



**ADRES**

**Automated Demand Response  
and Energy Savings System  
Installation Manual for the  
Lighting Controller**

**Version 1.5**



***Winn Energy Controls, Inc.***

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# ADRES Lighting Control INSTALLATION MANUAL

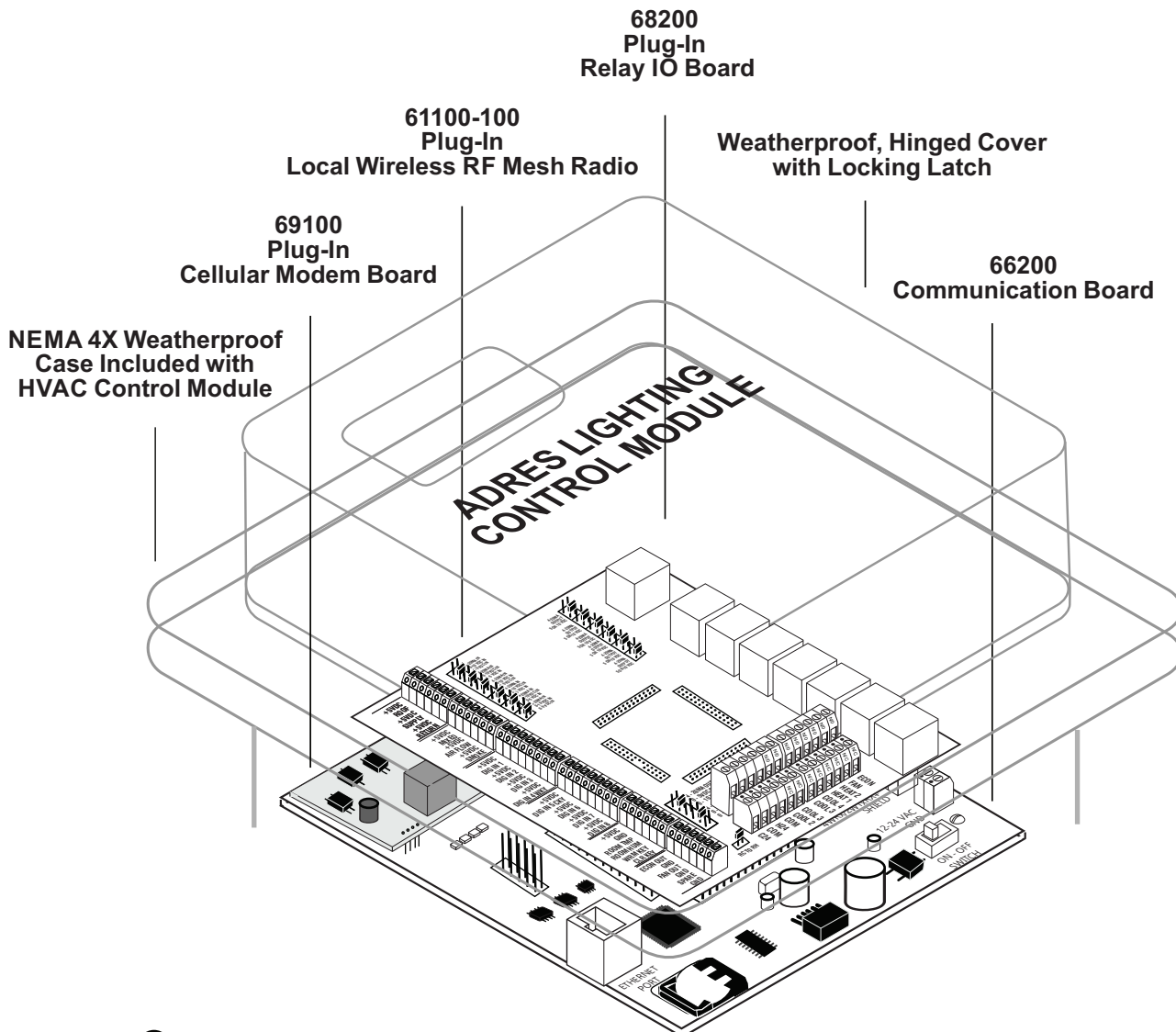
# Introduction to the ADRES Lighting Control

## Introduction

This manual describes the installation and wiring of the ADRES Lighting control module series which are supplied in NEMA 4X type enclosures. The 66200 Communication board can be powered by 12 to 24 VAC or 12 to 24 VDC. The 66200 Communication Board has four two row headers that receive a plug-in Relay Input / Output board 68200. The 66200 board also will receive an optional plug-in Cellular Modem board (69100) and local wireless RF radio board (61100). The part numbers of compatible boards are shown in Table 1.

Table 1	12-24 VAC / VDC
ADRES Communication Board	66200-100
ADRES Communication Board	66200-400
Relay IO Board	68200-100
Relay IO Board	68200-200
Relay IO Board	68200-200
Cellular Modem, Winn Wireless	69100-100
Cellular LTE Modem, Winn Wireless	70100-100
Local Wireless RF Mesh Radio	61100-100

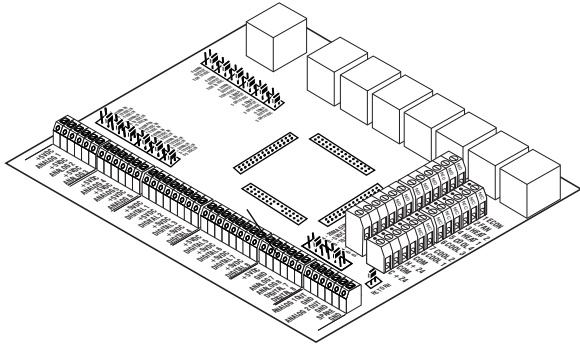
Table 1. Part numbers for compatible Components.



Reference  
IG 01

## Compatible Components

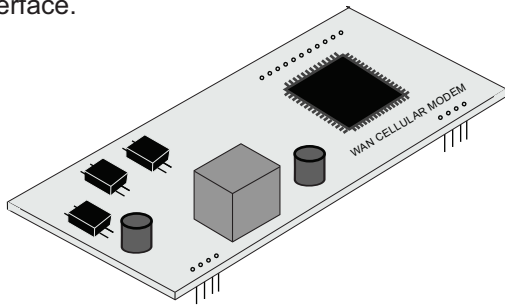
The 68200 Lighting Relay IO board plugs on to the Communication board and provides the wiring interface and controls and monitors practically any lighting relay, contactor or smart breaker.



68200-x00  
Lighting Relay IO Board

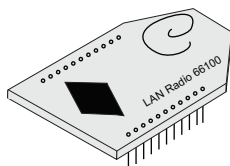
### 69100-100 Plug-In Cellular WAN Modem

The 69100-100 Plug-In Cellular Modem provide the Wide Area Network (WAN) connection to the ADRES controls to the Internet. The WAN Modem allows the ADRES controls to be monitored and controlled from a remote Server through the Internet Web browser interface.



### 61100-100 Plug-In Local LAN Radio

The 61100-100 Plug-In Local Radio Modem provides the wireless communication network between each ADRES module within the building and the Cellular Modem connection. The LAN Radio modem allows the ADRES controls to communicate locally between themselves and the Cellular modem.

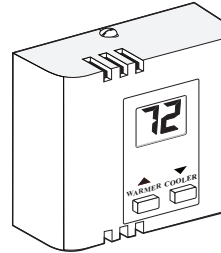


## Temperature Sensors

A variety of Room Temperature Sensors can be used with the HVAC Control module to monitor indoor space temperature, humidity, display temperature and provide limited control over the heating and cooling set-point temperatures.

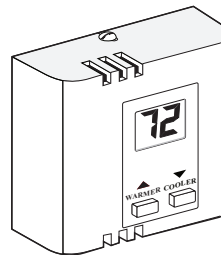
### 43021-400

The 43021-400 Room Temperature Sensor includes a thermistor type temperature sensor, humidity sensor, a digital thermometer with LCD display and Warmer and Cooler keys for changing set-point temperatures.



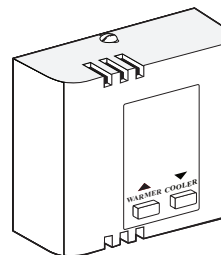
### 43021-300

The 43021-300 Room Temperature Sensor includes a thermistor type temperature sensor, a digital thermometer with LCD display and Warmer and Cooler keys for changing setpoint temperatures.



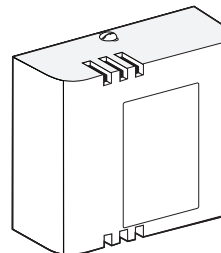
### 43021-200

The 43021-200 Room Temperature Sensor includes a thermistor type temperature sensor and Warmer and Cooler keys for changing setpoint temperatures.



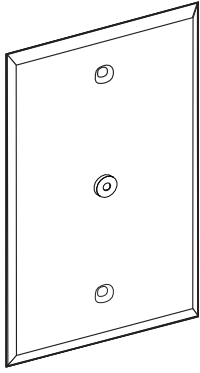
### 43021-100

The 43021-100 Room Temperature Sensor has a thermistor type temperature sensor for monitoring space temperature.



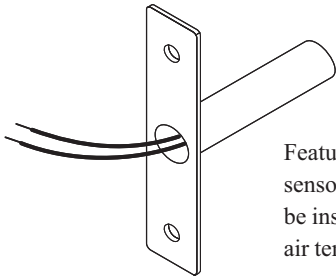
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## Temperature Sensors



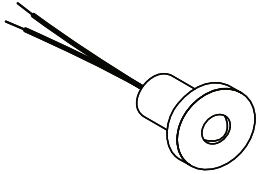
### 43102-100

The 43102 Room Temperature Sensor features an internal thermistor temperature sensor in a white, single wide, switch plate that can be attached to an electrical box or directly to a wall.



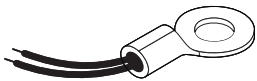
### 43103-100

Features an internal thermistor temperature sensor in a 3/8-inch diameter tube that can be installed in the duct to measure supply air temperature.



