Arklay S. Richards Co., Inc.
Industrial Wind Sensors and Alarm Systems

490-A

Wind Alarm

Instruction Manual
Revision Number 20241018r4

Covers Wind Monitor and Alarm Models
490-A and 490-A-B

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**Please note the revision number on this document. Due to our continuous improvement manufacturing policy, contents in this manual may change without notice.*

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1 - Initial Product Inspection and Setup Instructions

1.1 - Package Inspection

*Thank-you for purchasing the Arklay S. Richards **490-A-B Wind Monitor**! We are confident that you will find this to be a valuable tool for monitoring the wind and temperature conditions.*

When your wind sensor or instrument arrives, make sure the package is in good condition. If the package is damaged it should be refused and given back to the carrier. If the package is in good condition it can then be received from the carrier. Open the white inner sensor box and carefully inspect all wind sensors and their rotors for any visible signs of damage from shipping. Verify that all wind display instruments also are free from damage. Make sure the boxes also have all documentation and include a small bag containing mounting hardware, keys for the instrument lock, and Allen Keys.

1.2 - Arklay S. Richards 490-A-B Wind Monitor/Alarm Quick Setup

This quick setup guide will help you unpack and correctly wire the wind sensors to the Richards 490-A-B Wind Monitor/Alarm. Proper setup is very important in order to prevent damage to the instrument and to ensure the unit will operate a peak performance while in service.

This guide will outline how to properly install and configure the 490-A-B Wind Monitor/Alarm. After the system is installed, please retain the original packaging and documentation. Wind Monitors requiring upgrades, maintenance, calibration, or repair, should be returned in their original packaging to prevent damage to the instrument during transit.

1.3 - Wiring of a Single 490-A-B Wireless Wind Monitor/Alarm Quick Setup

1. Mount the C5C Series Anemometer, D5 Series Wind Vane, and optional temperature sensor in their required locations.
2. Run all sensor cables to the 490-A-B Wind Monitor's mounting location.
3. Note the 490-A-B Wind Monitor case is not waterproof and should be mounted indoors for protection from the elements.
4. If the monitor is to be installed outdoors, it must be mounted in a plastic or fiberglass weatherproof enclosure.
5. Metal enclosures should not be used since they will not allow the internal wireless transmitter to function properly.
6. Turn over the monitor and locate the vertical green, 16 pin, terminal block on the printed circuit board.
7. Feed the sensor wires through the cable gland and refer to the wiring diagram found in this manual.
8. Connect the White anemometer wire to terminal # 2 from the top.
9. Connect the Black anemometer wire to terminal # 3 from the top.
10. Connect the Red (+) wind vane wire to terminal # 4 from the top.
11. Connect the White (Signal) wind vane wire to terminal # 5 from the top.
12. Connect the Black (–) wind vane wire to terminal # 6 from the top.

13. Locate the RTD temperature sensor 3 pin horizontal connector block on the bottom right of the printed circuit board.
14. Connect the White RTD wire in terminal #1 on the right.
15. Connect one of the Red RTD wires in terminal # 2 from the right.
16. Connect the other Red RTD wire in terminal #3 from the right.
17. Tighten the cable gland to secure all of the cables.
18. Install the rear cover of the wind monitor with the supplied screws.
19. Install wall mounting plate or desk stand to the back of the monitor.
20. Place the unit in desired location for easy viewing and plug the AC adapter into the jack on the right side of the monitor.
21. Turn on the power button located on the front of the unit.
22. The monitor should power up and display the current wind speed, maximum gust, direction, and optional temperature.
23. See this manual for alarm settings if required.

1.4- Quick Setup and Wiring of Multiple or "Paired 490-A-B Wireless Wind Monitors

1. Locate the first 490-A-B Wind Monitor which is marked as the transmitter on the outside of the white shipping box.
2. The sensors will all be connected to this wind monitor.
3. Mount the C5C Series Anemometer, D5 Series Wind Vane, and optional temperature sensor in their required locations.
4. Run all sensor cables to the 490-A Wind Monitor's mounting location.
5. Note the 490-A-B Wind Monitor is not waterproof and should be mounted indoors for protection from the elements.
6. If the monitor is to be mounted outdoors, it has to be mounted in a plastic or fiberglass weatherproof enclosure.
7. Metal enclosures should not be used since they will not allow the internal wireless transmitter to function properly.
8. Turn over the monitor and locate the vertical green, 16 pin terminal block on the printed circuit board.
9. Feed the sensor wires through the cable gland and refer to the wiring diagram found in the manual.
10. Connect the White anemometer wire to terminal # 2 from the top.
11. Connect the Black anemometer wire to terminal # 3 from the top.
12. Connect the Red (+) wind vane wire to terminal # 4 from the top.
13. Connect the White (Signal) wind vane wire to terminal # 5 from the top.
14. Connect the Black (–) wind vane wire to terminal # 6 from the top.
15. Locate the RTD temperature sensor three pin horizontal connector block on the bottom right corner of the printed circuit board.
16. Connect the White RTD wire to terminal #1 on the right.
17. Connect one of the Red RTD wires in terminal # 2 from the right.
18. Connect the other Red RTD wire in terminal #3 from the right.
19. Tighten the cable gland to secure all the cables.
20. Install the rear cover of the wind monitor with the supplied screws.
21. Install surface mounting plate to the back of the monitor.

22. Install the monitor the desired location. If the monitor is located outdoors, install in a non-metallic weatherproof enclosure.
23. Plug the AC adapter into jack on the right side of the monitor.
24. Turn on the power button located on the front of the unit.
25. The monitor should power up and display the current wind speed, maximum gust, direction, and optional temperature. This data is automatically transmitted to other 490-A Wind Monitors set up as receivers for that particular serial number.
26. See this manual for alarm settings if required.

