<u>210-421x-A</u>

User Manual

**Dual Set Point Temperature Alarm** 

210-421-A (Air Temperature)

210-421W-A (Water, Soil Temperature)





Air Temperature Sensor



Water and Soil Temperature Sensor

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# **Receiving and Unpacking**

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

## Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

# Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

# Address

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## 1 FORWARD

Thank you for purchasing NovaLynx products. NovaLynx has been designing and manufacturing weather instruments since 1988. NovaLynx represents several well-known brands of quality manufacturers, including Gill Instruments, RM Young, Kipp & Zonen, and Vaisala. It is our hope that our products will meet all your monitoring requirements.

## 2 INTRODUCTION

The **210-421x-A Dual Set Point Temperature Alarm** includes an air temperature sensor or a water/soil temperature sensor. Two independently controlled relays are provided to operate external equipment such as alarm lights or sirens. The temperature alarm can function as a frost protection controller.

The back-lit LCD display is easily visible through the transparent cover. With the cover removed the unit is programmed by push-button controls without the need to connect a computer. All set points and the minimum and maximum temperatures are stored in non-volatile memory. DIP switch settings select the units (°F or °C) and enable/disable the internal buzzer.

#### Programmable Features:

Alarm Set Point	Temperature threshold for alarm	
Channel 1	Select > (greater than) or < (less than) operator and a value	(Default < 32° F <i>or</i> < 0° C)
Channel 2	Select > (greater than) or < (less than) operator and a value	(Default < 28° F <i>or</i> < -2° C)
Alarm ON Delay	0-99 seconds before alarm/ relay activation	(Default 5 sec)
Alarm OFF Delay	0-99 seconds before alarm / relay de-activation	(Default 5 sec)

When in alarm mode, a blinking LED indicates which relay(s) are active. Each relay can be connected in normally open or the normally closed mode.

It is the responsibility of the installer to properly insulate any connections to the relay terminals, especially if high voltages are present. It is also important to provide an earth grounding wire to protect the controller from static discharge, whether or not the relays are connected.

## 3 SPECIFICATIONS

210-421x-A Dual Setpoint Controller Specification						
Display	LCD, 2x16 characters, 3x8 mm character size, backlit					
Indicators	Green LED - Power, Red LEDs - Alarms					
Setup	DIP switch: WIND/TEMP, MPH/KPH, DEG F/DEG C, BUZZER/DISABLE					
Programming	Pushbutton: MENU, UP, DOWN, CLEAR, GO					
Connections	All user connections 1/4" male spade terminals (connectors supplied)					
Relay specifications	Form "C" (SPDT) N.O. and N.C. Contact rating: 3A @ 24Vdc / 115 VAC					
Alarm ON / OFF delay range	0 to 99 seconds					
Timing accuracy	± 2%					
Measurement range	-40° to 160° F (-40° to 60° C)					
Integration interval	2 seconds					
Input Power	12V AC or DC, 150 mA (50 mA when backlight disabled)					
Operating temperature	-20°C to +50°C					
Mounting	Knock-outs in back surface for screw mounting to a panel					
Dimensions	5.12 x 6.25 x 2.95 inch (13.0 x 15.9 x 7.5 cm)					
Weight / Shipping	2 lbs (0.91 kg) / 3 lbs (1.4 kg)					
110-WS-16T Air Temperature Sensor Specification						
Туре	Thermistor, 10K ohm @ 25°C ± 3%					
Range	-40° to 160° F (-40° to 60° C)					
Accuracy	± 1° F (± 0.56° C)					
Probe case	Aluminum					
Probe dimensions	2" L x 0.25" dia (51 mm L x 6.4 mm dia)					
Cable	40 feet (12 m), 2-conductor, 24 AWG, shielded					
110-WS-16TWS Water and Soil Temperature Sensor Specification						
Туре	Precision thermistor, 10k @ 25° C					
Range	-40 to 140° F (-40 to +60° C)					
Accuracy	±0.3° C					
Time constant	60 seconds					
Probe case	Stainless steel					
Probe dimensions	3" L x 0.375" dia (76 mm L x 10 mm dia)					
Cable	40 feet (12 m) 2-conductor, 18 AWG, shielded, direct burial					

The controller requires a 12V AC or DC power supply. The NovaLynx **200-WS21P Power Pack** (sold separately) is suitable in most applications, and comes with the proper terminals for easy connection.