### 43104-100

Features an internal thermistor temperature sensor in a 3/8-inch diameter flanged, plastic bushing that can be installed in single-gang switch or in the NEMA enclosure to measure room temperature or outdoor air temperature.



### 43105-100

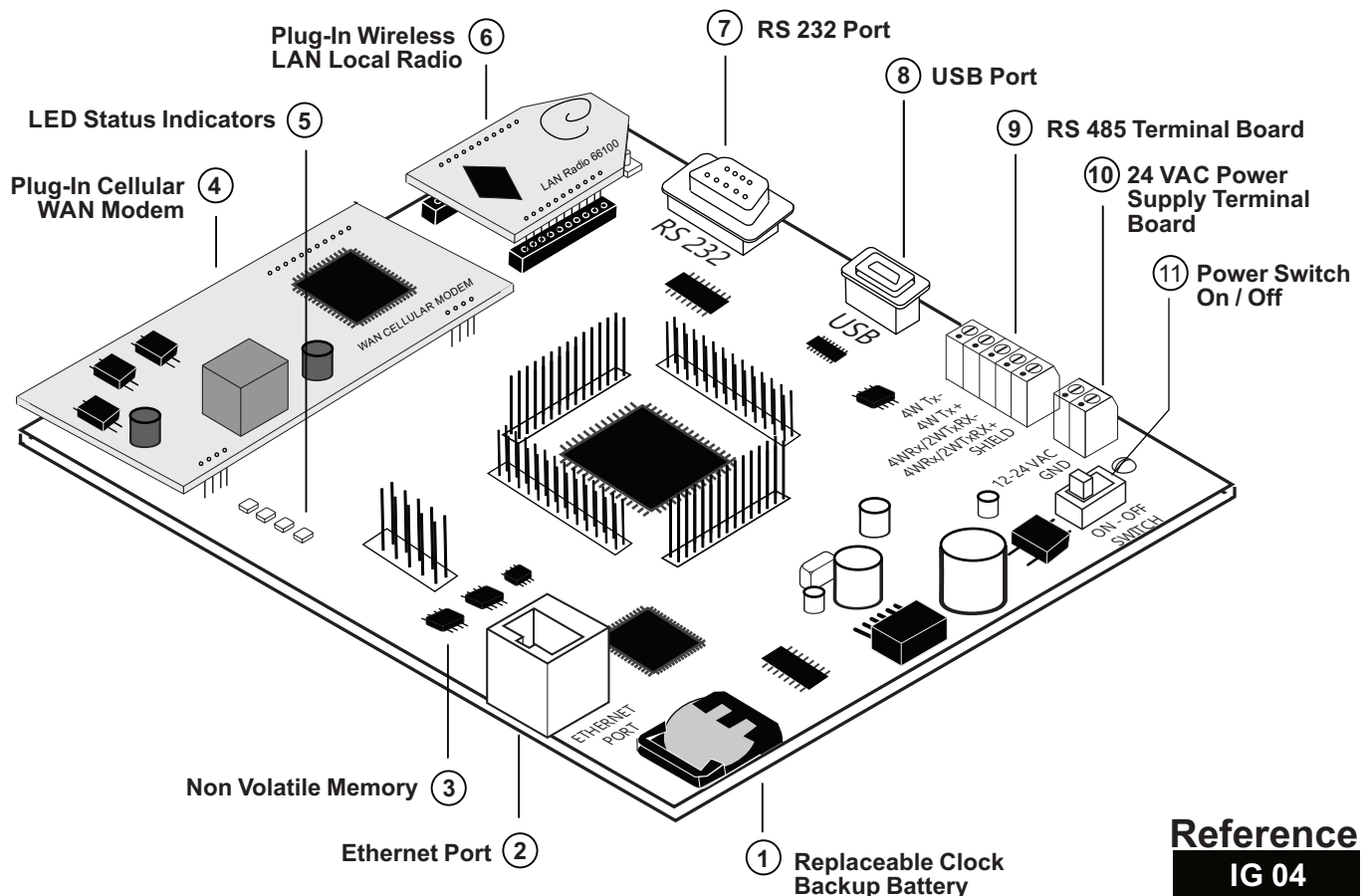
Features an internal thermistor temperature sensor in a copper lug that can be used to measure supply or outdoor temperature.

# ADRES Lighting Control INSTALLATION MANUAL

# ADRES Communication Board P/N 66200 Features

## Communication Board P/N 66200 Features

- ① **Replaceable Clock Battery**  
Replaceable Clock Battery to maintain Day / Date / Time.
- ② **Ethernet Port (RJ45)**  
Optional Ethernet Port (RJ 45) for Internet access through Cellular modem.
- ③ **Non Volatile Memory**  
Non volatile memory for up to three months of all program settings and historical performance and energy / demand consumption data.
- ④ **Plug-In Cellular Modem Board**  
Plug-in Cellular WAN modem to provide ADRES system access to remote server, OpenADR2.0 and web browser software interface.
- ⑤ **LED Status Lights**  
LED status lights to indicate system running and operational status.
- ⑥ **Plug-In Local Wireless Radio Board**  
Plug-in wireless local area network radio to provide on-site communication between ADRES modules.
- ⑦ **RS 232 Port (DB 9)**  
Jumper selectable RS 232 serial port through the DB 9 connector. Typically used for local programming through PC with EnergyPro software.
- ⑧ **USB Port**  
USB port typically used for local programming through PC with EnergyPro software.
- ⑨ **RS 485 Port (2 Wire or 4-Wire)**  
Terminal board to land optional hardwired RS 485 communication between ADRES control modules.
- ⑩ **12 to 24 VAC or VDC Power Terminal Board**  
Terminal board to land the external 12 - 24 VAC or VDC power supply.
- ⑪ **Power Switch On / Off**  
Power Switch to turn On or Off the power to the ADRES Lighting Control Module.



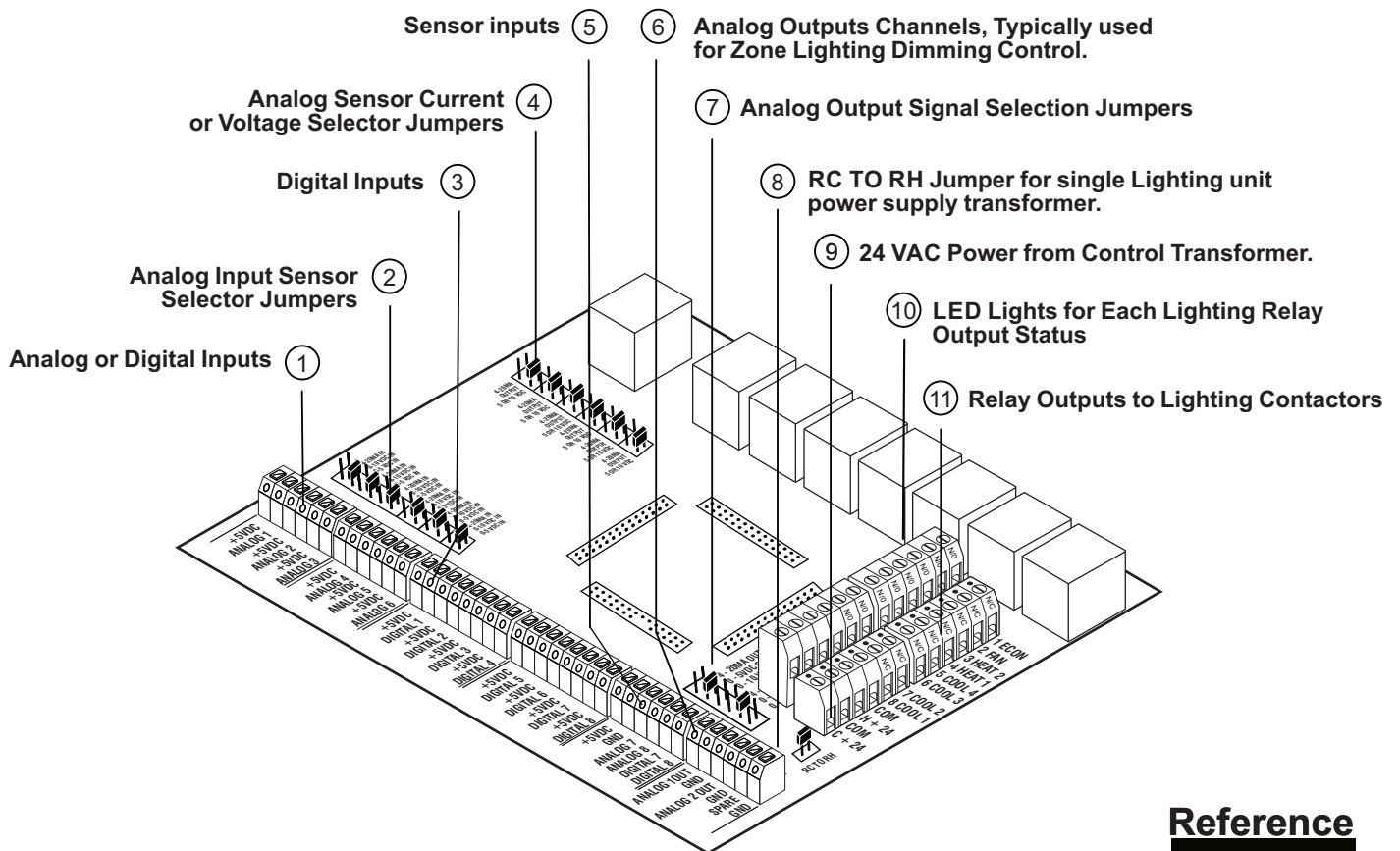
**Reference**  
**IG 04**

# ADRES Lighting Control INSTALLATION MANUAL

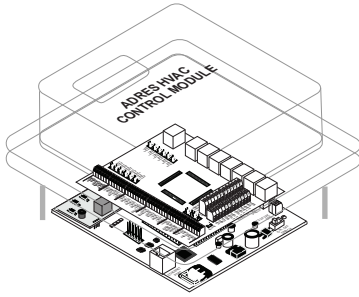
# ADRES Relay Input / Output Board P/N 66800 Features

