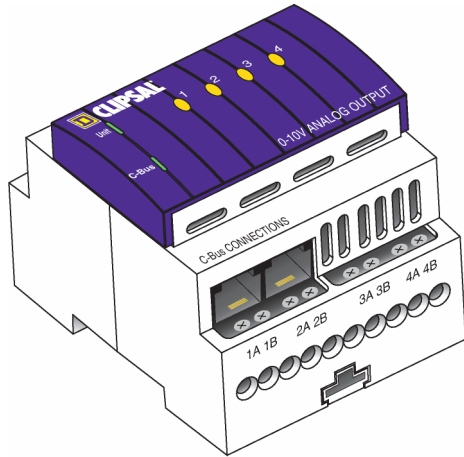


# Square D® Clipsal® DIN Rail Mounted, 0-10V, 4 Channel Analog Output Unit

SLC5504TAMP 120V and  
SLC5504HAMP 277V for Use with  
C-Bus™ Wired Networks

Instruction Bulletin  
Retain for future use.



## HAZARD CATEGORIES AND SPECIAL SYMBOLS

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### DANGER

Danger indicates an immediately hazardous situation which, if not avoided, will result in death or serious injury.

### WARNING

Warning indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

### CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

### CAUTION

Caution, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage or improper operation.

*NOTE: Provides additional information to clarify or simplify a procedure.*

## PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. This document is not intended as an instruction manual for untrained persons. No responsibility is assumed by Square D for any consequences arising out of the use of this manual.

### Class B FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## INTRODUCTION

The SLC5504TAMP(120V) and SLC5504HAMP (277V) 4 Channel Analog Output Units provide 0-10V analog output voltage control signals for various peripheral devices including electronically dimmable fluorescent lighting ballasts. The Analog Output Unit is DIN rail mounted for easy installation. C-Bus™ Network connection is conveniently achieved through the use of RJ45 connectors, allowing similar units to be quickly looped together.

### Before You Begin

Before installing an Output Unit, verify that your order is complete by comparing the contents of the package with the appropriate list in the table below. Also verify that the catalog number on the box label matches your order.

**Table 1: Contents of the Box**

Catalog Number	Description	Quantity
SLC5504 TAMP	4 Channel 0-10V Analog Output 120 V AC	1
HAMP	4 Channel 0-10V Analog Output 277 V AC	1
	Rubber RJ45 terminal plugs	1 bag of 3
	C-bus Network cable, 15.75 in. (400 mm)	1

### Capabilities

The Analog Output Unit is controlled by instructions received over the C-Bus™ Network. It is capable of sinking or sourcing current appropriate for the connected load. Each channel may control multiple loads, depending on the load current requirements. The unit isolates the electrical power source from the C-Bus Network.

## Network Considerations

The Analog Output Unit is available as a non-powered device. The Output Unit draws 22 mA from the C-Bus™ Network. Adequate C-Bus power must be supplied to the network to support the connected devices. Consult the C-Bus™ Calculator – Network Design Verification Software Utility to determine the total network current load.

## FEATURES

### Local Override Buttons

A set of 4 buttons is located on the front of the unit. They provide a means to toggle each channel locally (at the unit). Each button serves as a load indicator and is illuminated when the respective channel is in the ON state.

**Table 2: Local Override Buttons**

Operation	Function
Short press	One short press will toggle the state of the channel.
Double click	Two short presses (within 2 seconds) will return the channel to the C-Bus Network level.
Long press	Pressing the button for longer than 2 seconds will return all the channels on a unit to the C-Bus network level.

NOTE: The double-click and long press operations will only occur if the unit/channel is already in override mode.

C-Bus commands received by the unit will (by default) override local toggle changes. In this case, only the channel associated with the received commands will revert to the current C-Bus Network state. This option may be disabled in software.

### Remote Overrides

The extra pairs of conductors on the C-Bus connectors can be used to connect two remote switches that provide Remote Overrides (ON/OFF). These switches can operate without using the C-Bus network. The Remote Override connections are optional, but it is recommended that they be maintained for correct operation of these services across the C-Bus network. The Remote Overrides can be disabled by using the C-Bus Toolkit software.