### 4 PRE-INSTALLATION CHECKOUT

The controller can be operated before installation to become familiar with the menus and programmable features. You will need a power supply and the controller. The temperature sensor is usually connected prior to shipping. Refer to Appendix A for connection points.

## 4.1 Power Supply Connection

The **200-WS-21P Power Pack** (sold separately) is provided with ¼" spade connectors that fit the terminals at the lower left corner of the temperature alarm circuit board. If you are using a different power supply, crimp the provided accessory connectors to your 12V AC or DC power source. Plug the AC Adapter into a wall outlet and check that the green power LED on the temperature alarm circuit board turns on.

200-WS-21P AC Adapter (sold separately) (DC+) (DC-) ACin/DCgnd



# The display should look similar to the illustration on the right. This is the operating mode screen.

**NOTE:** If you see the word "Wind:" instead of "Temp:" then the DIP switches are in the wrong position. Refer to the "DIP Switch Settings" section of the manual to correct this situation.

## 4.2 Menu Navigation

MENU	UP	DOWN	CLEAR	GO	The programming buttons are below the display.

#### 4.2.1 MENU Button

Press the MENU button. One of three sub-menus will be displayed (depending on which was viewed last). Additional uses of the MENU button will be discussed in the following programming section.

#### 4.2.2 UP Button

Use the UP button to cycle through the menus.

- 1. Alarm Delays the delay (seconds) before and after an alarm threshold is crossed.
- 2. Temp Alarms the set points at which the alarm occurs.
- 3. Temps displays the lowest and highest temperatures recorded since the CLEAR button was pressed.





#### 4.2.3 DOWN Button

Use the DOWN button to select values when in an editable field. (Do NOT use the DOWN button to cycle through the menus.)

#### 4.2.4 CLEAR Button

The CLEAR button performs the following actions:

- 1. If the user is in an editable field, the field will be set to zero.
- 2. If the user is viewing the Temps Lo and Hi menu, the recorded values will be set to zero.
- 3. If the unit is alarming, all delay counters will be cleared.

#### 4.2.5 GO Button

Press GO from any menu to return to operating mode. If the unit is already in operating mode,

press GO to pause the system and disable all alarms.



**IMPORTANT:** Whenever the controller is turned on it is in Operating Mode and the alarms are active. If the system was in Paused Mode before a power failure, it will restart in Operating Mode when power is restored.

#### 4.3 Program Alarm Thresholds

To begin, navigate to the Temp Alarms menu:

- 1. Press GO until the display shows the operating mode screen (see GO Button, above).
- 2. Press MENU to bring up one of the three sub-menu displays.
- 3. Press UP to reach the Temp Alarms sub-menu. (Do NOT use the DOWN button to cycle through the menus.)



- 4. Press MENU again. A blinking block cursor will appear on the Channel #1 Operator.
  - a. < Operator means the alarm will occur when the temperature is less than the Value.
  - b. > Operator means the alarm will occur when the temperature is greater than the Value.
  - c. Press UP or DOWN to change the Operator.
  - d. Press MENU to advance to Channel #1 Value.
  - e. Press UP or DOWN to change the Value.
- 5. Press MENU again to advance to Channel #2 Operator.
  - a. Set the Channel #2 Operator. Press MENU to advance to the Channel #2 Value.
  - b. Set the Channel #2 Value. Press MENU to complete programming the Temp Alarms.
  - c. Press GO to return to the operating mode screen.

## 4.4 Program Alarm Delays

To begin, navigate to the Alarm Delays menu:

- 1. Press GO until the display shows the operating mode screen (see GO Button, above).
- 2. Press MENU to bring up one of the three sub-menu displays.
- 3. Press UP to reach the Alarm Delays sub-menu. (Do NOT use the DOWN button to change menus.)



- 4. Press MENU again. A blinking block cursor will appear at the ON Delay. *Note: The range is 0 to 99 seconds.* 
  - a. Press UP or DOWN to change the ON Delay.
  - b. Press MENU to advance to the OFF Delay.
  - c. Press UP or DOWN to change the OFF Delay.
  - d. Press MENU to complete programming the Alarm Delays.
  - e. Press GO to return to the operating mode screen.