## Relay IO Board P/N 68200 Features

- ① **Analog Inputs (Temperatures, Air Flow, Smoke)**  
Analog Input Sensors selectable for temperature, pressure, flow, vibration, humidity, etc.
- ② **Analog Input Sensor Selector Jumpers**  
Select by Jumper from 4-20 ma, 0-5 VDC or 0-10 VDC Sensor inputs.
- ③ **Digital Inputs Terminal Board**  
Three digital pulse counting inputs for Sub-metering.
- ④ **Analog Sensor Voltage or Current Jumpers**  
Jumper to select either 0-5 VDC, 0-10 VDC or 4-20 ma current inputs. Each analog input can be adjusted to match the sensor selected.
- ⑤ **Room Temperature Sensor Inputs**  
Terminal Board for Room Temperature Sensor Inputs.
- ⑥ **Analog Outputs**  
Analog Outputs to typically used as lighting zone dimmer control.
- ⑦ **Analog Output Selection Jumpers**  
The Analog Output selection jumpers are used to select the output signal desired, 4-20 ma current, 0-5 VDC or 0-10 VDC voltage.
- ⑧ **RC to RH Jumper**  
Jumper RC to RH when the lighting relays only need single control transformer. Default is jumpered.
- ⑨ **Lighting Unit 24 VAC or +24 VDC Power Supply**  
Terminal board to land the 24 VAC or +24 VDC ADRES unit system power supply.
- ⑩ **LED Lights Track Relay Output Status**  
Individual LED lights track each relay output status. Green is off and Red is On.
- ⑪ **Relay Outputs to Lighting Unit**  
Terminal board to land the Lighting zone control output relays.



**Reference**  
**IG 05**



One ADRES Lighting Control Module is capable of controlling up to eight (8) individual lighting circuit or zones. Each lighting zone can be setup to operate with most all lighting contactors, smart breakers and relays. The ADRES control module can be programmed to operate each lighting zone with four daily on / off schedules and each daily schedule can be different for each day. The module is programmed from the EPWeb Internet Web portal.

Once programmed, the operating parameters are stored in non-volatile memory (unaffected by power outages) and controls the Lighting systems.

## Compatible Lighting Systems

The Lighting control module can be setup and configured to operate with lighting contactors, individual contactors, high current relays and smart breakers. Control is typically energized On and Deenergized for Off.

## Analog Inputs and Sensors

The Lighting control module has eight Analog sensor inputs available to measure, monitor and alarm temperatures, pressures, flow, vibration, speed, and other typical analog input sensors that operate on either 0 - 5 VDC, 0 - 10 VDC or 4-20 ma. Typical use may be to measure and record temperature and performance data to create the Measurement and Verification report for energy savings.

## Communications

A plug-in wireless local RF radio is provided for normal wireless networked communication through the embedded cellular modem. A USB and serial RS232 port is provided for local programming / testing operations with a PC computer. Optionally, the unit can be hardwired to the RS485 port on the communication board.

## Wiring to the Lighting Contactor or Control Relays

Each Lighting control module is connected to each lighting zone high voltage / high current lighting contactor or relay using 18 Gage thermostat wiring.

Each Lighting zone is wired to control the high voltage contactor or relay to energize the relay to bring the lighting zone ON and de-energize the relay to turn the lighting zone OFF.

Each lighting circuit and zone is wired identical according to the wiring diagram in Section 2.0

Note, the ADRES Lighting control module should have only 24 VAC or 24 VDC power wired to either the Communication or Relay IO board.

## Control Wiring

The wiring of the Lighting control module to the lighting systems are shown in the detailed wiring diagrams in Section 2.0 of this manual.

A separate 24VAC 40VA transformer is recommended to provide power for each individual lighting control contactors or relays.

## Mechanical Installation

The Lighting control module is typically installed adjacent to the Lighting contactor or relay panel on the outside of the panel enclosure using four sheet metal screws. The control module should be positioned high enough so that it is not subject to interfere with the access to either the contactor or load center panels.

Single or multiple "seal-tite" conduit runs can be made between the control module and the Lighting unit. 24 VAC power and 24 VAC Lighting control cables should be run separate from the low voltage analog and digital input sensor wiring.



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## Before You Install the ADRES Control System

There are a number of options that should be selected before you install the ADRES Lighting control system and connect it to a Lighting in the building. The list below should help guide you through these options.

### Program the Address

Each control module is programmed with an address so that data can be read from a specific control without affecting others. See the EnergyPro software manual for detailed instructions. Default address is 01 for the ADRES control module.

### Program the Type of System

Each ADRES control module should be programmed for the type of system it is controlling. Select the Lighting Unit type.

### Cellular Modem

If a 69100-100 internal Cellular Modem is used in the Commboard, the ADRES Control module will automatically recognize the cellular modem.

### Program the Alarm Options

Each control module has an alarm capability that can display alarm messages on the EPWeb remote server. See your EPWeb Software User's Guide for detailed instructions. Default is all alarms disabled, alarm delay = 15 minutes.

### Select the Type of Communications

Most ADRES systems are equipped with the Cellular WAN modem and in the first ADRES controller and the plug-in wireless local radio option in each ADRES including the ADRES with the Cellular Modem. If a hard-wired configuration is desired, the various control modules can be configured in a variety of configurations as shown in Wiring Diagrams WD01.

### Select the Operating Power

The Lighting control modules can be supplied to operate on 12 to 24 VAC or VDC. Typically use an external 24 VAC control transformer rated 24 VAC 40 VA.

## Installing the NEMA Enclosure

The NEMA 4X enclosure can be installed indoors or outdoors at the Lighting contractor or control panel. Location the NEMA case on a panel or surface that does not obstruct opening of surrounding panels. Four mounting holes are provided for #10 screws. The NEMA case is pre-formed with conduit knockouts on the bottom of the box for routing the wiring as shown in Wiring Diagrams.

### Power Wiring

Wiring Diagram WD01 illustrates the wiring for both 12 to 24 VAC or VDC operation. The standard 24 VAC 40 VA rated transformer should be located within the HVAC unit's enclosure and its high voltage primary wiring should be insulated according to local code.

### Lighting System Wiring

Wiring Diagram WD 06 shows the wiring from the pilot relay on the ADRES Relay IO board to each lighting contactor, relay or smart breaker.

The pilot relay and corresponding lighting zone being controlled will be OFF when the pilot relay is wired to the Normally Open contacts of the pilot relay.

The pilot relay and the Lighting zone will be ON when the pilot relay is wired to the Normally Open contacts and the pilot relay is energized.

The corresponding lighting zone LED will turn Red when the zone is OFF and will turn Green when the zone is ON.

### Lighting System Dimming

Wiring Diagram WD 07 shows the wiring from either of the Analog Outputs (ANA Out 1 or ANA Out 2) to the lighting fixture or control to Dim or modulate from high to low the light levels of the fixture or control.

Two lighting zones can be individually modulated with the dimmer control from the Analog Outputs.

Select the Analog Signal output using the Jumper. Selection is either 0 - +5VDC, 0-+10 VDC or 4-20 ma.

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## Communication Between Control Modules

Each ADRES control module can communicate with the other ADRES control modules through the plug-in wireless local radio mesh network. One ADRES control module can be equipped with a plug-in wireless Cellular modem for Internet communication to the Epweb remote server using the Internet Web Browser. Local communication can be established between a PC running the EnergyPro application and either the USB or RS232 ports on the communication board. Alternatively, the ADRES control modules can be hardwired using the RS485 port on each control module.

Wiring Diagrams WD01 through WD05 illustrate the communication options or the ADRES Commboards. Wiring Diagram WD 01 - 05 illustrates the connection between adjacent ADRES control modules.

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## System Startup and Test

After each ADRES control module has been installed and connected to the Lighting system, you should verify that the system is operating properly. The following steps should be helpful in commissioning and testing.

### ● Check Power Wiring

Turn the power breakers On and measure the DC voltage between the +5VDC terminal and any GND terminal. It should measure +5VDC  $\pm 5\%$ . Measure the DC voltage between the +12VDC terminal and any GND terminal. It should measure 12VDC  $\pm 5\%$ .

Measure the DC voltage between the +5VDC terminal and the sheet metal (earth ground), it should measure approximately 0VDC. If you measure 5VDC there is a short between signal GND and earth ground and you will have to find and remove the short.

### ● Check Communication to each HVAC Control

You can verify the communication to each ADRES control module first through the USB or Rs232 for incoming or Master RS232 communications wiring by plugging a PC into the USB Connector (see WD03) of a Commboard.

### ● Check Lighting Wiring

The Lighting system wiring can be verified using the EPWeb to manually turn on and off each Lighting zone to ensure the Lighting description of the zone matches the lighting zone in the building observe that the correct LEDs on the Relay IO board are On. Repeat this same procedure for each Lighting zone.

### Toll Free Helpline

If you have questions concerning the installation or operation of the ADRES controls, please call:

(858) 274-1330.

# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Power Wiring for the ADRES Lighting Control Module

## Connecting 12 to 24 VAC or VDC Power to the Communication Board.

### Description

The 66200 Communication board can be powered by either a 12 to 24 VAC or 12 to 24 VDC power supply. For most all Lighting applications a standard 24 VAC 40 VA control transformer is recommended.

### Communication Board 66200-100

A 24 VAC control transformer should be installed within the high voltage area in the Lighting contactor NEMA box, or it can be mounted externally to the system, provided it meets all applicable wiring codes. The transformer should have a minimum rating of 40VA. The 24 VAC output should be isolated from the high voltage primary.

