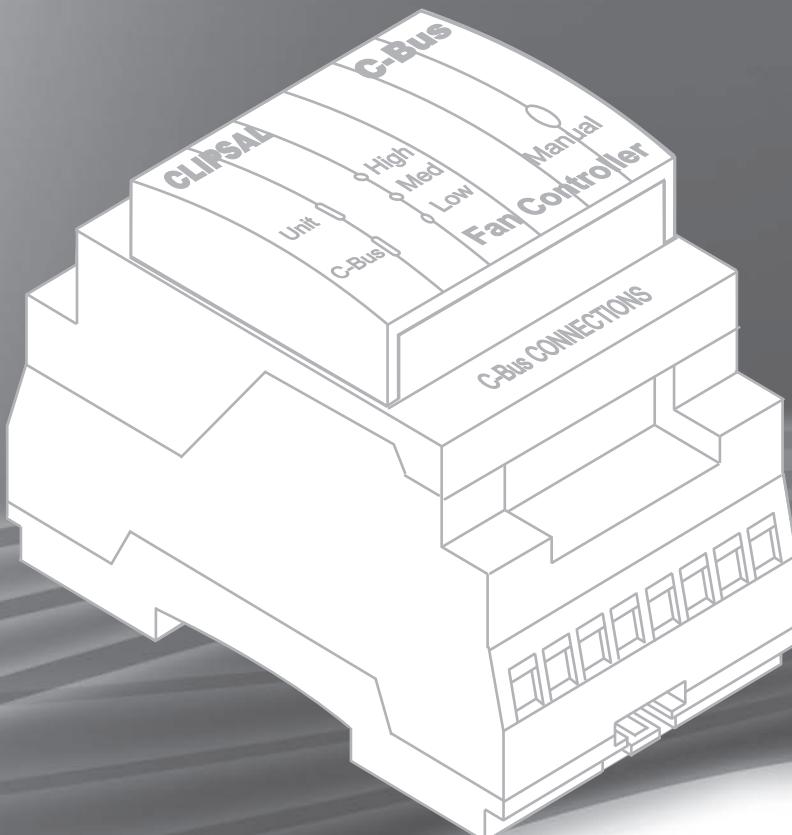




**CLIPSAL®**

by Schneider Electric



# C-Bus

**C-Bus Ceiling Sweep Fan Controller**

**L5501RFCP**

Installation Instructions



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December 2009

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## 1 Description

The L5501RFCP C-Bus Ceiling Sweep Fan Controller unit is a DIN rail mounted C-Bus output device that provides speed control for a ceiling sweep fan. The Fan Controller uses multiple relays and a dual capacitor block for speed selection. The Fan Controller can be installed in the optional 5501FRE plastic enclosure on a wall or in a ceiling space.

| Catalogue Number | Description   |
|------------------|---|
| L5501RFCP        | C-Bus output unit for controlling a ceiling sweep fan using capacitor control (DIN-rail version for switchboard installation) |
| 5501FRE          | Enclosure to accommodate a C-Bus ceiling sweep fan controller output unit   |

Table 1. Product catalogue numbers and descriptions

The L5501RFCP Ceiling Sweep Fan Controller provides C-Bus control of a ceiling sweep fan for up to three speeds (Low, Medium and High) and Off. The unit uses double pole latching relays that switch both the active and neutral inputs. For the High speed, the active line and neutral are connected direct on-line (DOL) to the fan motor using the screw terminal connections (no capacitor in the circuit).

The dual speed-control block capacitor (supplied with the fan by the ceiling fan manufacturer) can be conveniently located inside the Fan Controller body. You must open the hinged top cover to install the capacitor block in the well. Push-type connectors hold the capacitor wires in place.

The Fan Controller is designed to withstand the high temperatures often found in spaces above ceilings. The unit is for indoor use only. A qualified person must install the electrical connections.

The unit derives its power for programming and relay operation from the C-Bus network. The unit sinks 18 mA of current from the network and does not supply current to the network. The C-Bus network voltage can vary from 15V to 36V d.c. If the C-Bus network is disconnected or if the C-Bus voltage drops below 15V d.c. the fan speed will be set to Off. The unit does not derive power from the mains, nor does it require a mains connection to operate.