*Note: External voltage sources are not required and MUST NOT be connected to either of the unit's Remote Override inputs.*

Activation of the remote inputs occurs when the switch mechanism contact closes. When a Remote Override input is activated, all channels will be set to either ON or OFF accordingly. If the Remote ON and Remote OFF functions are activated simultaneously, the Remote OFF has priority (see the table "Operating Mode Priorities").

The remote switches can be located up to 3280 ft (1000 m) from the unit. Multiple switches can be connected in parallel to the same remote input, allowing remote control of the unit from different locations by using any type of cable. Similarly, a single switch can be used to remotely control up to 30 different units within the same C-Bus network.

The figure "Wiring for Remote Overrides" shows how one or more switches can be connected in parallel on any one network. If connecting a Remote ON switch, use the green and green-white conductors; if connecting a Remote OFF, use the brown and brown-white conductors. Remote Overrides are triggered by connecting the relevant conductors to C-Bus negative.

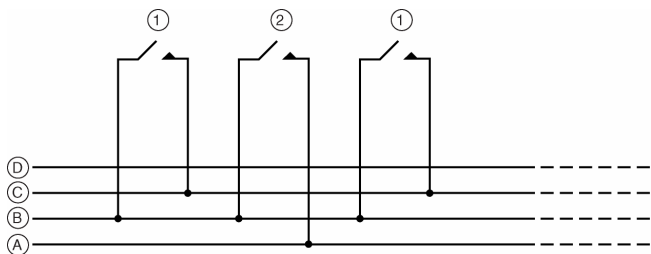
*NOTE: C-Bus is a balanced network, so C-Bus positive (+) must be present at any point where C-Bus negative (-) is taken. Therefore both network conductors [C-Bus positive (+), C-Bus negative (-)] must be looped through all Remote Override input switches on the network.*

**Figure 1: Wiring for Remote Overrides**

KEY:

- 1. Remote ON connections
- 2. Remote OFF connections

- A. Brown + Brown-White (Remote OFF)
- B. Orange-White + Blue-White (C-Bus [-])
- C. Green + Green-White (Remote ON)
- D. Orange + Blue (C-Bus [+])



## Configuring Operating Mode Priorities

The output status of the unit can be changed in the following ways:

- Press a C-Bus keypad button.
- Activate any of the Local Override buttons.
- Use the Remote Override facilities.

**Table 3: Operating Modes and Priorities**

Mode	Priority	Function
Remote OFF	1 (Highest)	Turns all channels OFF
Remote ON	2	Turns all channels ON
Local Override	3*	Toggle channel
C-Bus Input Unit (keypad, PIR, etc.)	4* (Lowest)	Control the channel

\* Local override has priority over normal C-Bus commands received on the bus (such as those generated by pressing a C-Bus keypad button). By default, if any channel is in Local Override mode and a C-Bus command is received for that channel, the C-Bus command state will be imposed ("Enable C-Bus Priority" option). This feature can be disabled in software so all relevant C-Bus commands will be ignored by the unit when it is in Local Override Mode.

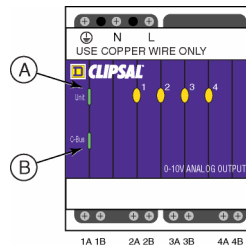
## Status Indicators

The 0-10V Analog Output Unit has 2 green indicator lights on the front.

**Figure 2: Status Indicators**

KEY:

- A. Unit Status Indicator - shows the status of the individual unit.
- B. C-Bus Network Status Indicator - shows the status of the C-Bus network at this unit.



## Unit Status Indicator

This indicator shows the status of the individual unit. When the unit is connected to a properly operating C-Bus network, the unit status indicator will display a continuous green light (ON).