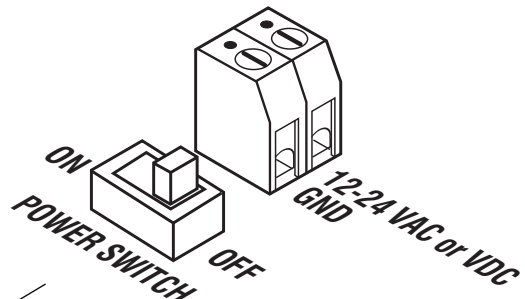
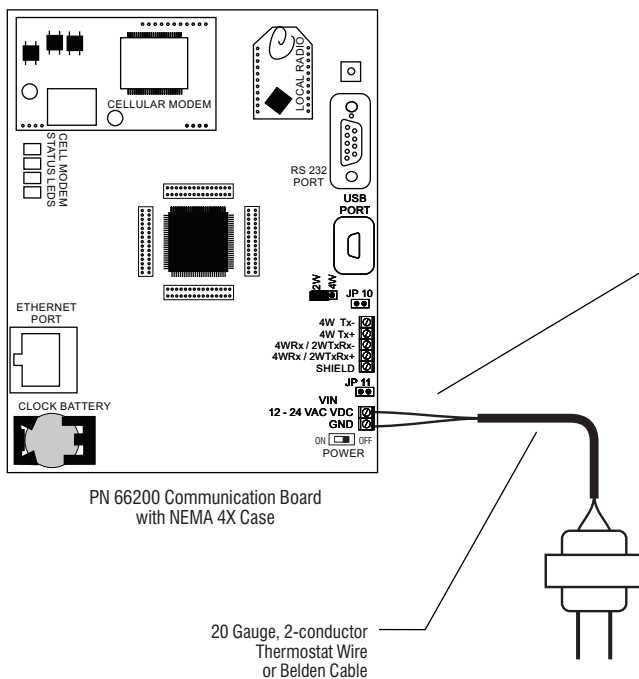
The primary should be connected to a fused power source and the 24 VAC secondary connected to the 24 VAC terminals on the Communication board using AWG 18 or larger wire.

### APPROVED TRANSFORMERS

Model Number	Manufacturer	Available From	Input Rating	Output Rating
43320-020	Winn	Winn	120/240VAC	24VAC,40VA

### Communication Board 66200-XXX

The Communication board operates from 12 to 24 VAC or VDC supplied by the customer. Wiring for the power is shown below.



### Power On/Off Switch

A switch is provided on the Communication Board for controlling all power to the Modem, Lighting Relay IO and Communication boards. Whenever wiring is changed or a board removed or installed, the power should be turned off at the Lighting Unit disconnect switch.

### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*

**Reference**  
WD 01



## Using a PC Computer to Provide On-Site Programming of ADRES Control Module.

### Description

A PC computer with the EnergyPro software can be used to locally program, monitor and control a number of ADRES control boards. A standard USB cable can be connected between the PC computer USB port and the ADRES communication board USB port. Alternatively, a straight through serial cable can be connected between the ADRES DB9 communication port and a serial port on the PC as shown below.

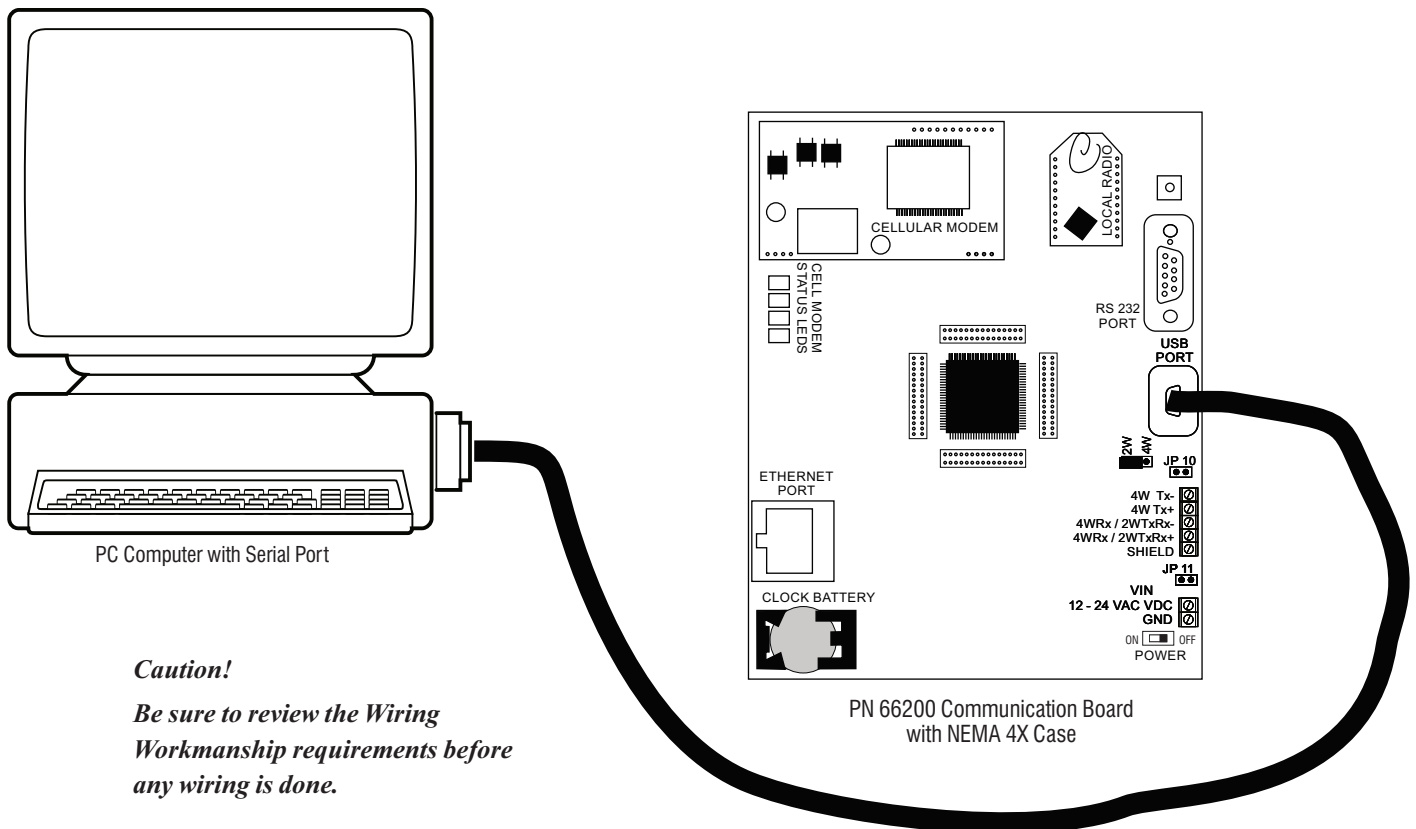
The EnergyPro software User's Guide shows how to select and initialize a serial port in the PC computer and verify the integrity of the communications.

After plugging in either the USB or Rs232 cable to the ADRES control module into the PC computer's USB or serial port, connect the cables as follows:

At the PC Connector	At the ADRES Connector	Function
USB	USB mini	USB Communications to ADRES
RS-232 Male	RS-232 Female	RS-232 Communications to ADRES

### Wiring Materials Required

1. USB to USB mini cable.



### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*

# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Local Programming through RS 232 Serial Port

## Using a PC Computer to Provide On-Site Programming of ADRES Control Module.

### Description

A PC computer with the EnergyPro software can be used to locally program, monitor and control a number of ADRES control boards. A standard serial RS 232 cable (straight through) can be connected between the PC computer USB port and the ADRES communication board RS 232 DB 9 port. Alternatively, a USB cable can be connected between the ADRES USB communication port and a USB port on the PC as shown below.

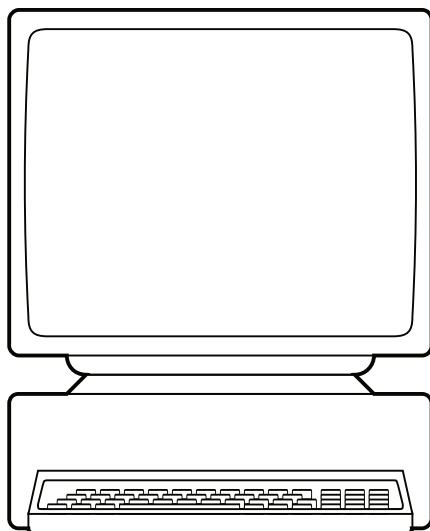
The EnergyPro software User's Guide shows how to select and initialize a serial port in the PC computer and verify the integrity of the communications.

After plugging in either the RS 232 cable to the ADRES control module into the PC computer's USB or serial port, connect the cables as follows:

At the PC Connector	At the ADRES Connector	Function
USB	USB mini	USB Communications to ADRES
RS-232 Male	RS-232 Female	RS-232 Communications to ADRES

### Wiring Materials Required

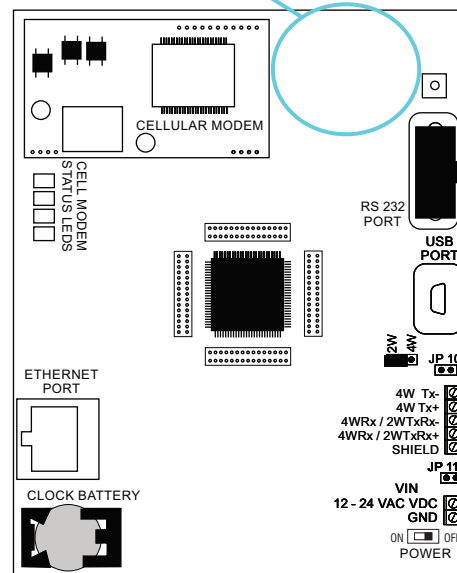
1. RS 232 Serial Cable (Straight Through).



PC Computer with USB Port



Note: Local RF Radio must be temporarily removed to use hardwired RS 232 DB 9 Connector ADRES will automatically recognize the Local RF Radio when plugged in.



