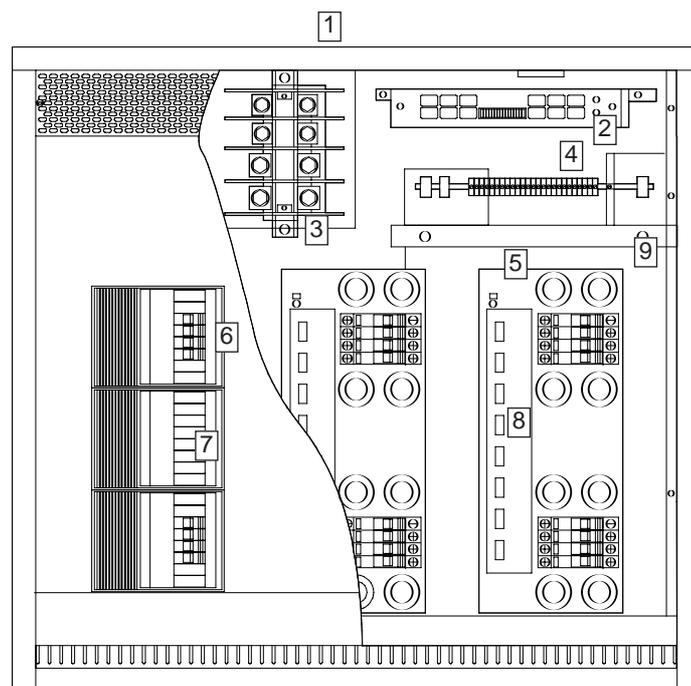(ii) - Control cable entry: 25mm diameter

Weights and Dimensions

Rack empty	41.5kg	(91.5lb)
Power block (approx.)	10.0kg	(22.5lb)
Power block (packed)	11.6kg	(25.5lb)
Full rack (approx.)	76.0kg	(168lb)
Full rack (packed)	135.0kg	(298lb)

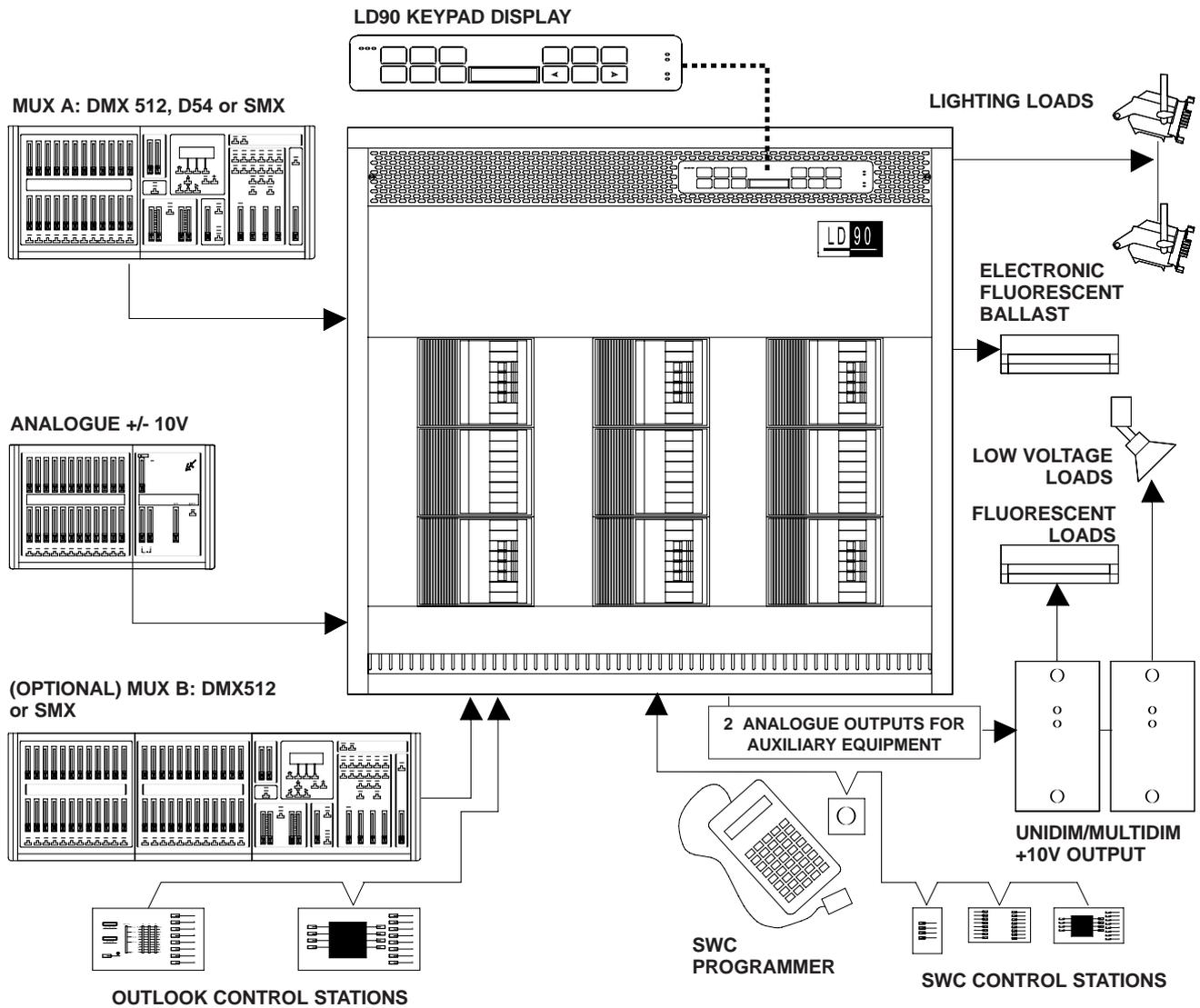|	
Floor area	1050mm x 150mm (41.3" x 5.9")
Packed volume	11.75cu ft (0.33m³)