**Table 4: Unit Status Indicator Definitions**

Indicator Status	Meaning
On	Normal operation
Off	No line voltage connected

## C-Bus Status Indicator

This indicator shows the status of the C-Bus network at the unit. If sufficient network voltage and a valid C-Bus clock signal are present then the C-Bus status indicator will display a continuous light (ON). If a network is connected that has more current load than the power supplies can support, then this indicator will flash to show a marginal network voltage. If there is no C-Bus clock then this indicator will not light.

*NOTE: The C-Bus indicator does not function when standalone programming is being performed on a dimmer unit powered by the C-Bus network.*

**Table 5: C-Bus Status Indicator Definitions**

State	Definition
ON	Power on and functional
Flashing	Insufficient power to support network
OFF	No C-Bus or electrical power connected No C-Bus clock signal present



## C-Bus System Clock

The 0-10V Analog Output Unit incorporates a software selectable C-Bus System Clock. The System Clock is used to synchronize data communications waveforms on a C-Bus Network. At least one active C-Bus System Clock is required on each C-Bus network for successful communications. No more than three units on any C-Bus Network should have Clock circuitry enabled, so this option should normally be disabled using the C-Bus Installation Software.

If a System Clock is required, it can be enabled from the Global Tab on the Graphical User Interface (GUI) for the unit.

## Power Outage and Restoration

All C-Bus units have onboard non-volatile memory, which is used to store the operating state of the unit in case of a power outage. With restoration of communications or power, the unit will initiate a brief power-up sequence (approx. 5 seconds.). After power-up is complete, the unit status can be set as desired.

## SAFETY PRECAUTIONS

This section contains important safety precautions that must be followed before attempting to install or maintain electrical equipment. Carefully read and follow the safety precautions below.

### DANGER

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- This equipment must be installed and serviced by qualified electrical personnel.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Turn off all electrical power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

**Failure to follow these instructions will result in death or serious injury.**

### Transient Voltage Surge Protection

Use this unit only within the limits of the design specifications. Each unit incorporates transient protection circuitry. Additional external power surge protection devices should be used to enhance system immunity to power surges. It is strongly recommended that over voltage equipment be installed at the load center.

## INSTALLATION

Follow the procedures in this section to properly mount and connect electrical power and C-Bus Network cables to the 0-10V Analog Output Unit.

### Mounting the 0-10V Analog Output Unit onto the DIN Rail

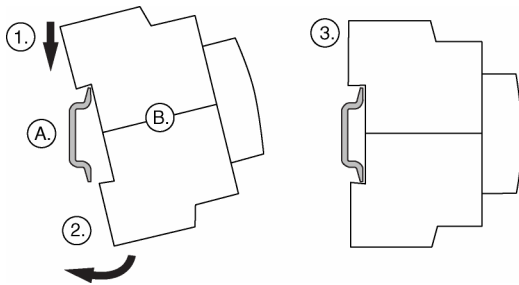
The DIN-rail units are designed to be installed onto a standard 1.38 in. (35 mm) DIN rail. To mount (i.e., attach) the dimmer unit, hook it onto the top of the DIN rail. Swing the bottom of the unit down until it clicks into place.

**Figure 3: Mounting the Unit onto the DIN Rail**

KEY:

- A. DIN rail
- B. DIN-rail unit

1. Hook the unit onto the top of the DIN rail
2. Swing the bottom of the unit down
3. Mounted unit



## Removing the 0-10V Analog Output Unit from the DIN Rail

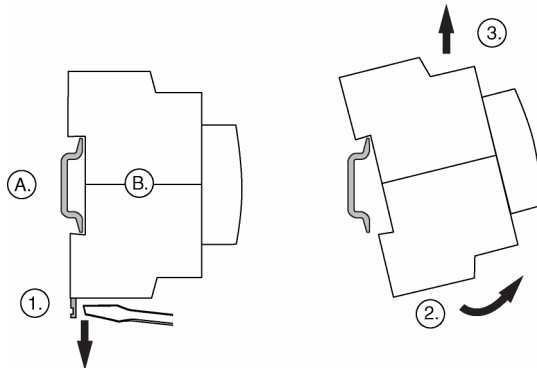
Use a small flat-blade screwdriver to pull either the upper or lower slide release out and disengage the unit from the DIN rail.