PN 66200 Communication Board with NEMA 4X Case

### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# ADRES Communication to Ethernet Enabled Devices

## The ADRES Controller can communication to an Ethernet addressable Device or Local Network.

### Description

The ADRES Controller with Cellular Modem can use its Ethernet port to communicate to Ethernet enabled device or devices through a switch connected to the ADRES Ethernet port.

The ADRES will provide a local IP address to the connected device or devices through a switch and allow remote communication to these devices.

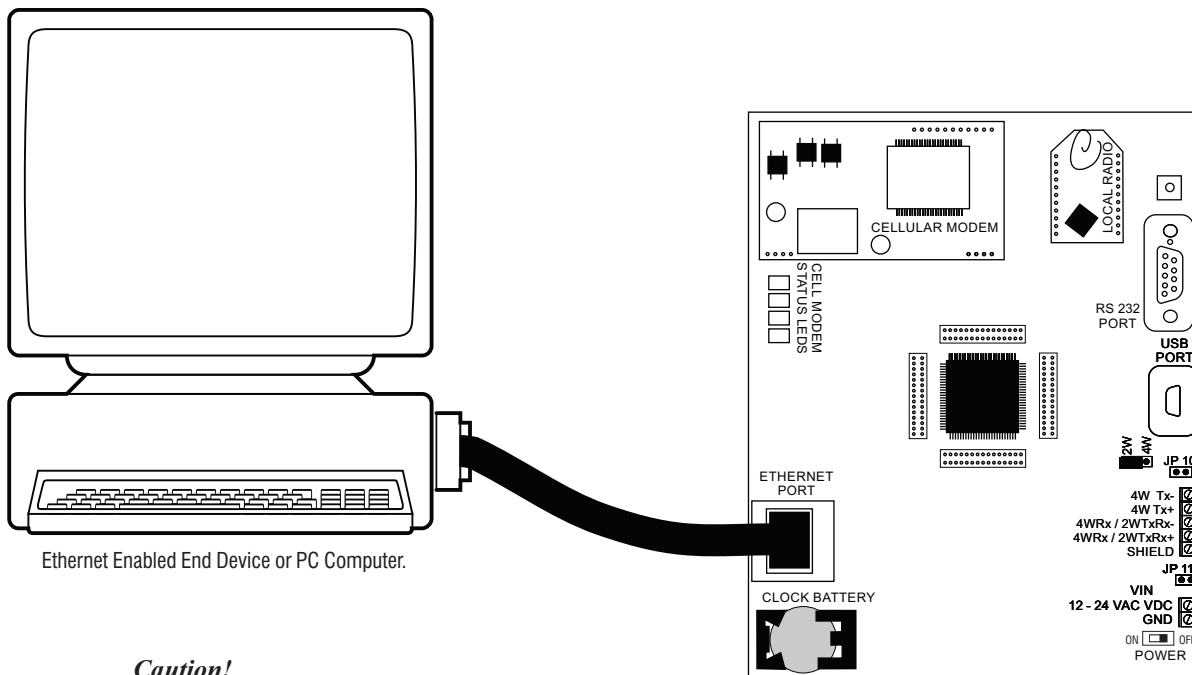
The ADRES controller can also use an Ethernet enabled submeter to read meter data directly and report via the EPWeb server HMI interface.

After plugging in an Ethernet cable between the ADRES Ethernet port and the End Device and its Ethernet Port, The ADRES can provide remote access to the device or devices using a Ethernet switch.

ADRES Ethernet Port	End Device Ethernet Port	Function
Ethernet Cable	Ethernet Cable	Ethernet to Local Device (s)

### Wiring Materials Required

1. Standard RJ 45 Ethernet Cable.



Ethernet Enabled End Device or PC Computer.

PN 66200 Communication Board with NEMA 4X Case

### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*



# ADRES Lighting Control WIRING INSTRUCTIONS

# ADRES RS-485 Communication Wiring Between Comm Board

## ADRES Hardwired Comm Board to Comm Board Communication Connections

### Description

The ADRES Communication between ADRES modules can be connected in a RS-485 daisy chain as shown below. Each ADRES Control board on the Comm board is programmed with a different address so that only that Comm board accepts the data being sent on the RS485 data lines and only that Comm board responds. Certain commands can be sent to all ADRES controller and only the ADRES Control board with address 01 will respond with an acknowledgement.

The backup power wiring is only required if a common backup power source is being used.

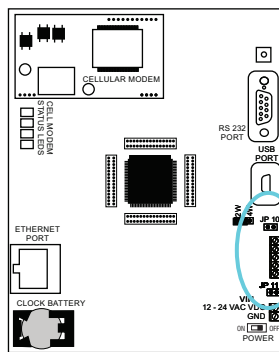
After mechanically installing the NEMA cases with the Comm boards, connect the communications RS-485 wires between Comm Boards as follows;

At the first Comm Board	At the next Comm Board	Wire Color	Function
SHIELD	SHIELD	BLK	Signal Ground
2WTxRx+	2WTxRx+	RED	RS-485 2-Wire
2WTxRx -	2WTxRx -	GRN	RS-485 2-Wire

### Wiring Materials Required

1. Belden Wire, 3 Conductor, AWG20 twisted and shielded.

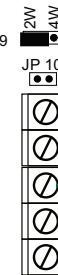
ADRES  
Controller  
Number 1



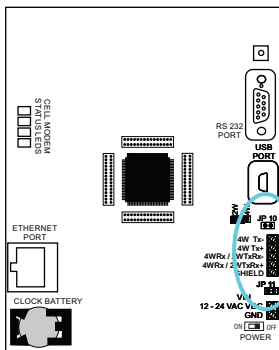
PN 66200 Communication Board  
with NEMA 4X Case

Install Jumper on JP 9  
Header to Select 2 Wire  
RS-485.

4W Tx-  
4W Tx+  
4WRx / 2WTxRx-  
4WRx / 2WTxRx+  
SHIELD



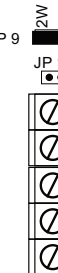
ADRES  
Controller  
Number 2



PN 66200 Communication Board  
with NEMA 4X Case

Install Jumper on JP 9  
Header to Select 2 Wire  
RS-485.

4W Tx-  
4W Tx+  
4WRx / 2WTxRx-  
4WRx / 2WTxRx+  
SHIELD



20 Gauge Twisted Shielded 3 Conductor Cable.

To Next ADRES Controller

### Caution!

*Be sure to review the Wiring  
Workmanship requirements before  
any wiring is done.*



**Reference**  
WD 05

# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Lighting Unit Wiring for the ADRES Lighting Control Module

## Typical Wiring of Lighting Contractors to the ADRES Lighting Relay board.

### Description

The wiring diagram below is typical of Lighting contractors, relays or smart breakers being controlled by the ADRES Lighting controller.

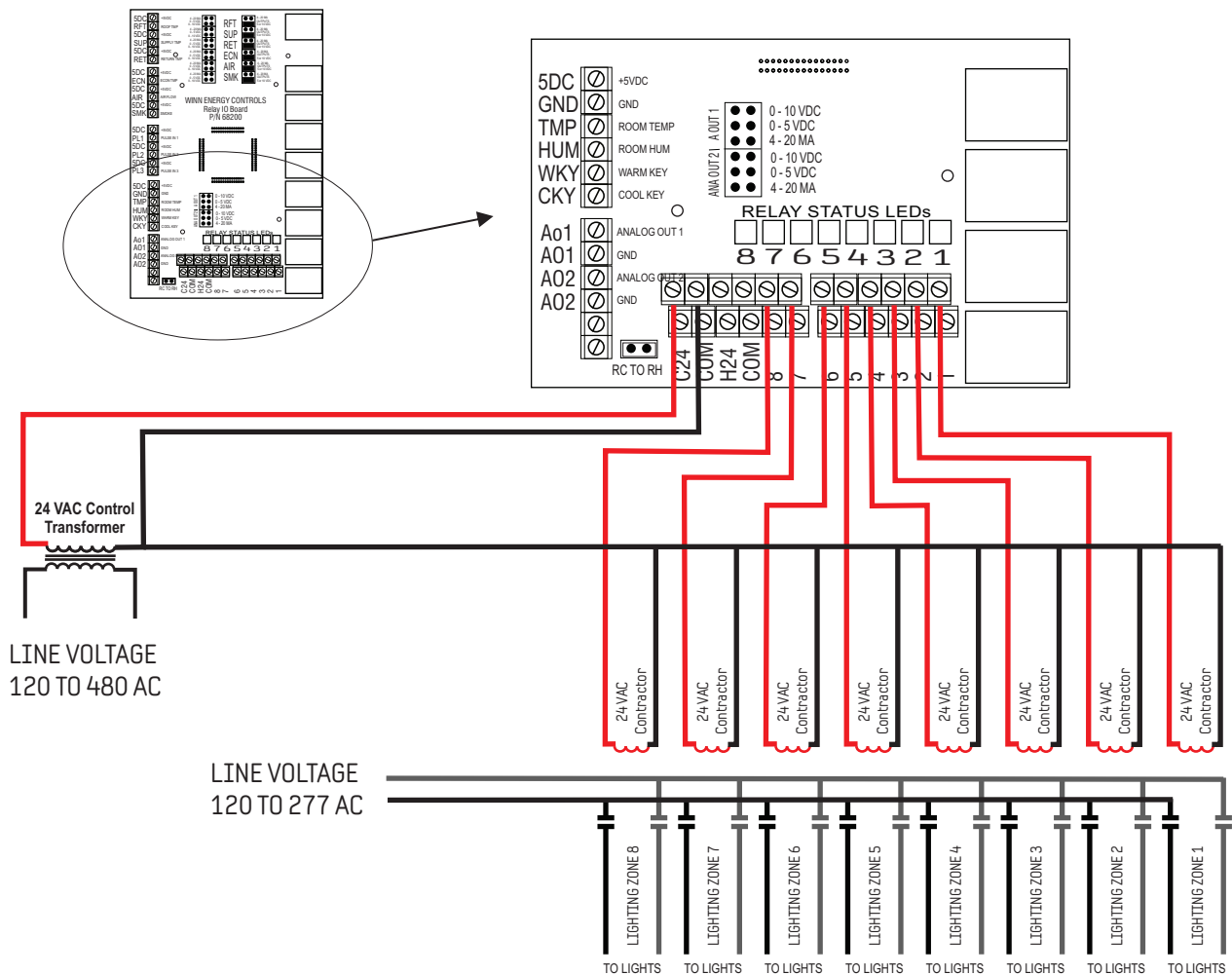
The typical wiring provides for 24 VAC control from an external 24 VAC transformer to each of the eight relay outputs from the ADRES Relay IO board. Each ADRES lighting pilot relay is presented in the EPWeb software as a zone. Multiple lighting circuits can be grouped as a zone.