The Fan Controller has a non-illuminated local override 'Manual' pushbutton that has similar functions to other C-Bus output devices, including Learn mode. The local override button can override the output. Each press cycles the speed of the fan in the following order:

Off → Low → Med → Hi → Off.

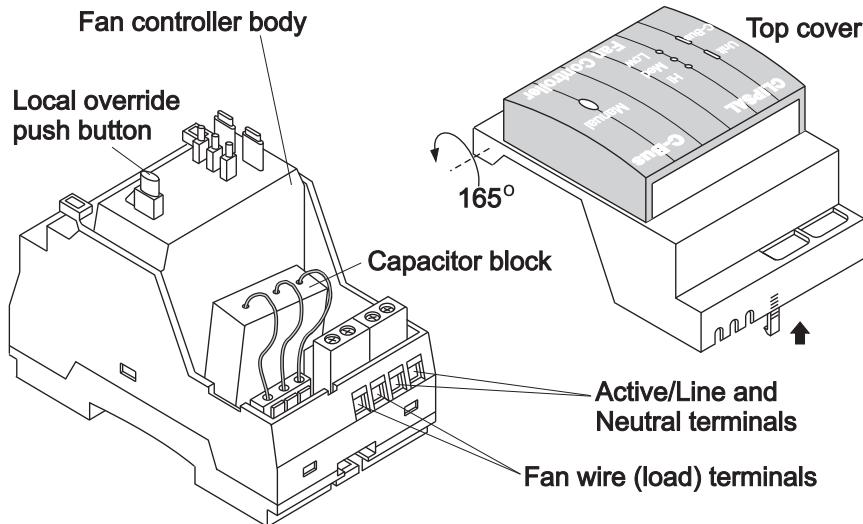


Figure 1. C-Bus Ceiling Sweep Fan Controller features

The unit has orange Unit and C-Bus LED indicators. In addition, there are orange indicators for each of the three selectable fan speeds. The fan speed indicators tell you the current speed selection (Low-Med-Hi). When no relay is energised, all of the fan speed indicators are off.

There are two RJ45 connectors for C-Bus. The C-Bus Remote Override On and Off functions are not used in Fan Controller. For DIN rail mounting, use the standard 400 mm RJ45-RJ45 C-Bus network cable. A bootlace cable is provided for ceiling mounting inside the 5501FRE enclosure.

The input power (A/L and N) and fan wires (SW Motor and SW N) are connected at a screw terminal block. Each of the connectors can accommodate two wires up to 1.5 mm<sup>2</sup> each.

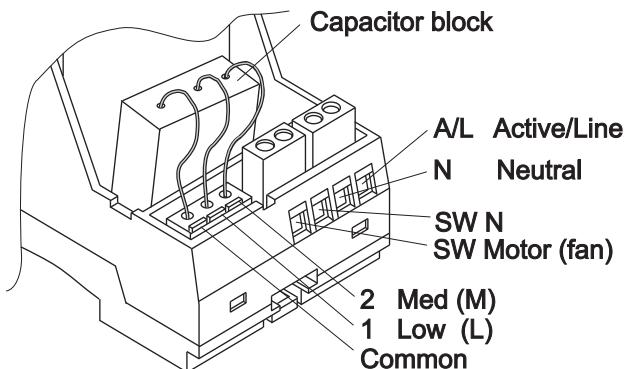


Figure 2. C-Bus Ceiling Sweep Fan Controller terminal block connections

## 2 Installing the Speed Control Capacitor



Only use the capacitor block that the fan manufacturer supplies for use with the fan motor. Do not substitute any other type or value. The capacitor must have an 85° C temperature rating that makes it suitable for use in ceiling spaces.

Install the capacitor block inside the Fan Controller. The well provided for the block can handle a capacitor up to 45 mm long x 20 mm wide x 32 mm high. The push type capacitor terminals can accommodate one 1.5 mm<sup>2</sup> wire.

1. To install the capacitor block, open the hinged top cover. Be careful not to damage the plastic indicator or pushbutton parts that extend above the body of the Fan Controller.
2. Orient the capacitor block with the wires toward you in the order needed for connecting to the terminal block.
3. Starting nearest the centre of the unit, push the terminal button down, insert the wire and release the button.
4. After attaching all three wires, position the capacitor block and close the top cover.