**Figure 4: Removing the Unit from the DIN Rail**

KEY:

A. DIN rail  
B. Unit

1. Pull out the slide release
2. Pull the unit away from the DIN rail
3. Lift the unit away from the rail



## Making Electrical Wiring Connections

Observe national and local electrical codes when wiring the unit.

Care must be taken to prevent copper strands from entering the DIN unit's openings. Insert the provided rubber plugs into any unused RJ45 terminal ports to stop foreign objects from inadvertently entering the unit. Always install plugs when units are to be mounted inside an appropriately rated DIN enclosure (Square D Clipsal 36M enclosure or equivalent).

Verify that the power supplying the system is turned OFF before handling electrical power conductors. Follow the guidelines listed below for making electrical connections.

- Make electrical wiring connections to the line terminals as shown in the figure "Electrical Wiring Connections."
- Use (1) #12 or (2) #14-16 AWG (3.1 mm<sup>2</sup> - 1.3 mm<sup>2</sup>) copper wire only.
- Prevent wire cuttings and debris from entering the unit.

- Do not exceed 4.5 ft-in. (.51 Nm) maximum torque on power terminals.
- Electrical power conductors must be separated from the C-Bus network cable and all other Class 2 conductors. Wiring must be routed to maintain minimum separation or be separated by barriers. Consult your electrical code for local requirements.
- Megger testing of electrical power terminals will not damage units. Since this unit contains electronic components, the installer should interpret Megger readings with due regards to the nature of the circuit connection.

<h2>CAUTION</h2>
<p><b>HAZARD OF EQUIPMENT DAMAGE</b></p> <p>Do not Megger® test C-Bus data cabling or terminals. Megger testing can result in equipment damage.</p> <p><b>Failure to follow this instruction will result in damage to the C-Bus network.</b></p>

### Figure 5: Electrical Wiring Connections

KEY:

NOTE: Only use (1) #12 or (2) #14-16 AWG (3.1 mm<sup>2</sup> - 1.3 mm<sup>2</sup>) copper wire.

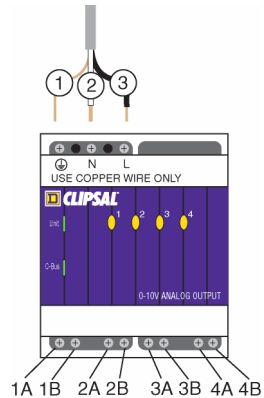
Electrical wiring terminals:

1. Ground
2. N = Neutral
3. L = Line

Output wiring terminals:

A Terminals = 0V output

B Terminals = +V (positive) output



### Figure 6: Electrical Wiring Connections to Channels

KEY:

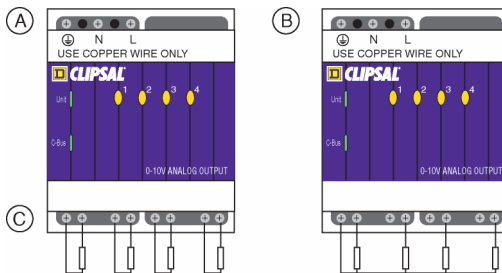
NOTE: Only use (1) #12 or (2) #14-16 AWG

(3.1 mm<sup>2</sup> - 1.3 mm<sup>2</sup>) copper wire.

A. Wiring scheme for individual 0V connection for each channel (Where channel A is negative (-) and channel B is positive (+)).

B. Wiring scheme using a common 0V connection for each channel

C. Output wiring terminals (A/B)



The output channel 0V connections of the unit are not isolated from each other, and can be commoned to reduce cabling requirements. Connections are polarity sensitive.

### Connecting the Output Unit to the C-Bus Network

Installation requires connection to the unshielded twisted pair C-Bus network cable. Use a Category 5 data cable. Verify that C-Bus network cables are connected to the C-Bus connections terminal ports (B).