1.5- Configuring of the Second "Paired" 490-A-B Wind Monitor Receiver

1. Locate the second 490-A-B Wind Monitor which has been marked on the white shipping box as the receiver. This monitor will be set up to receive the data transmitted by the first monitor which has the actual sensors connected to it.
2. Install the rear cover and surface mounting plate on the wind monitor with the supplied screws.
3. Install the monitor the desired location. If the monitor is located outdoors, install in a non-metallic weatherproof enclosure.
4. Plug the AC adapter into jack on the right side of the monitor.
5. Note both the transmitter and receiver have been pre-configured in the factory to communicate together.
6. Turn on the power button located on the front of the unit.
7. The display will power up and should momentarily display "waiting for" and the serial number of the transmitting unit.
8. When data is received, the current wind speed, maximum gust, direction, and optional temperature will display on the screen.

1.6- Programming Additional 490-A-B Wind Monitors as Receivers for Data from another Monitor

1. Plug the power adapter into the right side of the case of the monitor.
2. Hold down Up and Down arrow buttons and turn on the power button to enter the setup menu.
3. Using the up and down arrow buttons change Sensors to "Wireless"
4. Using the up and down arrow buttons change serial number pair to the serial number of the transmitting unit.
5. Save and restart
6. When the monitor restarts, the screen should momentarily display "Waiting for Serial Number Axxxx".
7. When data is received, the current wind speed, maximum gust, direction, and optional temperature will display on the screen.
8. See this manual for alarm settings if required.

2 - Important Instrument Information for Your Records

Please take some time to record all your instrument's specific details in the table below. Store your sensor and instrument information in a safe place for future reference. This product information is very important when ordering replacement parts for your Arklay S. Richards ASR-490-A-B Wind Monitor/Alarm. This information is required if your instrument is returned for service, upgraded, or your sensor recalibration in our wind tunnel.

	ASR-490-A-B Wind Monitor/Alarm Detailed Information for Your Records
Model Number	
Serial Number	
Date of Purchase	
Purchase Order Number	
Company Name	
Contact Name	
Instrument Options	

3 - Notes Regarding Your Instrument

4 - About This Manual

The Richards ASR-490-A-B Wind Monitor / Alarm is of the finest industrial grade wind instruments made today. These instruments have been designed from the ground up to insure many years of trouble-free service even under the most demanding conditions. In order to obtain optimum performance from your wind instrument, it is recommended that you follow the installation techniques, and periodic maintenance practices described in this manual.

5 - Product Overview

The ASR-490-A-B Wind Monitor/Alarm (Photo 1)

5.1 - Principals of Operation and Construction

Thank-you for purchasing Arklay S. Richards 490-A-B Wind Monitor/Alarm! We are confident that you will find this to be a valuable tool and sound investment in assisting you with monitoring wind speed, gusts, direction, and temperature.

This section of the manual will provide you with all the basic information you need to know to get your Richards 490-A-B Wind Monitor/Alarm up and running.

The 490-A Wind Monitor/Alarm is used to monitor current wind conditions and trigger a visual and audible alarm when user set points are reached. The monitor also has a single relay which can be used to shut down heavy equipment or to turn on a remote signal beacon during dangerous wind conditions. The Wind Monitor can display current wind speed, maximum gust registered during the previous 60 seconds, and the current wind direction if a wind direction sensor is used. The instrument also can display the temperature if used with an optional resistance type temperature probe (not included). The 490-A Wind Monitor has an intuitive menu-driven interface controlled by three front panel selection buttons. User setup options include unit of measurement, sensor type and alarm settings. The user can configure the LED lighted alarm and relay settings for gust speed, wind speed, minimum and maximum temperature. All monitor settings are kept secure with a physical key lockout. Although wind and temperature sensors are hardwired directly to the monitor, the unit can wirelessly transmit data to other monitors or to a wireless internet gateway for uploading to the internet to be used with our complimentary online wind monitoring interface.

Wireless Option - Wireless options include the capability of each unit acting as either a transmitter or a receiver. If one unit is set up as a transmitter, a second unit can be set up as a receiver to act as a remote display. Data is transmitted over a 2.4 GHz wireless link using the 802.15.4 protocol. Wireless range is approximately 300 ft (90m) line-of-sight with the stock antennas and no obstructions. Range can be extended with an optional directional, high-gain antenna. Additional capability includes remote live internet-based monitoring via Richards Remote Monitoring Services. Examples of this service can be found on or website at www.asrichards.com. This option requires the Richards Wireless Gateway (PN: C-24154), as well as an onsite, always on, Ethernet based internet connection.

5.2 - Navigation

The Wind Monitor's easy-to-use interface includes a backlit LCD screen, which displays current wind speed and the maximum gust speed registered during the previous 60 seconds. The LCD screen can also display current wind direction (wind vane must be connected) and temperature if an optional RTD temperature sensor is connected. A simple menu-driven interface using the LCD and three front panel buttons makes setup easy. A bright backlight makes the wind monitor very easy-to-use at night.

5.3 - Control Button and Switch Descriptions

There are three instrument control buttons on the Richards ASR-490-A-B Wind Monitor/Alarm. They are all located on the front of the instrument just below the LCD display for easy access.

Note: To access the setup screens, depress the left down control button and the right up control button simultaneously while powering up the unit.

(LEFT Down) Down Arrow Control Button - Scrolls through display screens and allows user calibration in setup menus. The left control button will always move the values in the **negative** direction.

(CENTER) Select Control Button - Press the center control button to enter the 'Setup' menu and to set all the user calibrated displays. The Select Control Button is also used to mover the curser to the next digit.

(RIGHT) Up Arrow Control Button - Scrolls through display screens and allows user calibration in setup menus. The right control button will always move the values in the **positive** direction.

(POWER) On/Off Control Switch - Turns the unit on an off. Turning off also disables any alarms or relay outputs.

(ALARM) On/Off Control Switch - Allows users to silence or turn the audible alarm on and off. This switch can be used to temporarily silence the alarm as necessary. Switch should be turned to the "on" position for normal use. Certain alarm conditions cannot be silenced (user configurable).