### 3 Installing the Fan Controller

You can install the Fan Controller on a DIN rail inside a power enclosure or you can use the optional custom enclosure, catalogue number 5501FRE. Install the Fan Controller indoors in a location free from moisture or direct sunlight.



During installation, make sure that the top cover is closed. The plastic indicator parts and local override 'Manual' switch can be damaged when the top cover is open.

#### CAUTION

#### 3.1 DIN Rail Installation

The location of the Fan Controller on the DIN rail is not critical. To remove the Fan Controller from the DIN rail, use a small screwdriver to release the spring clip.

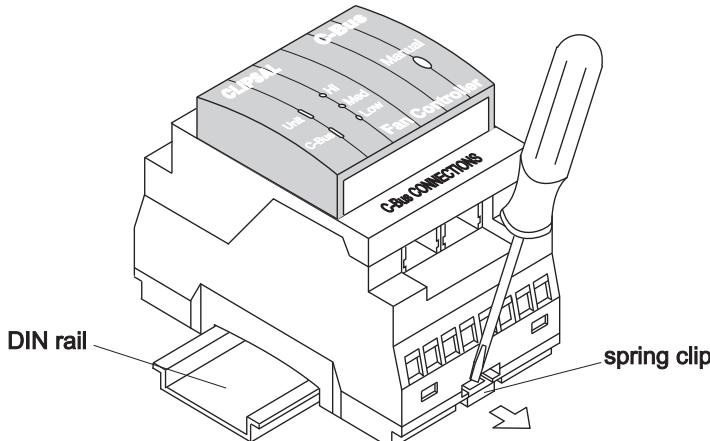


Figure 3. Removing the Fan Controller from the DIN rail.

### 3.2 Using the Optional Enclosure

The 5501FRE enclosure is recommended when the Fan Controller is installed on a wall or in a ceiling space.

1. In some locations it is advisable to cut or drill the holes for cable entry and exit before you permanently mount the back piece of the enclosure.
2. The enclosure can be mounted horizontally or vertically. Be sure to use mounting screws that are correct for the mounting surface, usually plasterboard or wood.
3. Keep the C-Bus network cables separate from the power input and fan wires. The C-Bus Cat.5e cabling enters from one end of the enclosure and the power and fan (load) wires enter from the opposite end.

**Note:** Placing the fan controller inside the enclosure creates a physical barrier between the C-Bus and the mains/fan control areas of the enclosure. The unit can only be fitted inside the enclosure in the orientation shown in Figure 4.

4. Be sure to secure the cables at the anchor points to prevent accidental disconnection of the wires from the unit.

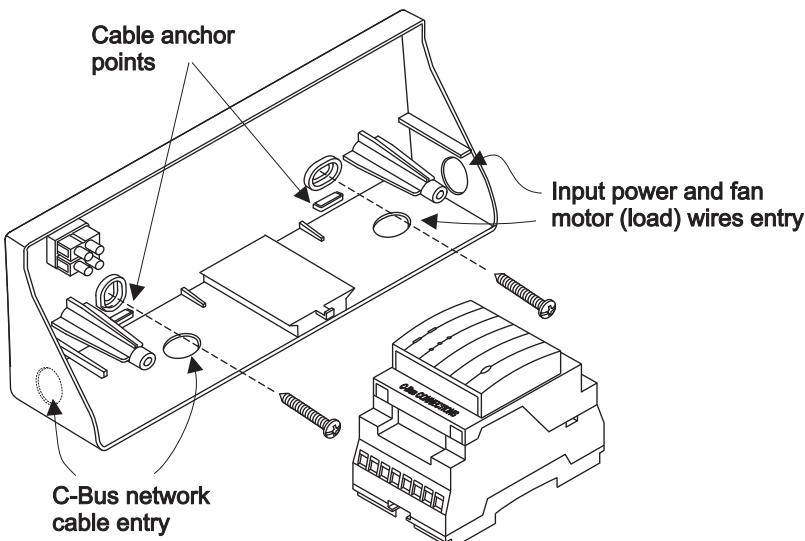


Figure 4. The optional 5501FRE Fan Controller Enclosure

## 4 Power and Fan Motor Wiring



**WARNING**

A qualified electrician must connect building power and the fan motor to this device. Turn off the supply circuit before connecting the active line, neutral or fan motor wires.