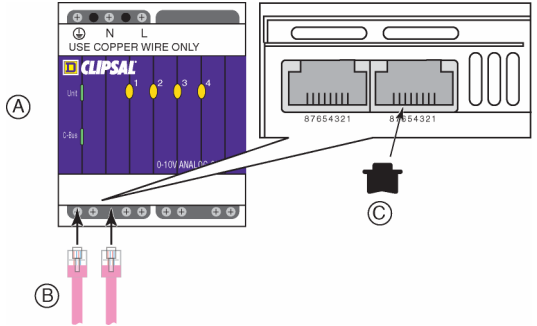
*NOTE: Insert the provided rubber plugs into any unused RJ45 cable terminals.*

The number of C-Bus network power supply units on the C-Bus network must be adequate to support all the connected devices. Use the C-Bus™ Calculator – Network Design Verification software utility to determine the total network current load.

**Figure 7: Connecting C-Bus Cables to the C-Bus RJ45 Terminal Ports**

KEY:

- A. 0-10V Analog Output Unit
- B. C-bus network RJ45 cables and terminal ports
- C. Rubber plug for unused terminal ports



**Table 6: RJ45 Pin Connections**

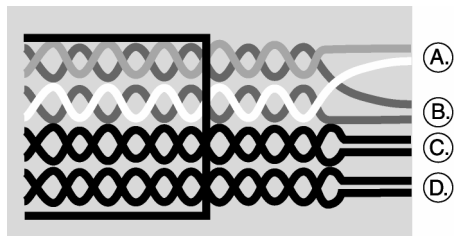
RJ Pin	C-Bus Connection	Color
1	Remote ON*	Green/White
2	Remote ON*	Green
3	C-Bus Neg (-)	Orange/White
4	C-Bus Pos (+)	Blue
5	C-Bus Neg (-)	Blue/White
6	C-Bus Pos (+)	Orange
7	Remote OFF*	Brown/White
8	Remote OFF*	Brown

\* Typically not used.

**Figure 8: C-Bus Wiring Connections**

KEY:

- A. C-Bus positive (+): blue + orange
- B. C-Bus negative (-): blue/white + orange/white
- C. Remote OFF: brown + brown/white
- D. Remote ON: green + green/white



## CONFIGURING THE UNIT




Before the Output Unit can operate on the C-Bus network, it must be assigned a unique identification (unit address) and mode of operation on the network. This is done with the C-Bus Toolkit™ software. When the Output Unit is being installed as part of a large or complex network, it is most efficient to perform this basic configuration before the unit is physically installed. However, the unit can be configured before or after physical installation.

The Output Unit can be programmed with or without connection to an electrical power source. The unit can be connected to any operational C-Bus Network that is capable of supporting one or more extra C-Bus units (22mA current required). The unit can then be configured using the C-Bus Installation Software. The analog output will only function when an electrical power connection is made.




## STANDARDS


**Table 7: U.S. and Canadian Product Safety Standards and U.S. FCC Regulations**

Standards/Regulations		Title
 CSA C22.2 No. 205		Complies with cUL Standards for Signal Equipment
 UL916		Energy Management Equipment
 FCC Part 15		Complies with FCC Standards for Home or Office Use

**Table 8: European Directives and Standards**

 European Council Directives		Standards	Title
89/336/EEC	EMC Directive	EN 55022	IT Equipment - RFI Emissions Standard
		EN 55024	IT Equipment - RFI Immunity Standard
		BS/EN 61000-4-2	Immunity to ESD
		BS/EN 61000-4-3	Immunity to RFI
		BS/EN 61000-4-4	Immunity to EFT
		BS/EN 61000-4-5	Immunity to Surge Voltages
		BS/EN 61000-4-6	Immunity to Conducted RF Currents
73/23/EEC	Low Voltage Directive	EN 61558-1	Safety of Power Transformers – General Requirements
		EN 61558-2-6	Safety of Power Transformers – Particular Requirements