### 4.5 DIP Switch Settings

The DIP switches are pre-set at the factory and should not need to be adjusted. However, sometimes during installation they get changed accidentally.

- 1. The Dual Set Point controller is designed to operate as either a wind alarm or temperature alarm. The DIP switch marked "Wt" determines which mode is selected. Set this switch to ON for temperature alarms.
- 2. The "Wu" switch sets the wind speed units. This is not relevant to the temperature alarms, so it doesn't matter how this switch is set.
- 3. The "Tu" switch sets the temperature units. Set the "Tu" switch to OFF to display temperature in degrees Fahrenheit (°F). Set the switch ON for degrees Celsius (°C).
- 4. The "Si" (silent) switch determines whether the internal buzzer operates. The normal setting is OFF which allows the buzzer to operate. The ON setting silences the buzzer.

The controller checks the positions of the DIP switches when the unit initializes during power-up. Disconnect the AC Adapter for a few seconds and then re-connect power to change modes after changing any switches.

## 5 TEMPERATURE SENSOR INSTALLATION

## 5.1 Air Temperature Sensor and Sunshield

The **110-WS-16T Temperature Sensor** is suitable for monitoring ambient air temperatures. It is not designed to be buried in soil or submerged in water. When installed indoors, place it at an appropriate height (remember that hot air rises) in an area that has adequate air movement.

When used outdoors, the sensor must be installed in a solar radiation shield to protect it from direct sunlight and rain. The NovaLynx 380-280 Solar Radiation Shield is an economical option for use with the 110-WS-16T.

The **380-280 Solar Radiation Shield** (sold separately) is fitted with two universal bushings that help center and hold the sensor in place. The bushings are suitable for use with smooth probes, such as temperature sensors.

#### Sensor Installation

- 1) Insert the probe until the tip is within an inch (25 mm) of the upper cap.
- 2) Route the cable through the cable clamp that is on the underside of the bracket. The clamp will provide strain relief for the cable and ensure the sensor will not fall out.

#### For Pipe Mounting

- 1) Remove the U-bolt from the mounting bracket.
- 2) Secure the radiation shield to a 1 ½" mast (38 mm).

#### For Surface Mounting

- 1) Remove the U-bolt from the bracket.
- 2) Mark the outer two holes of the mounting bracket on the surface.
- 3) Drill the two holes marked in the previous step into the surface.
- 4) Attach the radiation shield with appropriate fasteners (not included).

Route the sensor cable to the temperature alarm in the most direct manner. Leave a "drip loop" of cable below the entry point to the equipment enclosure to help keep moisture out. Fasten the cable to the mast with cable ties to prevent whipping during high winds. For best results, use cable ties that are resistant to ultra-violet radiation and place them at two foot intervals. Do not over-tighten.

## 5.2 Water / Soil Temperature Sensor

The 110-WS-16TWS Water and Soil Temperature Sensor has a stainless steel probe tip and direct burial cable jacket, making it more robust. The cable can be buried directly in soil or placed in conduit to protect it from burrowing animals. The probe should be shaded from sunlight for best results.

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380-280 Solar Radiation Shield

## 6 TEMPERATURE ALARM INSTALLATION

#### 6.1 Controller Location

To be effective the temperature alarm must be in a location where one can view the display and hear the alarm. At the same time it should not be accessible to unauthorized personnel. It will need to be mounted near a 120V AC receptacle for power. If the controller is inside a building the sensor cable may need to be routed outside so that the sensor can be exposed ambient air conditions.

## 6.2 Controller Mounting

There are 4 knock-out locations inside the controller box for placing screws. It will be necessary to remove the circuit board to access these points. After mounting the case to your wall or panel, install the small caps that are included in the accessory bag to cover the screw locations. The caps will help keep moisture from entering the box. Replace the controller circuit board and secure it with the mounting screws.



## 7 CONNECTIONS

Please refer to the connection diagram in Appendix A of this manual.