### Requirements

- The supply circuit for the fan motor must be protected by a circuit breaker or fuse.
- Be sure to provide a separate earth (ground) wire for the fan motor body. The Fan Controller does not have an earthing terminal.
- Install the Fan Controller in an indoor location protected from moisture and direct sunlight.
- The Fan Controller relays are rated at 1.5A for an inductive load only. Do not exceed the rated value.
- The double pole relays in the Fan Controller switch the neutral as well as the active line. Do not use the fan motor output terminals as a connection point for any other device.
- The Fan Controller is compatible with copper and aluminium wire and solid conductor or stranded network cable.
- Keep the C-Bus network cabling segregated from the mains power and fan motor wiring in accordance with local wiring regulations.
- To avoid damage to the internal circuits, disconnect the fan load wiring from the Fan Controller unit before Megger testing the fan load wiring. Do not Megger test the C-Bus Cat.5e network cables.
- Provide strain relief for cables and seal the cable entry holes when using the optional enclosure.

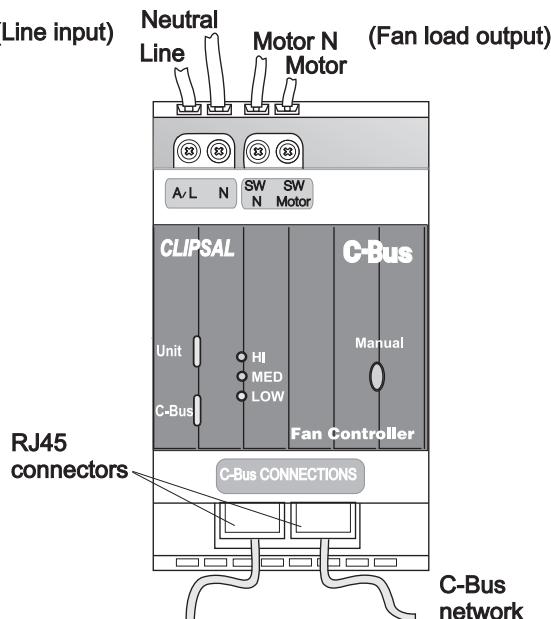


Figure 5. Wiring connections for DIN rail mounted units

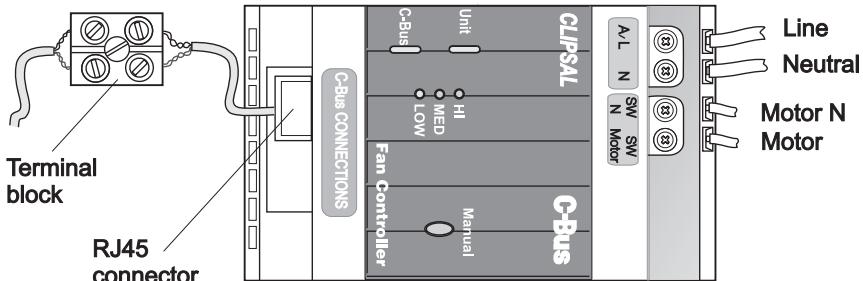


Figure 6. Wiring connections in the optional enclosure

C-Bus network wiring must be kept away from the input power and fan wires. When using the enclosure, the C-Bus Cat.5e cables must exit from one end of the enclosure and the power and fan connections must exit from the opposite end.

## **5 C-Bus Connections**

Two RJ45 connectors are provided for upstream and downstream network attachment. The C-Bus network uses pink Cat.5e, polarised 15-36 Volt, twisted-pair cables.