**Table 9: Australian/New Zealand EMC & Electrical Safety Frameworks and Standards**

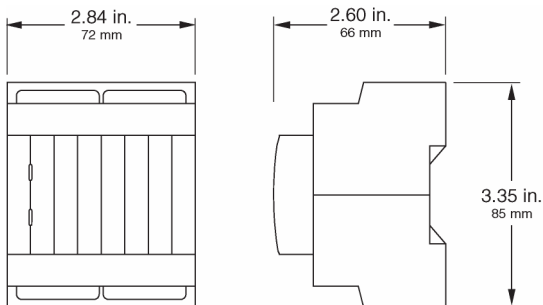
	RCM Framework	Standards	Title
EMC		AS/NZS CISPR22	IT Equipment - RFI Emissions Standard
		EN 55024	IT Equipment - RFI Immunity Standard
		BS/EN 61000-4-2	Immunity to ESD
		BS/EN 61000-4-3	Immunity to RFI
		BS/EN 61000-4-4	Immunity to EFT
		BS/EN 61000-4-5	Immunity to Surge Voltages
		BS/EN 61000-4-6	Immunity to Conducted RF Currents
Electrical Safety		AS/NZS 3100	General Requirements for Electrical Equipment
		AS/NZS 61558-1	Safety of Power Transformers – General Requirements
		AS/NZS 61558-2-6	Safety of Power Transformers – Particular Requirements

**SPECIFICATIONS**

<b>Catalog no.</b>	<b>SLC5504TAMP</b>	<b>SLC5504HAMP</b>
Nominal supply voltage	110-120V	277V
Frequency range(s)	47-53Hz and 57-63Hz	
C-Bus supply voltage	15-36V DC @ 22mA required for programming. Does not source current to the C-Bus Network.	
AC input impedance	50kW @ 1kHz	
Electrical isolation	3.75kV RMS from C-Bus to Electrical Power Source	
Status indicators	C-Bus, Unit, Load	
C-Bus network		
Output voltage range	0 to 10 VDC	
Output rating - sourcing	2.5mA (i.e. minimum of 4kohm)	
Output rating - sinking	15mA at V out = 0V 8mA at V out = 10V (i.e. I = 15-(0.7*V out) mA)	
Quiescent power	10 Watts	
Warm up time	5 seconds	
Restart delay	0 seconds to 42 minutes and 30 seconds	
Network clock	Software selectable	
Remote override	Remote switch input can be daisy chained to a maximum of 50 units and a maximum of 3280 ft. (1000m) of cable	
Electrical terminals	Accommodates (1) #12 or up to (2) #14 - 16 AWG (3.1 mm <sup>2</sup> - 1.3 mm <sup>2</sup> ) copper wire only.	
Weight	8.64 oz (245g)	
Dimensions	2.83 x 3.35 x 2.56 in. (72 x 85 x 65 mm)	
C-Bus connections	2 x RJ45 receptacles	
Operating temp. range	32°F – 113°F ( 0 – 45°C)	
Operating humidity range	10 – 95% RH non-condensing	

**Square D® Clipsal® DIN Rail Mounted, 0-10V, 4 Channel Analog Output Unit  
Instruction Bulletin**

**Figure 9: DIN Unit Dimensions**



## SUPPORT AND SERVICE


Contact the Square D Customer Information Center for technical support by phone at 1-888-Square D (1-888-778-2733) or e-mail at [lightingcontrol.support@us.schneider-electric.com](mailto:lightingcontrol.support@us.schneider-electric.com).

Contact your local Square D service representative or Square D® Clipsal® certified installer for repairs or service to your network.

You may also find helpful information on our web site at [www.squaredlightingcontrol.com](http://www.squaredlightingcontrol.com).

**Schneider Electric, USA**  
295 Tech Park Drive  
La Vergne, TN, 37086  
1-888-SquareD (1-888-778-2733)  
[www.squaredlightingcontrol.com](http://www.squaredlightingcontrol.com)

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Square D, , Clipsal, C-Bus are trademarks or registered trademarks of Schneider Electric and/or its affiliates in the United States and/or other countries.

© 2006 Schneider Electric. All Rights Reserved.