STRAND LIGHTING DATA SHEETS

- Dimmer law (linear power, 'S', or square law)
- Fluorescent mode with top and bottom cut-off points
- Selectable electronic ballast 'fast-start' mode
- All-digital dimming system with choice of dimmer blocks for custom requirements at an economical price
- Suitable for fixed dimming installations in entertainment or architectural lighting applications
- Compact convection-cooled rack, finished in grey with moulded MCB fascia plates
- Easy installation and service access
- Comprehensive programmable features per dimmer
- Local control panel for programming and rack status
- Smooth 2000-step fade resolution
- System Wide Control (SWC) for setting and selection of internal programmable presets using the SWC Programmer and control panels
- 99 programmable System Wide Control (SWC) preset memories per rack
- Handheld SWC programmer option provides simple direct control of all dimmers for focusing
- Integral Outlook™ control system for architectural or zoned channel and preset control
- Programmable choice of backup memory when Mux signal isnot present
- Multiplex and analogue control input
- Second DMX control input option
- Two analogue control signal outputs for auxiliary equipment such as houselight dimmers, relays etc
- Fluorescent control modes including unique 'fast start' to ensure smooth dimming with electronic ballasts
- Complies with European safety and EMC regulations
- Earth leakage breaker (RCD) option
- Available as complete racks or as component parts to construct custom configured racks and supplied with fixing screws, gland plates and instruction booklet

1. Rack
2. Processor Unit
3 Mains Input Terminations
4 Earth bus bar
5. Power block
6. Miniature Circuit Breakers (MCB)
7 Position for optional RCD
8. Dimmer load Terminations
9. 35mm x 7.5mm Top Hat (DIN) Rail

System configuration

LD90 KEYPAD DISPLAY

MUX A: DMX 512, D54 or SMX

ANALOGUE +/- 10V

(OPTIONAL) MUX B: DMX512 or SMX

OUTLOOK CONTROL STATIONS

LIGHTING LOADS

ELECTRONIC FLUORESCENT BALLAST

LOW VOLTAGE LOADS

FLUORESCENT LOADS

2 ANALOGUE OUTPUTS FOR AUXILIARY EQUIPMENT

UNIDIM/MULTIDIM +10V OUTPUT

SWC PROGRAMMER

SWC CONTROL STATIONS

All power blocks are fitted with MCBs, and an RCD may be included as an option. Racks may be positioned and cabled before the power blocks are installed, to reduce the risk of damage during building work. Each power block has the same overall size and power requirement, so a mixture of 2.5kW and 5kW dimmers may be included in the same rack. Blank power blocks are available for custom equipment or branch breakers, or just for completing a partly-equipped rack.