The temperature sensor and AC adapter (NovaLynx 200-WS-21P, sold separately) are supplied with connectors that fit the ¼" spade terminals on the temperature alarm circuit board. Extra connectors are provided for connecting an earth ground and alarm relay connections. You will need a crimp tool or heavy duty pliers to make these connections. You will also need to provide insulated wire for the earth ground and relay connections. Stranded wire (14 to 16 AWG) is preferred.



Wire Connector with an extra lug for Earth Ground

## 7.1 Temperature Sensor Connection

Route the temperature sensor cable through the gland fitting and into the case. Connect the earth ground connector with the tab facing down, to make room for the other connections. Attach the red and black wires as indicated on the drawing.

Prepare a suitable length wire with a standard wire connector, and connect it to the lug on the earth ground connector. Route the other end of this wire to a good earth ground – an electrical box with an earth connection or a metal cold water pipe that actually enters the ground. Failure to provide a ground may cause erratic operation and make the system more vulnerable to damage from nearby lightning strikes.

### 7.2 Power Connection

**NOTE:** It is good practice to program the set points and delays, and then operate the system using the visible LEDs and buzzer as alarm indicators for testing the system before connecting the relays to your external equipment.

Route the wiring from the AC Adapter or other power supply through the cable gland and attach the positive terminal (marked with red shrink wrap or a white stripe on one lead) to the ACin / DCin terminal. Connect the ground wire to the ACin / DCgnd terminal. The power input accepts 12 volts AC or DC.

NovaLynx recommends connecting the AC Adapter to an outlet with a surge suppressor. Power strips with surge suppressors are often used to protect computer equipment and are readily available.

Check your connections to make sure there are no stray wires that could cause a short circuit. Plug in your power supply. The green power LED should turn on and the word "Temp:" will be displayed. If you see the word "Wind:" instead of "Temp:" then the DIP switches are in the wrong position. Refer to the "DIP Switch Settings" section of the manual to correct this situation.

## 7.3 Relay Connections

There are two internal relays for alarms or operating pumps, etc. Please refer to the specifications to ensure the internal relays are rated for the load you intend to control. If the contact rating is less than required an external relay will be needed (not supplied). Refer the installation to a qualified electrical contractor.

**WARNING: Turn off all power sources before connecting to the relays.** Identify which relay(s) you will be using and which function is required. When there is no alarm, the N.O. contacts are OPEN. This contact is used to turn something ON when there is an alarm. The N.C. contact does the opposite, i.e. turns something OFF when there is an alarm.

The relay contacts are "dry". Connect the Hot lead to C1 for relay #1 or to C2 for relay #2. Connect the corresponding N.O. or N.C. output to the load. The return side of the load must be connected to Neutral to complete the circuit. Connect the grounding wire to the Earth Ground lug.

**WARNING: The unused spade lug (N.O. or N.C.) will be electrically HOT under some circumstances.** Place a spare connector or insulating tape over the unused lug to prevent anyone from touching it accidentally.

Be sure you have programmed the temperature alarm to the settings you desire and the temperature alarm system is operating properly before you connect power to your external devices.

## 8 ALARM FUNCTIONS

The temperature alarm must be in Operating Mode in order for the alarms to activate. Alarms are disabled while programming and when the unit is in Paused Mode. Be sure to return the unit to Operating Mode when the alarm function is required. (See GO button instructions).

Temp:	71.	4	(°	F)
1:< 32		2	:<	28

**Operating Mode Screen** 

#### Alarm Channel #1:

The audible alarm will beep at 400 millisecond intervals (if enabled) and the relay will energize when the threshold and Delay-Before-ON timeout has occurred. A red LED on the circuit board will also flash.

#### Alarm Channel #2:

The audible alarm will beep at 200 millisecond intervals (if enabled) and the relay will energize when the threshold and Delay-Before-ON timeout has occurred. A red LED on the circuit board will also flash. When both alarms occur together, the beeping will be at 200 millisecond intervals.

#### Paused Mode

Press the GO button to place the controller in Paused Mode to turn off the alarms and relays. The controller will remain in this mode indefinitely unless the power to the controller is interrupted. Press GO again to return to operating mode.

### CLEAR Button (temporarily clears the alarm)

The CLEAR button will stop the alarms by clearing the Delay Before ON timeout. If the temperature is beyond the programmed threshold the alarm will activate again when the timeout occurs.

## APPENDIX A