### Lighting Zone Wiring

At the ADRES Control	To Relay IO Board HVAC Terminal	Wire Color	Lighting Zone
R	RH and RC	RED	24VAC
C	C	BLK	24VAC Common
8	Cs1	RED	Lighting Zone 8
7	Cs2	RED	Lighting Zone 7
6	Cs3	RED	Lighting Zone 6
5	Cs4	RED	Lighting Zone 5
4	Hs1	RED	Lighting Zone 4
3	Hs2	RED	Lighting Zone 3
2	FAN	RED	Lighting Zone 2
1	ECN	RED	Lighting Zone 1

### Wiring Materials Required

1. Multi-conductor, 20 gauge thermostat wire.





# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Light Zone Dimming Modulation using Analog Output Wiring Diagram

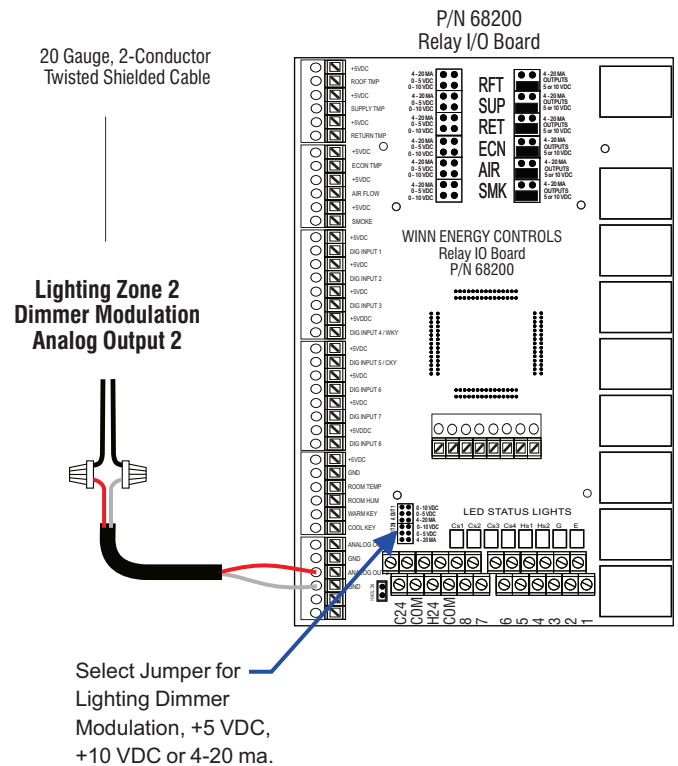
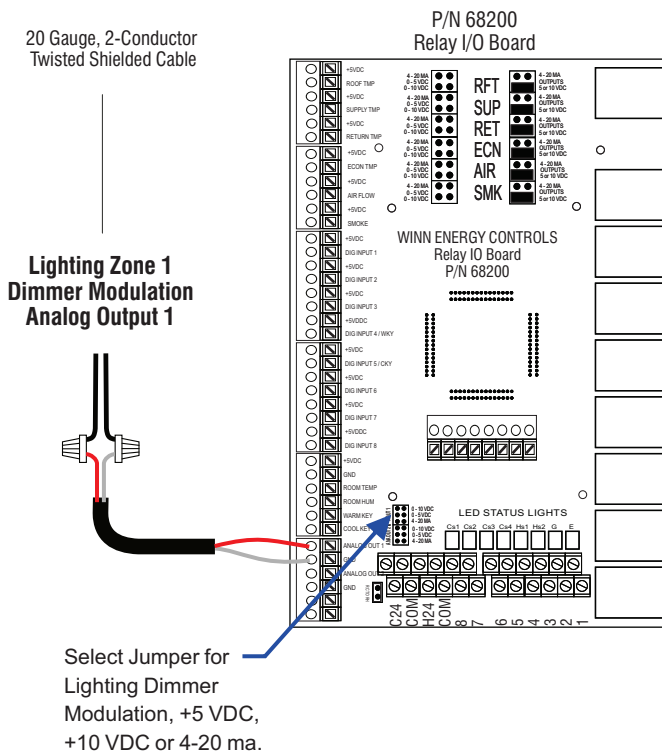
### Description, Analog Output Modulation

The Analog Outputs 1 and or 2 can be used in concert with the Lighting Relay to as a dimmer to modulate the light level to the circuit being controlled by the Analog Output. The output is jumper selectable to modulate either +5 VDC, +10 VDC or 4-20 ma to match the requirements of the lighting fixture (s).

Use appropriate sized wire nuts to connect the two wires of a 2-conductor twisted shielded cable to the wires on the Lighting dimmer terminal board. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	ANA OUT 1	WHT	Light Dimmer Modulation
SNR	+5 VDC	RED	+5 VDC, +10 VDC, 4-20 ma

The ANALOG OUTPUT 1 terminals are polarized and must be connected as shown.



**Caution!**  
Be sure to review the Wiring Workmanship requirements before any wiring is done.



Reference  
WD 07

# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Digital and Pulse Input

## Wiring for the 68200 Relay I/O Board

### Description, Digital Signal Input

The Digital Inputs channels 4 through 8 are available to support only a digital input signal. Each channel can be utilized with a dry contact to send +5VDC and when the digital signal contact is closed, the +5VDC will be read on the channel input.

Use appropriate sized wire nuts to connect the two wires of a 2-conductor twisted shielded or thermostat cable to the wires on the digital input signal. Connect the corresponding wires at the 68200 Relay I/O board as shown below on the available digital input channel.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	DIG IN 4 - 8	WHT	Digital Signal Monitoring Only
SNR	+5 VDC	RED	+5 VDC

The DIGITAL INPUT terminals are not polarized and either wire can be connected to either terminal.

### Description, Digital Pulse Counting Input

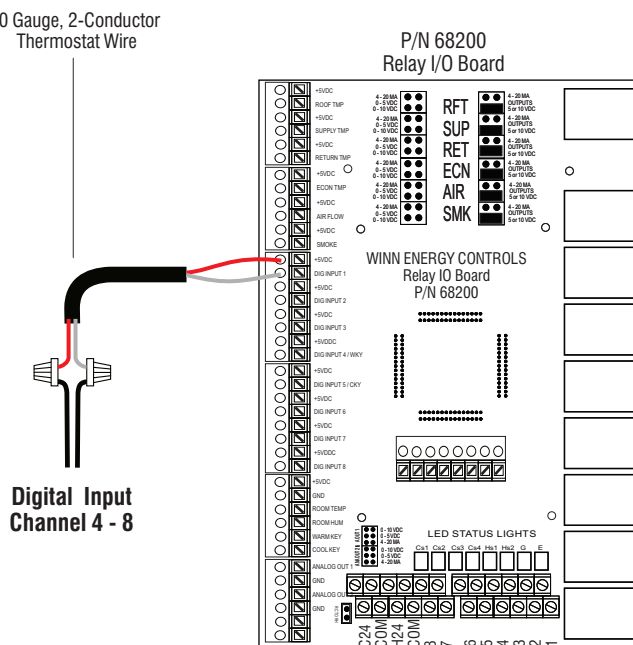
The Digital Pulse Inputs channel 1 through 3 are available to support a pulse digital input signal. Each channel can be utilized with a dry contact to send +5VDC and when the digital signal contact is closed, the +5VDC will be read on the channel input. Typically used for submetering.

After mechanically installing the submeter, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	DIG IN 1 - 3	WHT	Pulse or Digital Input Monitoring
SNR	+5 VDC	RED	+5 VDC

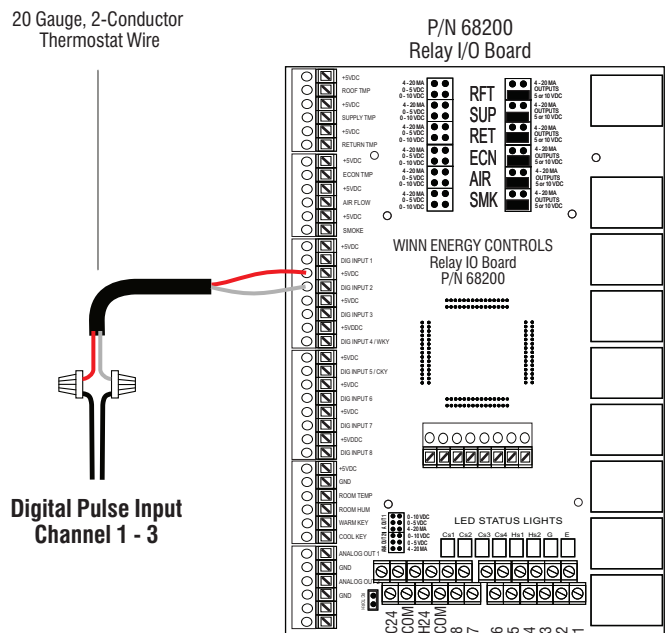
The PULSE DIGITAL INPUT terminals are not polarized and either wire can be connected to either terminal.

20 Gauge, 2-Conductor Thermostat Wire



Digital Input Channel 4 - 8

20 Gauge, 2-Conductor Thermostat Wire



Digital Pulse Input Channel 1 - 3

### Caution!

Be sure to review the Wiring Workmanship requirements before any wiring is done.