Key Switch - Used to disable push buttons in order to prevent the operator from changing settings.

All buttons respond to a single press and holding a button down will not cause multiple actions to occur.

5.4 - Powering the 490-A-B Wind Monitor/Alarm

The Richards 490-A-B Wind Monitor/Alarm **Power** button is located on the front of the instrument for easy access. The wind monitor operates using 24 volts DC power. An AC power adapter is included with the wind monitor and is plugged into the power jack on the right side of the case. The unit is also protected by a 15-amp fuse and average power consumption is 15 watts using a Richards heated anemometer.

See Figure 1 for example wiring and connection diagrams.

Reversing positive and negative wires will destroy the unit and void your warranty! If this is not clear, please call us for further information.

5.5 - Sensor Connections (Anemometers, Wind Vanes and Temperature Sensor)

The 490-A-B Wind Monitor has one anemometer input channel for a Richards C5 or C5C Series Switch/Pulse (reed switch) or Hall Effect Anemometer.

The 490-A-B Wind Monitor also has one Wind Vane input which is compatible with Richards D5 and D5C Series Wind Vanes providing a 0 to 5-volt linear signal. In addition, there is an input for a Platinum Resistance Detector (PT100, DIN, 3 Wire RTD) which can be used for monitoring the air temperature.

The new 490-A-B Wind Monitor is now compatible with FT702LT Ultrasonic Wind Sensors. Since the FT wind sensor measures both wind speed and direction, it can be used in place of an anemometer and wind vane. The wiring diagram for FT Ultrasonic Wind Sensor wire connections can be found in figure 6 shown in this manual.

5.6 - Remote Audible / Visual Signal Devices or Beacons

The 490-A-B Wind Monitor has an audible and visual alarm buzzer on the front of the instrument. This will flash and sound when the alarm set points are reached. Some wind alarm installations require an additional remote audible / visual signal device, such as the AV1-LED, mounted at some distance from the monitor itself. This can be done by connecting the signal beacon to the wind monitors second relay. Wiring examples can be found on figure 7 and 8 in this manual.

See the wiring diagram section found in this manual for example sensor wiring and connection diagrams.

6 - Product Operation

6.1 - Richards 490-A-B Wind Monitor/Alarm Configuration and Operation

	Display Screen	Description
Status Screen	0.0 MPH 0.0 Speed Wind Gust Wind Dir: 0° (N) Temperature: 70°F	The Status Screen is the Default screen. The Wind Speed and Maximum Gust (over the past 60 seconds) will be displayed when the unit is turned on. If the appropriate sensors are connected, the 490-A Wind Monitor is capable of displaying the wind direction as well as the air temperature. Alarms and warnings are also displayed on the Status Screen.
Main Menu	*1) Units, Wind&Temp 2) Anemometer Type 3) Warning Settings 4) Alarm Settings More below... DOWN SELECT UP	To access the setup screens, hold down the **Up** and **Down** buttons simultaneously while powering the unit on. If the Wind Monitor is equipped with a key lock, the key lock must be disabled first. The serial number of the unit is displayed briefly until buttons are released. Press the **Up** ▲ or **Down** ▼ buttons to move through the menus and use the **Select** button to enter a sub-menu.
Main Menu	*5) Data Source 6) Paired Serial # 7) Relay Settings 8) Save and Restart 9) Leave w/o Save DOWN SELECT UP	Scrolling down in the main menu reveals more sub-menus. Select **Save and Restart** to save all changed settings and restart the Wind Monitor. Select **Leave w/o Save** to cancel all new changes and return to the main status screen. If no selection is made within a certain period of time, the Wind Monitor will automatically cancel all changes and return to the main status screen.

1) Units, Wind & Temp

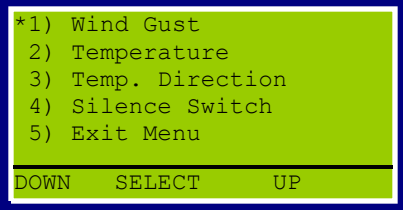
Units	*1) Wind Speed Units 2) Temperature Unit 3) Exit Menu DOWN SELECT UP	The **Units, Wind & Temp** menu allows you to adjust the units displayed on the Status Screen. Select **Exit Menu** to return to the Main Menu.
Speed Units	*1) meters / second 2) miles / hour 3) kilometers / hr 4) knots 5) Leave w/o Save DOWN SELECT UP	To change the wind speed units displayed on the Status Screen, select **Wind Speed Units**. Then select the unit of measurement to be used for the displayed wind speed. Alternatively select **Leave w/o Save** to exit the sub-menu without making any changes.
Temp. Units	*1) °C 2) °F 3) Leave w/o Save DOWN SELECT UP	To change the temperature units displayed on the Status Screen, select **Temperature Units**. Then select the unit of measurement to be used for the displayed temperature. Alternatively select **Leave w/o Save** to exit the sub-menu without making any changes.

2) Anemometer Type

Anemo. Type	Anemometer Type: * 1: ASR C5/C5H m=0.715 b=1.610(MPH) Start of Options DOWN SELECT UP	The **Anemometer Type** menu allows you to specify which type of anemometer is connected to the Wind Monitor. The pre-programmed calibration values for each sensor are also displayed. An asterisk (*****) indicates which sensor type is currently selected.

3) Warning Settings

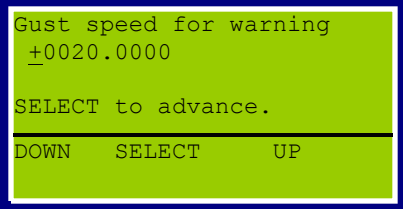
Warning Set.



The **Warning Settings** menu allows you to adjust various settings related to warnings.