Programmable features

Language
English, French, German.

Rack number
1 - 99. Used for SWC

Max output voltage (per dimmer)
50 Volts -250 Volts.

Min level (per dimmer)
0% - 100%.

Digital network control
Each dimmer and analogue output may be patched to a room (between 1 and 16) and channel number (between 1 and 12).

Multiplex control
Each dimmer and analogue output may be patched to any valid DMX or D54 address number for both the standard multiplex input A and optional multiplex input B.

Mux input
Select DMX, SMX or D54 for Mux input A. DMX or SMX for MUX B

Patching
Individual patches per Mux input and Outlook room/channel/dimmer patches

Non-Dim
Individual assignment of dimmers as non-dims with threshold levels programmable between 1% - 99%.

Curve
Response curve assignment per dimmer: Linear Power, Square, S-Curve and Fluorescent (with top and bottom set levels).

Response speed
Dimmer response: fast (30ms), normal (100ms) or slow (300ms).

Preset (Outlook)
Recall preset 1-8, On and Off for each room. Record presets 1-8 and all programmable fade times for each room.
Set channel levels for each room.

Preset (SWC)
Recall back-up preset 0 - 99; record presets 1-99 with fade times; define Preset No. or "Hold" condition on Mux failure.

Level
Dimmer control assignment to "Input" (Mux A, Mux B, Analogue, Digital Network Control or SWC), or to a fixed level 0% - 99% or "Full".

Environmental

Maximum temperature operating range
 0° to 35°C ambient at full rating
40°C with de-rating at 4% per °C above 35°C.

Cooling method
Convection cooled. Ventilation grills at top and bottom of front panel must be kept clear at all times. Fan cooling not required under normal operating conditions.

Storage temperature
0°C to + 55°C.

Relative humidity
10% to 95% non-condensing.

Operating environment /ventilation
Clean, dry ventilated space within temperature and humidity limitations.

International standards
Complies with EC directive on EMC 89/336/EEC.

EMC emissions EN50081-1,EN55014.
EMC immunity EN50082-1, IEC 1000-2-2.

Safety: EN60950, EN60439 Part 1 (Also Part 12, BS5486).

Fire resistance
Plastic materials are self-extinguishing to UL94V0.

Ingress protection
IP 20 to EN60529.

Mechanical data

Finish/colour
Grey powder coat epoxy paint, colour BS4800 "Storm grey".

Labelling
LD90 and Strand logo standard dimmer rating plate per power block; blank 'write-on' labels for user circuit identifications.

Construction
Welded steel rack enclosure with positions for three power blocks and one processor unit. The racks may be wall or floor mounted, and may be placed side by side, back to back, or one above the other, provided installation instructions are followed.

Note: For wall mounting, support bracket 76314 must be used.

Electrical data

Supply voltage/frequency
Nominal 200V-240V 3-phase, 3 wire (Delta), 50/60Hz. The Processor is immune to mains carried interference (ripple disturbances) of up to 20 Vpp sinusoidal signals at frequencies above 180Hz.

Distribution
100A 3-phase and earth (ground)

Rack isolation
External isolator required.

Total capacity
2.5kW Max. current 140A phase pair
5.0kW Max. current 140A phase pair

Minimum dimmer loads
Minimum load per dimmer 60W tungsten.

Rise time/filtering
100 microseconds.

Cable entry
50mm and 25mm cable entries for signals, 505mm x 135mm cover plate power/load cables.

Supply connections
M12 (L1), M8 (L2, L3 and E).

Load connections
2.5kW dimmers: up to 4mm2 wiring cable as standard. 5.0kW dimmers: up to 6mm^2 wiring cable using supplied pin crimp terminals Optional: 4 circuits x 16mm^2 wiring termination kit may be mounted on the terminal 35 x 7.5mm (DIN) rail.

Phasing
Three software-controlled dimmer sequence numbering options are available.

Circuit protection
Each dimmer output circuit is protected by a thermo-magnetic breaker. MCBs used are Double Pole (DP). The MCB rated fault currents are 3,000A @ 2.5kW, 10,000A @ 5kW

Control input
The following control protocols are supported as standard:
Mux A: The rack will support DMX512, SMX or D54.
Mux B (optional) : DMX512, SMX.
26 analogue inputs +/- 10V, top set adjustable between 7V and 13V.
SWC: By hand held programmer, 8 or 16 preset wall panel, display station or A/V interface
Digital Network Control: To support Outlook control stations.