**CAUTION**

Never connect the C-Bus interface to Ethernet or telephone equipment networks. Damage to equipment could result.

| RJ45 pin | Signal name          | Wire Colour    |
|----------|----------------------|----------------|
| 1        | Remote ON            | green & white  |
| 2        | Remote ON            | green          |
| 3        | C-Bus negative ( - ) | orange & white |
| 4        | C-Bus positive ( + ) | blue           |
| 5        | C-Bus negative ( - ) | blue & white   |
| 6        | C-Bus positive ( + ) | orange         |
| 7        | Remote OFF           | brown & white  |
| 8        | Remote OFF           | brown          |

**Note:** The Remote On and Remote OFF features are not implemented on the Fan Controller.

Table 2. C-Bus network wiring colour codes

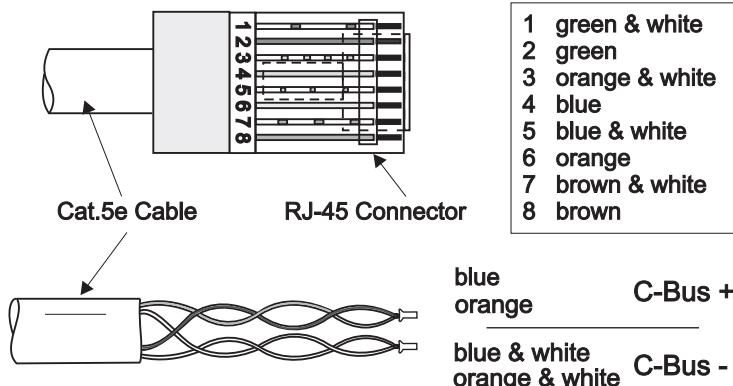


Figure 7. C-Bus network cable pin assignments

## 6 Controls and Indicators

The indicator LEDs show unit status and fan speed. The non-illuminated Local Override 'Manual' pushbutton provides 'Local Toggle' and Learn Mode functions.

### 6.1 Unit LED Indicator

The orange Unit indicator shows the status of the individual unit. When C-Bus is connected, the indicator stays illuminated. If the Local Override is active, the Unit indicator flashes with a 90% duty cycle.

| Indicator Mode                                     | Meaning                              |
|--|--------------------------------------|
| Off  | Not connected to C-Bus               |
| On   | C-Bus connected                      |
| Flashing (90% duty cycle)                          | Local Override is active             |
| Turning off of on alternately with C-Bus indicator | The Fan Controller is in Learn mode. |

Table 3. Unit indicator meanings

### 6.2 C-Bus LED Indicator

The orange C-Bus indicator LED shows the status of the C-Bus network at the unit. If sufficient network voltage (20V d.c. to 36V d.c.) and a valid network clock are present, the indicator stays illuminated. If the network voltage is marginal, the indicator flashes. When the Fan Controller is operating in Learn Mode, the Unit and C-Bus LEDs alternately turn on and off.

| Indicator Mode                                    | Meaning   |
|---|---|
| Off   | No network clock signal is present and/or no power is present.        |
| On  | Power is on and C-Bus network clock is present.                       |
| Flashing at a 4 Hz rate                           | The C-Bus network power is marginal (15 V d.c. < voltage < 20 V d.c.) |
| Turning off of on alternately with Unit indicator | The Fan Controller is in Learn mode.                                  |

Table 4. C-Bus indicator meanings

## 6.3 Fan Speed LED Indicators

The Fan Controller activates the corresponding orange indicator when the output is set to Low, Medium or High. All fan speed indicators are off when the fan speed is set to Off.

The local fan speed control sequence is Off-Low-Medium-High-Off.

## 6.4 Local Override 'Manual' Pushbutton Switch (non-illuminated)

### Local Toggle Mode

Local Toggle Mode lets you cycle the fan through the speed control sequence locally. This feature is often used during testing and commissioning. The Local Toggle feature can be disabled using Toolkit software.

If the Fan Controller is not already in Local Toggle mode and if the software allows the feature, a short press starts Local Toggle Mode with all relays Off.

Subsequent button presses step the Fan Controller relays through the speed control sequence: Low-Med-Hi-Off, and so on.

To exit Local Toggle Mode use a long press. The Fan Controller returns to normal C-Bus control.

### Learn Mode

Learn mode is most often used to assign the Fan Controller to a lighting group. The Learn Mode feature can be disabled using Toolkit software.