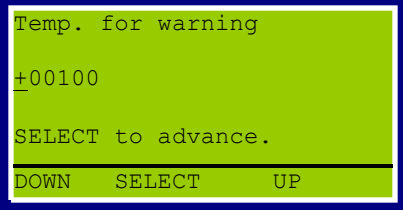
Select **Exit Menu** to return to the Main Menu.

Wind Gust



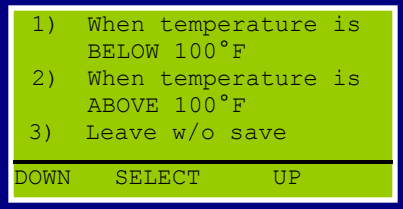
Wind Gust allows you to enter a wind gust speed that will trigger the warning. Press up or down to change each digit and press select to advance to the next digit. A cursor indicates which digit is currently being changed. Pressing select on the last digit returns to the **Warning Settings** menu.

Temperature



Temperature allows you to enter a temperature set point that will trigger the warning. Press **Up** ▲ or **Down** ▼ buttons to change each digit and press the select button to advance to the next digit. A cursor indicates which digit is currently being changed. Pressing select on the last digit returns to the **Warning Settings** menu.

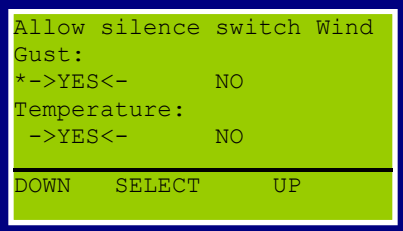
Temp. Direction



Temp. Direction allows you to select whether the warning is activated when the temperature is **BELOW** your set point, or when it is **ABOVE** your set point.

Select **Leave w/o Save** to exit the sub-menu without making any changes.

Silence Switch



The **Silence Switch** allows you to select whether the warning can be silenced by the Alarm Silence switch. Press **Up** ▲ or **Down** ▼ buttons to select whether a Wind Gust warning can be silenced. Press select to advance to the next setting. Then press **Up** ▲ or **Down** ▼ buttons to select whether a Temperature warning can be silenced. Pressing select will return to the **Warning Settings** menu.

Note about warnings: A wind speed warning occurs when there is a gust of wind higher than the set-point. This warning will typically be activated for 60 seconds unless the wind continues to gust higher than the set-point. A temperature warning can be configured as either an over-temperature warning or an under-temperature warning.

It is possible to configure whether the warning can be silenced using the Alarm Silence switch on the front of the Wind Monitor. This may be useful for extended periods of warning conditions. However, it is recommended to return the Alarm Silence switch to the normal position after the warning conditions have ended. Otherwise, the user may not be alerted to new warnings.

4) Alarm Settings

Alarm Set.

```
*1) Wind Speed
 2) Temperature
 3) Temp. Direction
 4) Silence Switch
 5) Exit Menu
DOWN   SELECT     UP
```

The **Alarm Settings** menu allows you to adjust various settings related to alarms.

Select **Exit Menu** to return to the Main Menu.

Wind Speed

```
Wind speed for alarm

 ±0015.0000

SELECT to advance.
DOWN   SELECT     UP
```

Wind Speed allows you to enter a wind speed that will trigger the alarm. Press **Up** ▲ or **Down** ▼ buttons to change each digit, and press select to advance to the next digit. A cursor indicates which digit is currently being changed. Pressing select on the last digit returns to the **Alarm Settings** menu.

Temperature

```
Temp. for alarm

±00000

SELECT to advance.
DOWN   SELECT     UP
```

Temperature allows you to enter a temperature set point that will trigger the alarm. Press **Up** ▲ or **Down** ▼ buttons to change each digit, and press select to advance to the next digit. A cursor indicates which digit is currently being changed. Pressing select on the last digit returns to the **Alarm Settings** menu.

Temp. Direction

```
 3)  When temperature is
     BELOW 0°F
 4)  When temperature is
     ABOVE 0°F
 3) Leave w/o save
DOWN   SELECT     UP
```

Temp. Direction allows you to select whether the alarm is activated when the temperature is **BELOW** your set point, or when it is **ABOVE** your set point.

Select **Leave w/o Save** to exit the sub-menu without making any changes.

Silence Switch

```
Allow silence switch Wind
Speed:
* YES      ->NO<-
Temperature:
 ->YES<-       NO
DOWN   SELECT     UP
```

Silence Switch allows you to select whether the alarm can be silenced by the Alarm Silence switch. Press **Up** ▲ or **Down** ▼ buttons to select whether a Wind Speed alarm can be silenced. Press select to advance to the next setting. Then press **Up** ▲ or **Down** ▼ buttons to select whether a Temperature alarm can be silenced. Pressing select will return to the **Alarm Settings** menu.

Note about alarms: A wind speed alarm occurs when there is an instantaneous reading of wind higher than the alarm set-point. Unlike a warning, this can be a very brief/intermittent alert. As soon as the wind speed reading drops below the set-point, the alarm will end. However, the alarm will be active if the reading is above the set-point. A temperature alarm can be configured as either an over-temperature alarm or an under-temperature alarm. The temperature alarm works identically to the temperature warning, but you can configure each individually as over-temperature or under-temperature alerts.

It is possible to configure whether an alarm can be silenced using the Alarm Silence switch on the front of the Wind Monitor. This may be useful for extended periods of alarm conditions. However, it is recommended to return the Alarm Silence switch to the normal position after the alarm conditions have ended. Otherwise, the user may not be alerted to new alarms.

6.2 - 490-A-B Wind Monitor Wind and Temperature Warning and Alarm

Note These Terms: Warning is based on "Gust" and Alarm is based on instantaneous reading.

6.3- Wind Warning and Alarm Examples

You could have an Alarm set to sound @ 20MPH and be "silenceable". And a Warning set to sound @ 30MPH but not be "silenceable".

So if wind is briefly going over 20MPH, the alarm would sound briefly whenever it's over 20MPH and instantly stop when it goes below. If user wanted to silence those repeated alerts, they could flip the silence switch. But if a wind Gust spiked to 30MPH, it would set of a 60 second alert that could not be silenced. More like an alert not to be ignored.