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Electric Submeter Pulse Input Wiring for the 68200 Relay I/O Board

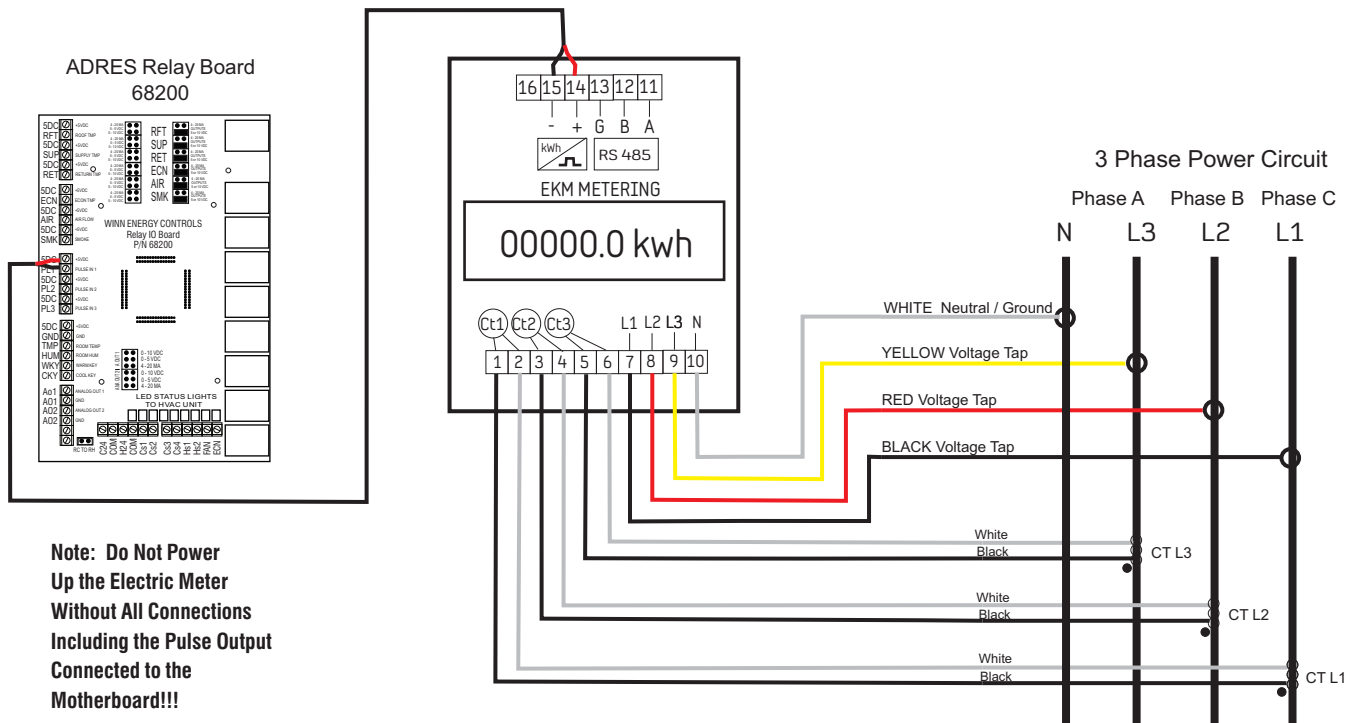
### Description, Electric Submeter Pulse Counting Input

The Digital Pulse Inputs channel 1 through 3 are available to support a pulse digital input signal. Each channel can be utilized with a dry contact to send +5VDC and when the digital signal contact is closed, the +5VDC will be read on the channel input. Typically used for submetering.

After mechanically installing the submeter, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	DIG IN 1	WHT	Pulse or Digital Input Monitoring
SNR	+5 VDC	RED	+5 VDC

The PULSE DIGITAL INPUT terminals are not polarized and either wire can be connected to either terminal.



**Note: Do Not Power Up the Electric Meter Without All Connections Including the Pulse Output Connected to the Motherboard!!!**

### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*

**Reference**  
WD 09



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Natural Gas Submeter Pulse Input Wiring for the 68200 Relay I/O Board

### Description, Electric Submeter Pulse Counting Input

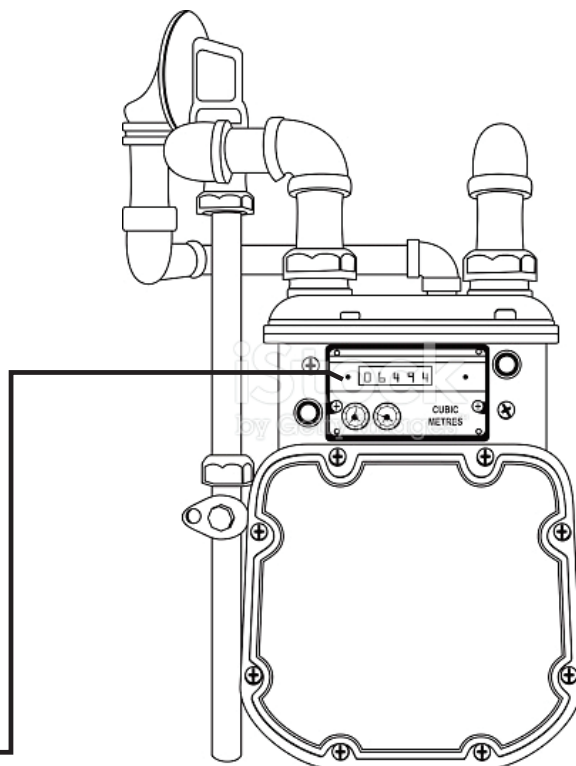
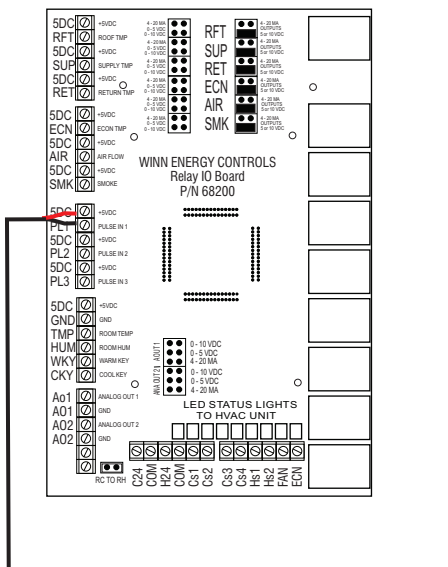
The Digital Pulse Inputs channel 1 through 3 are available to support a pulse digital input signal. Each channel can be utilized with a dry contact to send +5VDC and when the digital signal contact is closed, the +5VDC will be read on the channel input. Typically used for submetering.

After mechanically installing the submeter, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	DIG IN 1	WHT	Pulse or Digital Input Monitoring
SNR	+5 VDC	RED	+5 VDC

The PULSE DIGITAL INPUT terminals are not polarized and either wire can be connected to either terminal.

ADRES Relay Board  
68200



### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*



Reference  
WD 10

# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Water Submeter Pulse Input Wiring for the 68200 Relay I/O Board

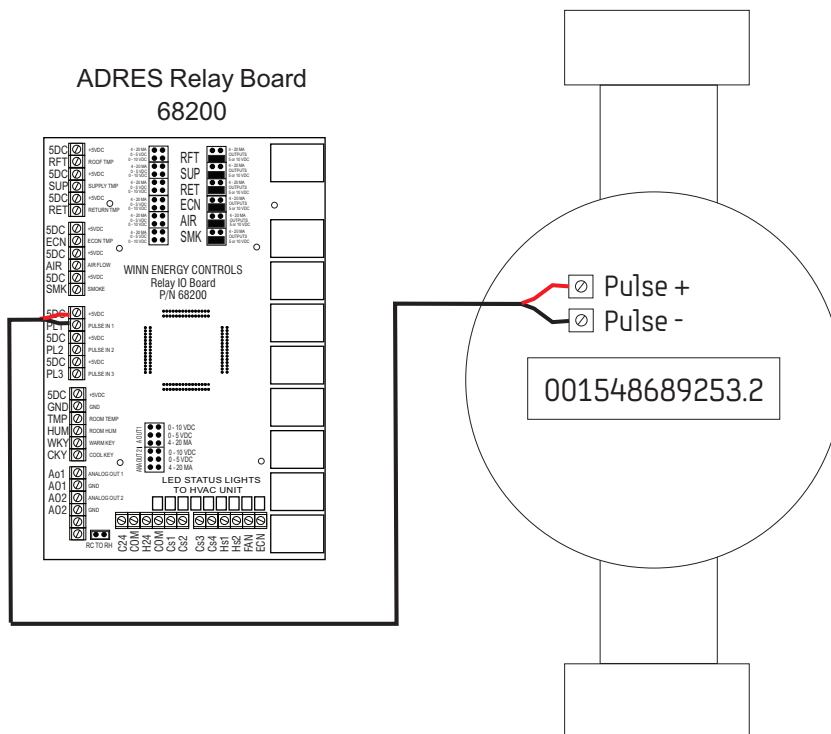
### Description, Electric Submeter Pulse Counting Input

The Digital Pulse Inputs channel 1 through 3 are available to support a pulse digital input signal. Each channel can be utilized with a dry contact to send +5VDC and when the digital signal contact is closed, the +5VDC will be read on the channel input. Typically used for submetering.

After mechanically installing the submeter, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	DIG IN 1	WHT	Pulse or Digital Input Monitoring
SNR	+5 VDC	RED	+5 VDC

The PULSE DIGITAL INPUT terminals are not polarized and either wire can be connected to either terminal.



Water Meter with Pulse Output  
(Typical 1 Pulse = 1 Gallon)



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Thermistor Temperature Sensor

## Wiring for the 68200 Relay I/O Board

### Description, Thermistor Temperature Sensors

Thermistor temperature sensors should be installed so that it senses the temperature desired. Install the 0-5 VDC Jumper for the Output for the Analog Channel being setup and configured.