If the Fan Controller is not in Local Toggle Mode and if the software allows Learn Mode, a long press (10 seconds) starts Learn Mode. A subsequent long press exits Learn Mode.

## 7 C-Bus Programming Requirements

Use C-Bus Toolkit software to configure the Ceiling Sweep Fan Controller. Using software not provided or approved by Clipsal could void the hardware warranty.

The latest version of Toolkit software can be downloaded free of charge from <http://www.clipsal.com/cis/portal>, select Technical and then select Downloads.

The Fan Controller unit integrates with C-Bus network group addresses etc. The Fan Controller has software-settable C-Bus network clock and burden.

If C-Bus power is removed or if C-Bus voltage falls below 15V, the Fan Controller sets the output level to Off. Upon recovery from power failure, the Fan Controller sets the output speed to the last set level (default), or Off. The 'Restore to Off' function is user selectable.

## 8 Specifications

| Parameter                       | Value   |
|---------------------------------|---|
| C-Bus input voltage             | 15-36 V d.c.  |
| C-Bus current requirement       | 18 mA, powered from C-Bus network, does not provide power for the C-Bus network   |
| Maximum units per network       | 100   |
| Network clock                   | Software selectable   |
| Network burden                  | Software selectable when Unit Address is 001  |
| AC input impedance              | 100 kΩ @ 1 kHz  |
| Warm-up time                    | 10 seconds  |
| Electrical isolation            | 3.75 kV from C-Bus to mains   |
| Input voltage for fan motor     | 100 VAC to 240 VAC; input circuit must have a suitable circuit breaker  |
| Fan load rating                 | 1.5 A   |
| Switch duty type (S1)           | Continuous duty. Line and neutral are switched. Fan motor and neutral are switched.   |
| Speed control                   | Capacitive; capacitor block supplied by fan manufacturer for Low and Medium speeds. High speed uses direct on-line (no capacitor in the circuit). Three unique fan speeds Low, Med and Hi and Off.        |
| Connectors                      | C-Bus: 2 x RJ-45<br>Capacitor block: 3 x push button for one 1.5 mm <sup>2</sup><br>Fan: 2 x screw type for one 1.5 mm <sup>2</sup> wire<br>Input Power: 2 x screw type for up to two 1.5 mm <sup>2</sup> |
| Indicators                      | Unit, C-Bus, 3 x Fan speed  |
| Control                         | Local override pushbutton, not illuminated  |
| Class of switch                 | Class II  |
| Rated impulse withstand voltage | 4 kV  |
| IP rating                       | 20  |
| Proof tracking index (PTI)      | 175   |
| Pollution degree                | 2   |
| Glow wire test (GWIT)           | Level 3, 850° C   |
| Mounting type                   | DIN rail, or wall or ceiling space mounting in the optional plastic enclosure; For indoor use only  |
| Weight                          | Fan Controller Relay Unit: 145 grams<br>Optional plastic enclosure: 220 grams   |
| Operating temperature           | 0° to 65° C   |
| Humidity                        | 10 to 95% RH, non condensing  |