Likewise, you could have a silenceable Warning set to 20MPH And a non-silenceable Alarm set to 30MPH.

So any time the wind goes over 20MPH, it would set off the 60 second alert (or long if it continues to gust), but the user could silence it. However, if the wind speed is over 30MPH, it would be an un-silenceable alert that would stop as soon as the wind drops below 30MPH.

So there's different ways it can be used. In addition, the two relays (one for the Buzzer and one for a secondary output) can also be configured independently. So, for example, you could have an Alarm (instantaneous) set off the buzzer for a user alert. But when there's a Gust that triggers the "Warning", it could set off a 60 second external alarm. Or just the opposite, you could have the Alarm trigger a 24-volt warning light indicator on the second relay, and then have the Gust Warning trigger the actual buzzer.

There are many possibilities. It's all configurable.

6.4- Temperature Warning and Alarm Examples

Finally, for the temperature alerts, Warning and Alarm both act the same way. It's just like having two separate "alarms". You could specify one to trigger above a certain temperature, and the other to trigger below a certain temperature. (i.e., alert sound above 100 degrees or below 50 degrees)

Alternatively, you could have a Warning set to trigger the buzzer above 100 degrees, and an Alarm set to trigger the external/second relay above 150 degrees for a broader alert.

5) Data Source

Data Source

```
*1) Sensors
 2) Wireless 802.15.
 3) Leave w/o save

DOWN   SELECT     UP
```

The **Data Source** menu allows you to specify whether the unit acts as a primary (transmitting) or remote (receiving) display. Selecting **Sensors** displays readings from any sensors hard-wired to the unit. This setting also allows the data to be transmitted via the wireless transmitter. Selecting **Wireless 802.15.4** allows the unit to display remote data from a separate transmitting unit.

6) Paired Serial

Paired Serial

```
*1) Serial Prefix
 2) Serial Number
 3) Back to Main
 Only RX from this
 SN. Currently A1234
DOWN   SELECT     UP
```

The **Paired Serial #** menu allows you to specify the serial number of the transmitting unit that you want to receive data from. The currently selected serial number is also displayed. This is only used when **Data Source** is set to **Wireless 802.15.4**. The Wind Monitor will only display data received from the unit with the serial number entered in this menu.

Serial Prefix

```
Serial Prefix:
          A

Valid range: A to Z

DOWN   SELECT     UP
```

Use the **Serial Prefix** screen to enter the first part of the serial number of the device you want to receive data from. Press up or down to change the letter and press select to set it.

Serial Number

```
Serial Number:
          1234

DOWN   SELECT     UP
```

Use the **Serial Number** screen to enter the numeric portion of the serial number of the device you want to receive data from. Press **Up** ▲ or **Down** ▼ buttons to change the serial number and press select to set it.

7) Relay Settings

Relay Settings

```
*1) Relay A Warnings
 2) Relay A Alarms
 3) Relay B Warnings
 4) Relay B Alarms
 5) Back to Main
DOWN   SELECT     UP
```

The **Relay Settings** menu allows you to select which relay(s) are triggered by an alarm or warning, respectively. Relay A is normally connected to the Wind Monitor's built in buzzer. Relay B can be used for activating external alarms or indicators.

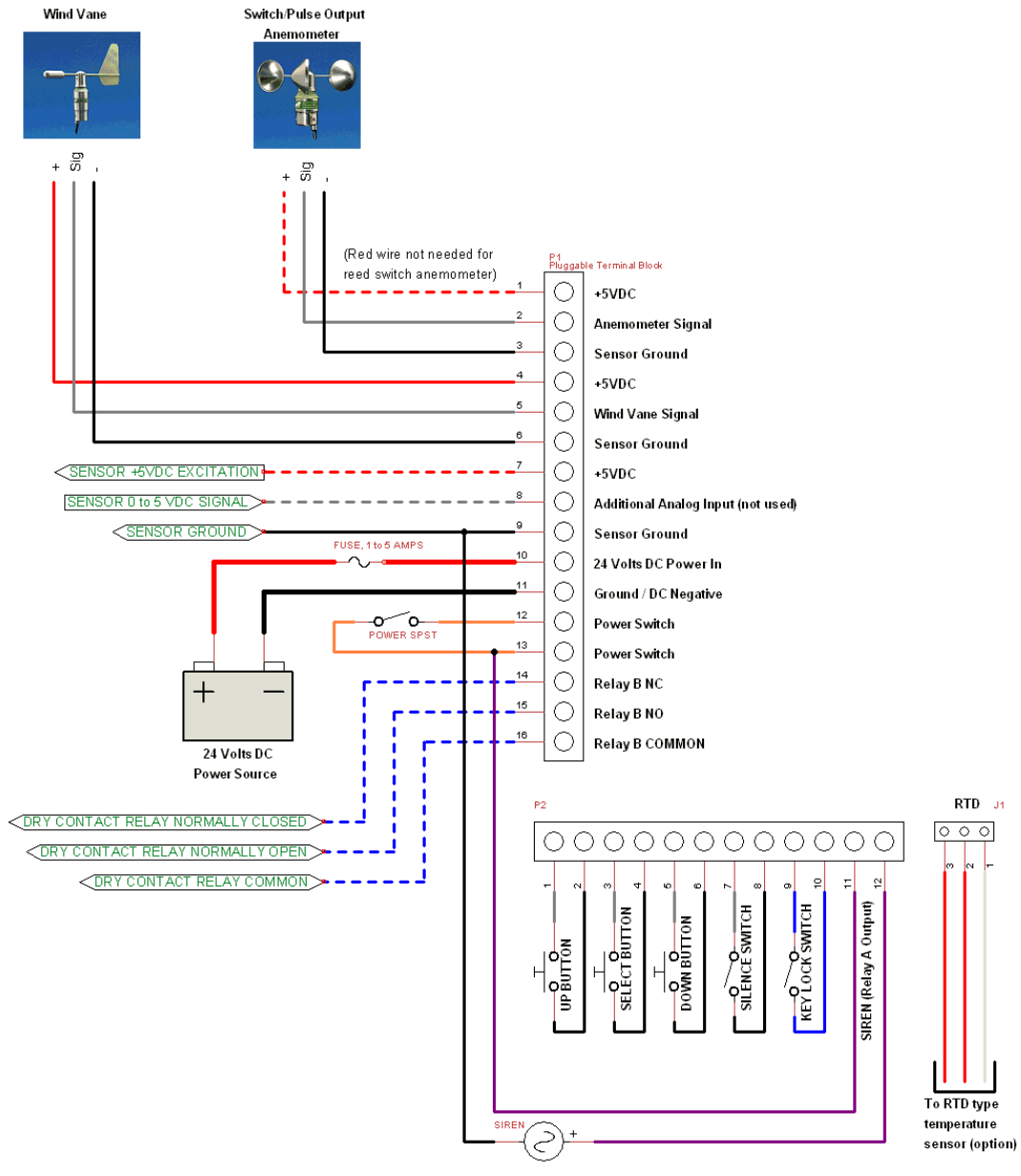
Relay Settings

```
Relay A Warnings
Wind Gust:
* ->YES<-       NO
Temperature:
  ->YES<-       NO
DOWN   SELECT     UP
```