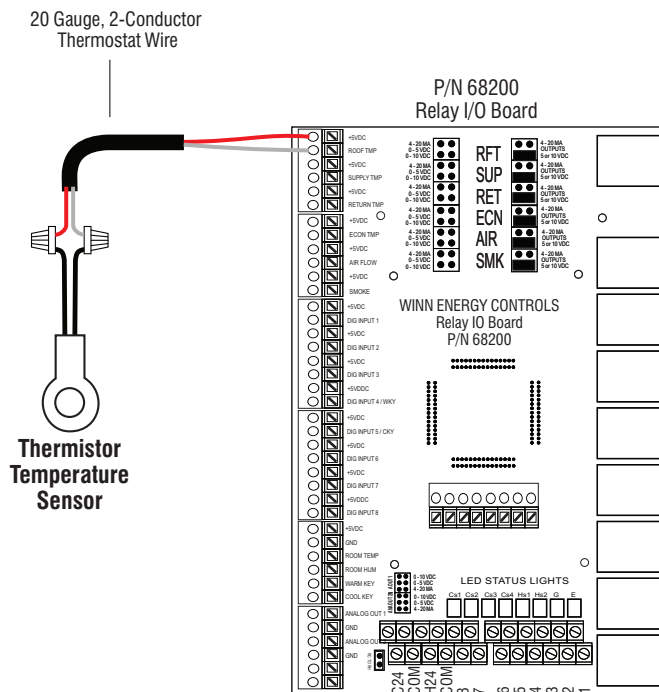
After mechanically installing the sensor, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

### Compatible Thermistor Sensors

Description
Thermistor - Insertion Flange Short Length
Thermistor - Insertion Flange Long Length
Thermistor - Threaded, 1/8 NPT Pipe
Thermistor - Clip On Tubing, Copper

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	ANALOG INPUT	WHT	Thermistor Output
SNR	+5 VDC	RED	+5 VDC

The ANA X SENSOR terminals are not polarized and either wire can be connected to either terminal.



### Wiring Materials Required

1. Thermostat Wire, 2-Conductor, AWG20.

### Caution!

*Be sure to review the Wiring Workmanship requirements before any wiring is done.*



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Analog Sensor Wiring for the 68200 Relay I/O Board

### Description, Analog Sensors

The ADRES controller provides for a wide range of analog input sensors. A variety of analog sensors are available to match the parameter desired. Install the 0-5 VDC Jumper for the Output for the Analog Channel being setup and configured.

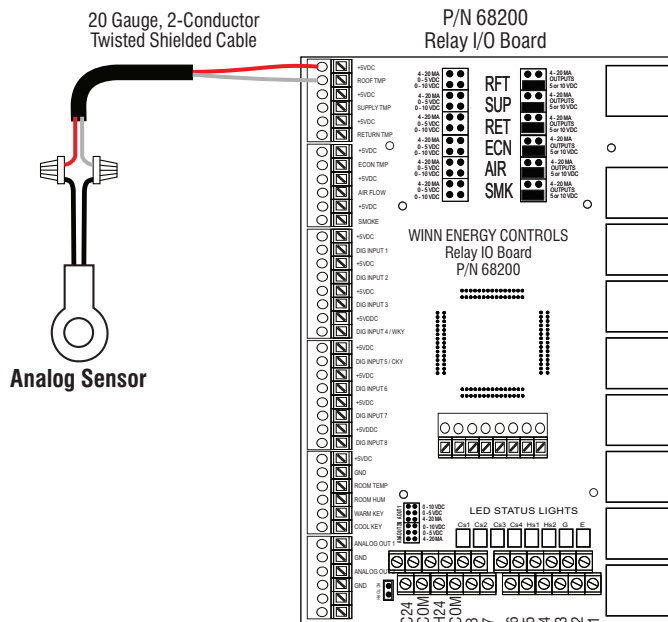
After mechanically installing the sensor, use appropriate sized wire nuts to connect the two wires of a 2-conductor thermostat cable to the wires on the temperature sensor. Connect the corresponding wires at the 68200 Relay I/O board as shown below.

At the Sensor	To Relay I/O Terminal Board	Wire Color	Function
SNR	ANALOG INPUT	WHT	Thermistor Output
SNR	+5 VDC	RED	+5 VDC, +10 VDC, 4-20 ma

The ANA X SENSOR terminals are typically polarized and must be connected correctly.

### Compatible Analog Sensors

Description
Thermistor - Insertion Flange Short Length
Thermistor - Insertion Flange Long Length
Thermistor - Threaded, 1/8 NPT Pipe
Thermistor - Clip On Tubing, Copper
Pressure Transducer 1/4 NPT Threaded (Various Pressure Ranges)
Flow Meter - Fluid, Inline (Various Sizes)
Wind Speed Anemometer
Level Indicator, Fluid
Vibration (Velocity or Acceleration)
Humidity
Carbon Monoxide Sensor (CO2)
Ozone Sensor (O3)
Rotation Speed (RPM)
Insolation (Solar Intensity)



### Caution!

Be sure to review the Wiring Workmanship requirements before any wiring is done.



# ADRES Lighting Control

## WIRING INSTRUCTIONS

# Room Temperature Sensor Wiring for the 68200 Relay IO Board

### Description

The Room Temperature Sensor is available in different configurations. All include a thermistor type temperature sensor, keys for monitoring temperature and optionally a humidity sensor and thermometer with an LCD display.

The sensor should be located on a wall where it will accurately sense the space temperature. Use the same good practices as when installing a conventional thermostat. The schematic of the Room Temperature Sensor is shown below.

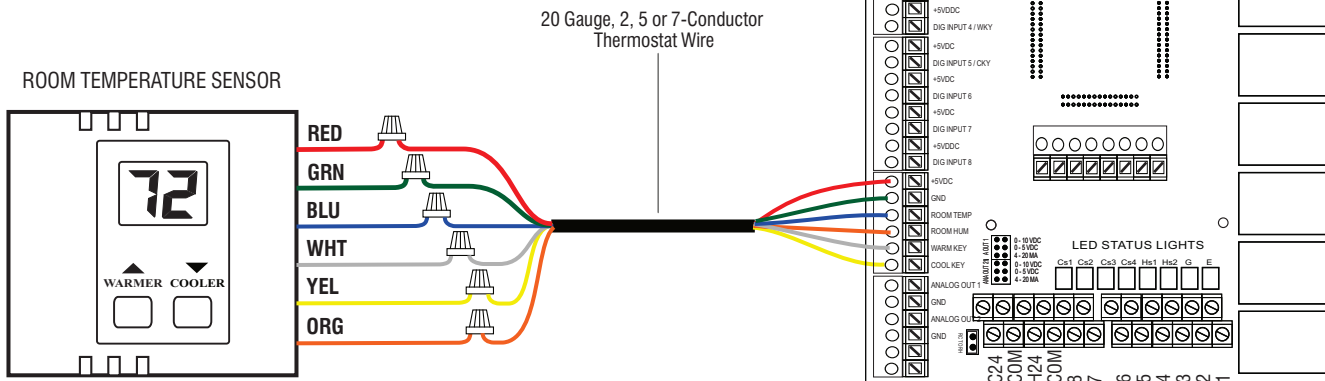
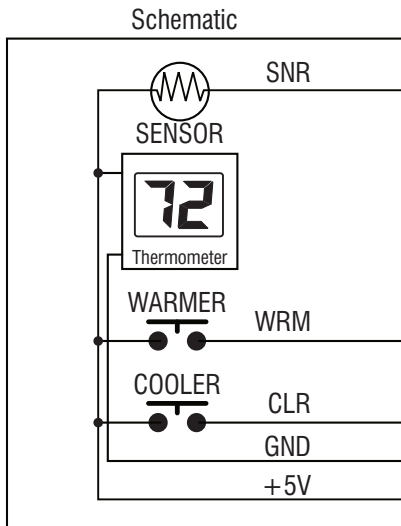
Using an appropriate sized wire nut, connect the wires to the wires on the Room Temperature Sensor (RTS). Connect the corresponding wires to the 68200 Relay IO Board as shown below.

At the RTS	To Relay IO Terminal	Wire Color	Function
GND	GND	GRN	Signal Ground
+5VDC	+5VDC	RED	+5VDC Power from Relay Board
SNR	ROOM TMP	BLU	Thermistor Output
WRM	WRM KEY	WHT	Warmer Key
CLR	CLR KEY	YEL	Cooler Key
HUM	ROOM HUM	ORG	Humidity Sensor

The GND, HUM, WRM KEY and CLR KEY wires do not have to be connected if only a temperature sensor is being used.

### Wiring Materials Required

1. Thermostat Wire, 2 or 5-Conductor, AWG20.



P/N 68200  
Relay I/O Board

### Caution!

Be sure to review the Wiring Workmanship requirements before any wiring is done.





### **Safety First**

Before you perform any wiring be sure you turn Off the power breaker for the system. Failure to do so can result in personal injury and damage to the ADRES controls.

### **Local Electrical Codes**

All wiring should meet all applicable electrical codes including any permit requirements.

### **Professional Installers**

Only professional, experienced and qualified technicians should install these controls.

### **Approved Materials**

Where applicable, only UL approved wire and supplies shall be used in the installation of these controls. Use only the size and type wire specified in the Wiring Diagrams.

### **Stripping and Installing Wires**

The insulation on wires that are installed in the terminals on the control boards should be stripped about 1/4-inch being careful not to damage the conductor.

Insert the stripped conductor into the terminal and secure it with the screw. Always check that the wire is secure by gently tugging on it.

### **Insulation Damage Cause Shorts**

The insulation on wires can be cut by sharp sheet metal and cause the conductor to short to earth ground. This provides a path for electrical damage during lightning strikes and can cause damage to the equipment.

### **Securing the NEMA Enclosure**

The NEMA enclosure should be secured so that it cannot be damaged by technicians on the roof or be damaged by vibration. An unsecured NEMA enclosure can pose a personal hazard and potential damage to the equipment.



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