**Note:** The unit draws no power from mains and requires no mains connection to operate.

## 9 Dimensions

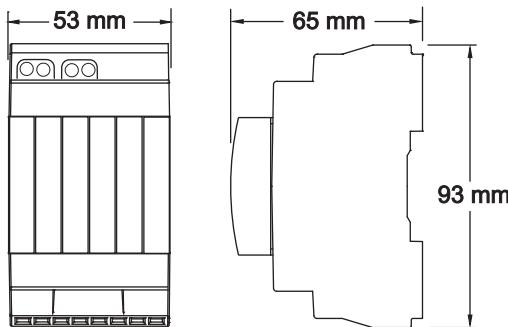


Figure 8. L5501RFCP C-Bus Ceiling Sweep Fan Controller dimensions

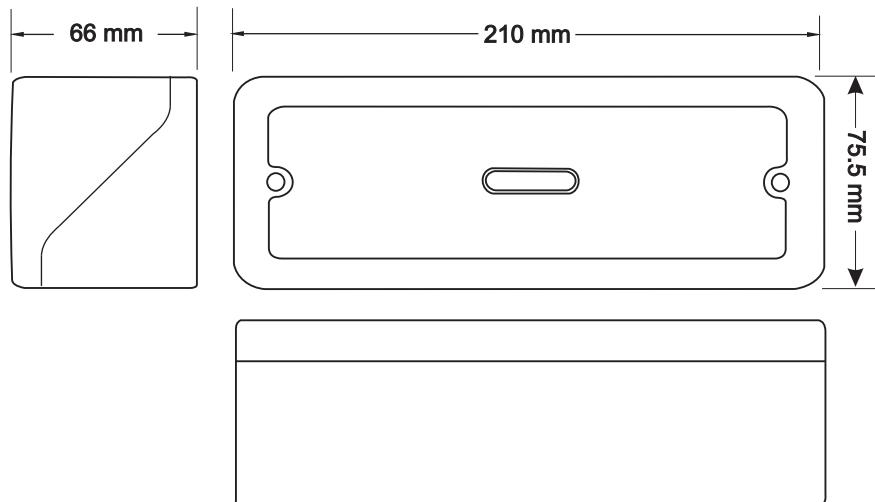


Figure 9. Optional 5501FRE Enclosure dimensions

# 10 Standards Complied

## Declarations of Conformity

The L5501RFCP C-Bus Ceiling Sweep Fan Controller meets the following standards.

### **Australian/New Zealand EMC & Electrical Safety Frameworks and Standards**



| Regulation | Standard         | Title   |
|------------|------------------|---|
| EMC        | AS/NZ CISPR 14-1 | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emissions |
| Safety     | AS/NZS 61058-1   | Switches for appliances – General Requirements  |

### **European Directives and Standards**



| European Council Directive       | Standard                | Title   |
|----------------------------------|-------------------------|---|
| EMC Directive 2004/108/EC        | EN 55014-1<br>EN55014-2 | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Emissions<br>Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Immunity – Product family standard |
| Low Voltage Directive 2006/95/EC | EN 61058-1              | Switches for appliances – General Requirements  |
| RoHS 2002/95/EC                  |                         | Reduction of hazardous substances   |

### **Other International Directives and Standards**

| Regulation | Standard                 | Title   |
|------------|--------------------------|---|
| EMC        | CISPR 14-1<br>CISPR 14-2 | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emissions<br>Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Immunity – Product family standard |
| Safety     | IEC 61058-1              | Switches for appliances – General Requirements  |

## 11 Two-Year Warranty

The L5501RFCP C-Bus Ceiling Sweep Fan Controller carries a two-year warranty against manufacturing defects.

### Warranty Statement

The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to the Schneider Electric product, which the consumer has in the location where the product is sold.

The warrantor is Schneider Electric with offices worldwide.

This Schneider Electric product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.

Schneider Electric reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.

This warranty is expressly subject to the Schneider Electric product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions. Any alterations or modifications made to the product without permission of Schneider Electric might void the warranty.

Schneider Electric shall meet all costs of a claim. However, should the product that is the subject of the claim be found to be in good working order, all such costs shall be met by the claimant.

When making a claim, the consumer shall forward the Schneider Electric product to the nearest Schneider Electric office. Provide adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

For all warranty enquiries, contact your local Clipsal sales representative. The address and contact number of your nearest sales office can be found at <http://www.clipsal.com/locations> or by telephoning Technical Support 1300 722 247 (CIS Technical Support Hotline).

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## **Technical Support**

For further assistance in using this product, consult your nearest Clipsal Integrated Systems (CIS) Sales Representative or Technical Support Officer.

| <b>Technical Support Contact Numbers</b> |   |
|--|---|
| Australia                                | 1300 722 247 (CIS Technical Support Hotline)  |
| New Zealand                              | 0800 888 219 (CIS Technical Support Hotline)  |
| Northern Asia                            | +852 2484 4157 (Clipsal Hong Kong)            |
| South Africa                             | 011 314 5200 (C-Bus Technical Support)        |
| Southern Asia                            | +603 7665 3555 Ext. 236 or 242 (CIS Malaysia) |
| United Kingdom                           | 0870 608 8 608 (Schneider Electric Support)   |

**Technical Support email:** cis.support@clipsal.com.au

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