In each **Relay Setting** menu, you can select whether a relay will be activated by a Wind Warning (or Alarm) as well as by a Temperature Warning (or Alarm). In this example, Relay A would be triggered by both Wind and Temperature Warnings.

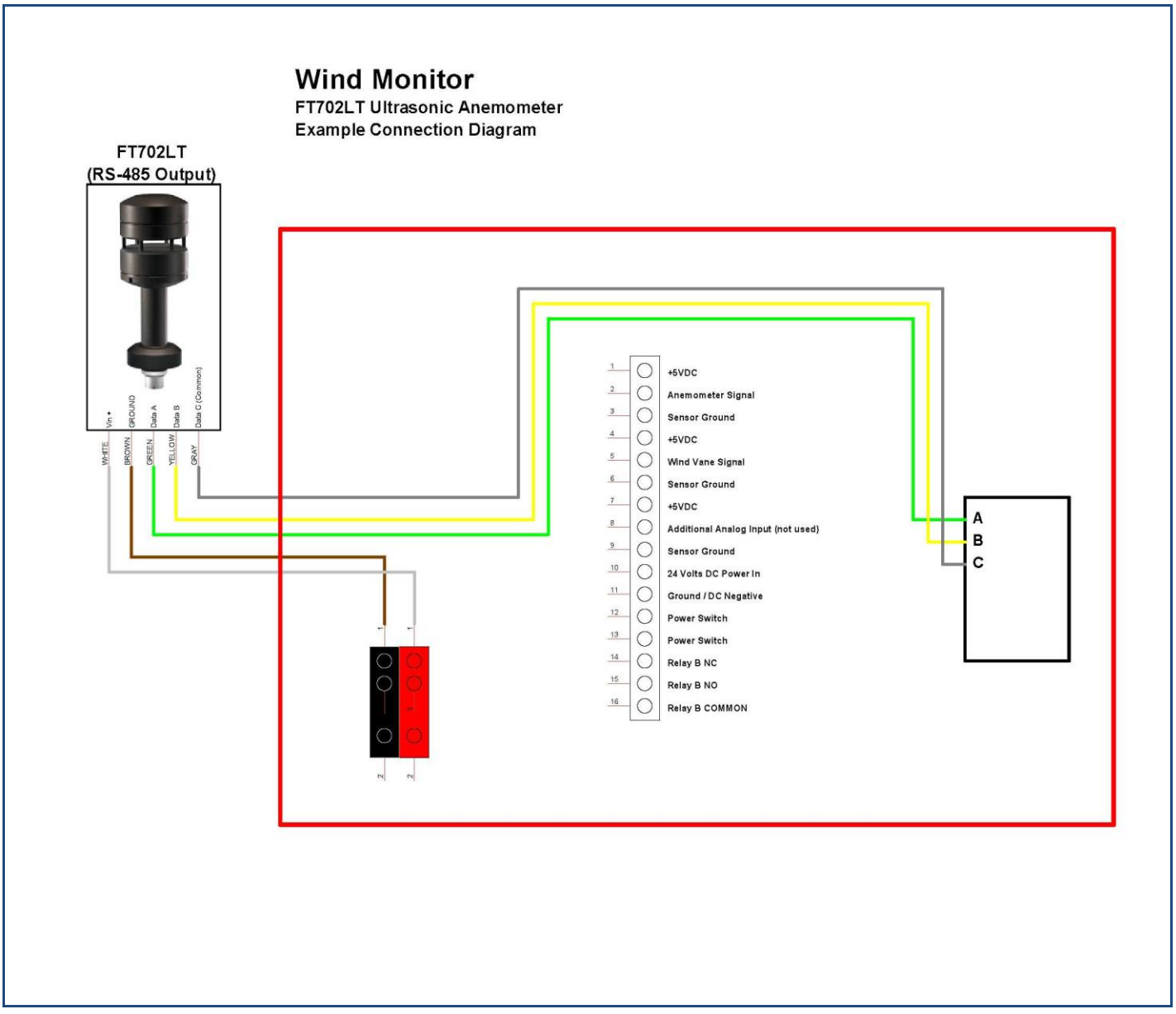
7 – Wiring Diagrams for the ASR-490-A-B Wind Monitor/Alarm

7.1 - 490-A-B Wind Monitor Wiring Diagram for D5C Wind Vane and C5C Cup Anemometer