Control output
Two 0 to +10V, max 1mA outputs to allow control of auxiliary equipment.
12 relay driver outputs for magnetic fluorescent ballast circuits.

Operational data

Indicators
16 character, one line liquid crystal display (LCD) unit. There are a number of LED indicators showing: presence of phases 1, 2 and 3, A Mux OK, processor OK. Over temperature, B Mux interface fitted and OK and B Mux OK.

Local control
By keypad, individual dimmer level control.

Max no. of dimmers
24 x 2.5kW   12 x 5.0kW

Dimmer firing
Digital

Over temperature protection
LED indication and remote via SV90 program.

Ordering information

LD90 24 x 2.5kW

A standard rack configuration comprising three power blocks, each with eight 2.5kW dimmers, and a choice of MCB/terminal configurations. NDT version has Neutral Disconnect Terminal blocks for circuit checking. SPN are fitted with Neutral Switch MCBs which give double pole isolation from the mains but trip only on phase overload. Two individual load terminals per dimmer output are available.

Accessories include RCD kit (one required per power block), analogue input connectors, additional DMX signal input, larger cable termination, and single phase operation. Custom racks may be created from the system building blocks listed below.

Cat. No.	Description
74102	LD90 24 x 2.5kW, single-pole MCB
74104	LD90 24 x 2.5kW, single-pole MCB (NDT)
74105	LD90 24 x 2.5kW, SPN MCB

LD90 12 x 5kW

A standard rack configuration comprising three power blocks, each with four 5kW dimmers, and a choice of either single or double-pole MCBs. Two individual load terminals per dimmer output are available.
Accessories include RCD kit (one required per power block), analogue input connectors, additional DMX signal input, larger cable termination, and single phase operation. Custom racks may be created from the system building blocks listed below.

Cat. No.	Description
74103	LD90 12 x 5kW, single-pole MCB
74106	LD90 12 x 5kW, double-pole MCB

LD90 system building blocks

LD90 can be customised to a specific requirement by ordering the component parts separately. The empty rack includes the common processor unit, and space for three power blocks.

Two basic styles of power block provide either eight 2.5kW dimmers or four 5kW dimmers. The NDT version has Neutral Disconnect Terminal blocks for circuit checking, SPN are fitted with Neutral Switch MCBs which give double pole isolation but trip only on phase overload. Two individual load terminals per dimmer output are available.

The blank power block has blank MCB cover plates for completing a partly-equipped rack and also has fixings for a custom selection of MCBs to give branch breaker facilities.

Accessories include RCD kit (one required per power block), additional Mux signal input, larger cable termination, set of connectors for analogue inputs, and single phase operation. For further details of rack configuration options, please contact your Strand distributor.

Cat. No.	Description
74101	LD90 Empty rack with processor
72203	Power block, 8 x 2.5kW 1-pole MCB
72204	Power block, 8 x 2.5kW 1-pole MCB (NDT)
72206	Power block, 8 x 2.5kW 1-pole MCB (SPN) with NDT
72205	Power block, 4 x 5kW 1-pole MCB
72207	Power block, 4 x 5kW 2-pole MCB
72208	Blank/custom power block

LD90 Accessories

Cat. No.	Description
76314	Wall mounting bracket
76309	Additional Mux input kit
76311	Analogue input connector set
76310	RCD option (1 per power block)
76313	Single phase option (1 per single phase rack)
76312	16mm2 cable termination kit (1 per 4 dimmers)
76102	SWC Handheld programmer
76320	SWC remote socket panel (supplied with backbox)
62951	8 preset pushbutton control panel
66800	Backbox, 8-preset
62952	16 preset pushbutton control panel
66802	Backbox, 16-preset
63030	Outlook/SWC Display Station
66804	Backbox, display station
62953	SWC A/V Interface PCB
66101	DIN Rail PSU (for Outlook and SWC)
66100	PSU with enclosure for Outlook and SWC
66071	Remote control cable extension (XLR6 10m)
66072	Remote control cable extension (XLR6 20m)

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