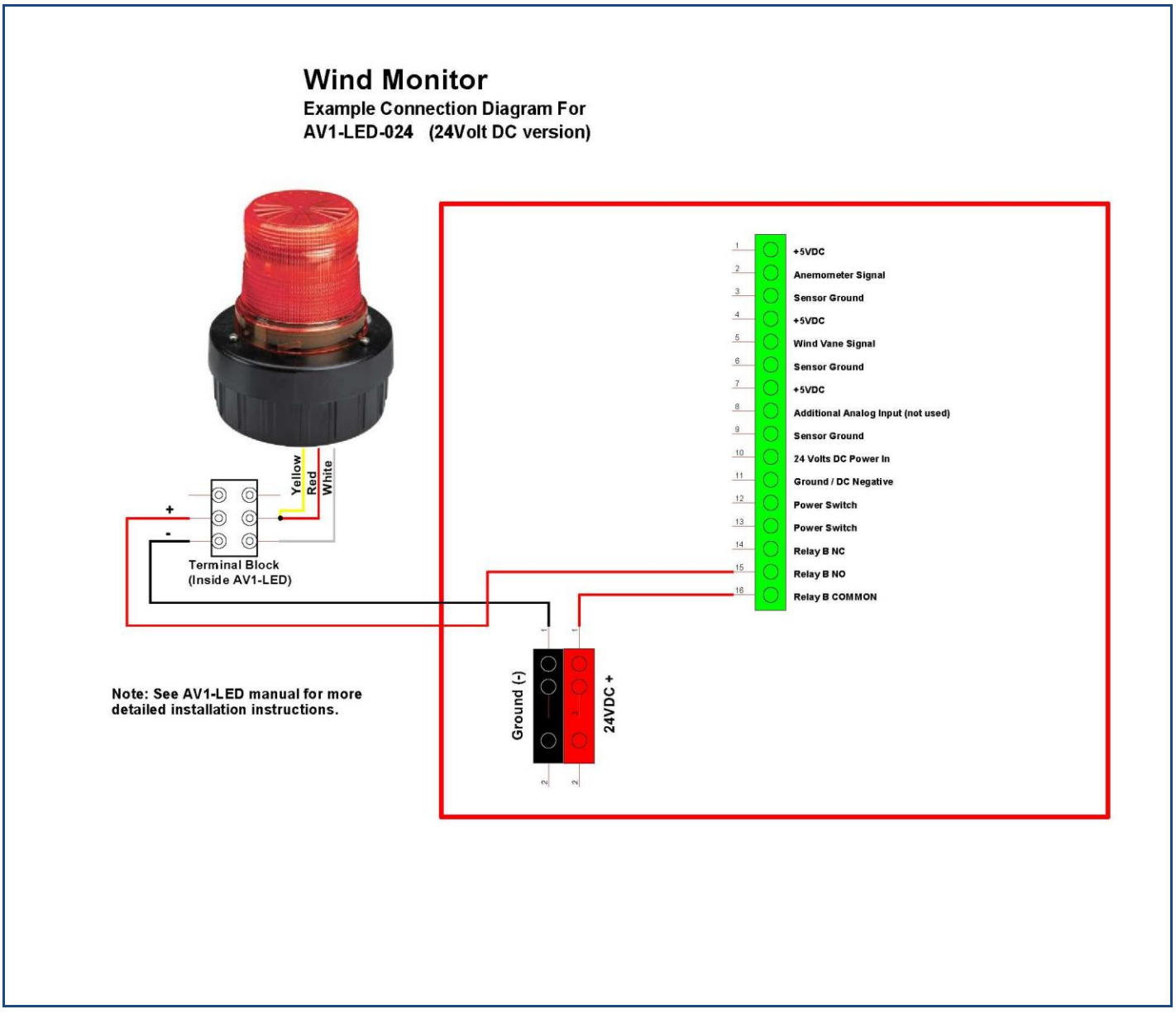
Richards 490-A-B Wind Monitor / Alarm Wiring and Sensor Connections Diagram (Figure 1)

7.2 - Richards 490-A-B Wind Monitor Wiring Diagram for FT702LT Ultrasonic Wind Sensor



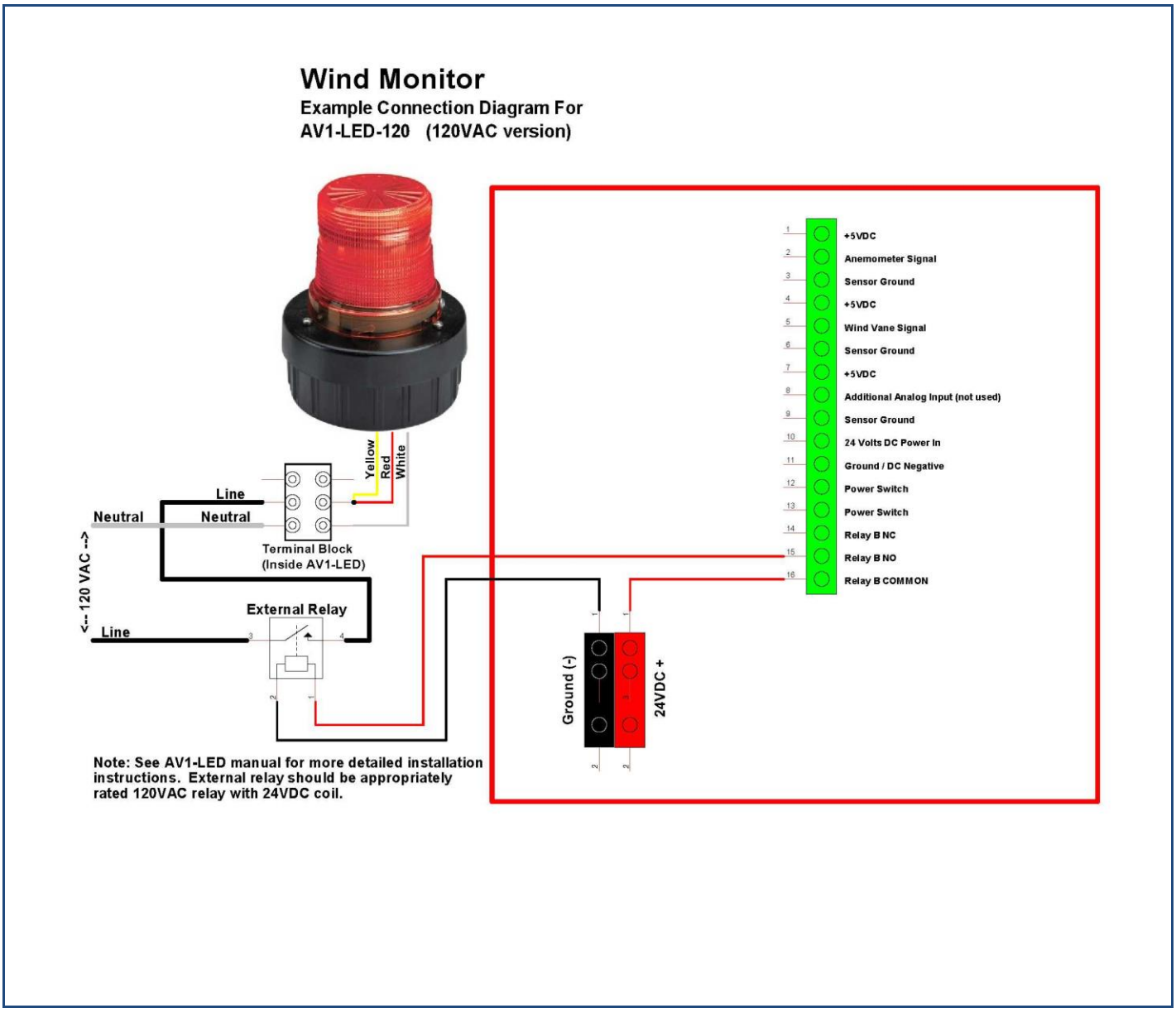
Richards 490-A-B Wind Monitor / FT702LT Ultrasonic Wind Sensor Wiring Diagram (Figure 6)

7.3 - AV1-LED Series Combination Audible and Visual Signal Light Wiring Diagram for 24 Volt DC



AV1-LED Series Combination Audible and Visual Signal Light for 24 Volt DC Wiring Diagram (Figure 7)

7.4 - AV1-LED Series Combination Audible and Visual Signal Light Wiring Diagram for 120 VAC



AV1-LED Series Combination Audible and Visual Signal Light for 120 VAC Wiring Diagram (Figure 8)

8 - Technical Specifications for the ASR-490-A-B Wind Monitor/Alarm

8.1 - Covers Richards Wind Monitor/Alarm Model Number ASR-490-A-B

Enclosure Materials of Construction and Finish

Enclosure machined from solid 6061-T6 aluminum stock
Overall IP Rating of IP64
Durable, high visibility bright red powder coated finish
Polycarbonate LCD protector
Two ½" (21.6 mm / 0.85 actual diameter) knockouts for fittings

Sensor Inputs

Single C5 or C5C Series anemometer Input
Supports C5C Anemometers with switch pulse output
Programmable transfer function and units
Single Wind Vane input
Supports D5 or D5C Wind Vane with 5 volts DC excitation voltage
Supports FT702LT Ultrasonic Wind Sensor
Displays 0 to 359 Degrees and cardinal directions
Programmable North offset
Single temperature Input
Supports PT100 RTD, 10k NTC thermistor, 0-5 volt analog
Selectable transfer functions and units

Operator Interface and Display

Graphics LCD
128 x 64 Pixels
Green LED Backlight
2.6 x 1.3 inch (67 x 33 mm) active display area
Power Switch
Silence Switch
Three Momentary buttons: Down, Select, UP
Easy Text Based Menus

Audible Alarm and Relay Output

Frequency 2900 Hz +/- 500 Hz
Loudness @ 2 feet (0.6 meters), 95 to 105 Db(A)
Programmable silence switch for warnings and alarms
Relay: 5 amps @ 30 volts DC / 120-volt AC, Dry Contact
SPDT – Connections: normally open, normally closed, common

Physical Dimensions, Weight and Mounting

Height (8.0 inches or 203.20 mm)
Width (5.0 inches or 127.00 mm)
Thickness (1.6 inches or 40.64 mm)
Weight (3.75 pounds or 1700.97 grams)
Rear mounting plate 6 x 8 x 0.25 in. (152.4 x 203.2 x 6.35 mm)
Mounting area is 0.5 in (12.7 mm) strip on top and bottom of unit

Power / Sensor Protection

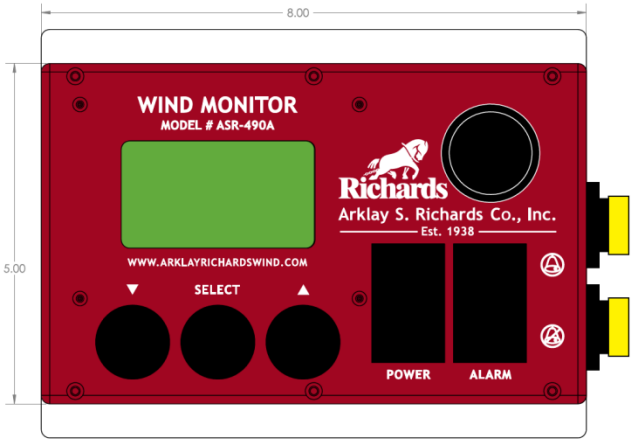
9 to 76 volts DC, < 5 watts typical
Sensor inputs: Transient Voltage Suppression (TVS) protected

Environmental and Regulatory Compliance

Operating Temperature -4°F to 158°F (20°C to 70°C)
Operation below -4° is possible, but display will be slow to refresh
RoHS Compliant
Made in USA

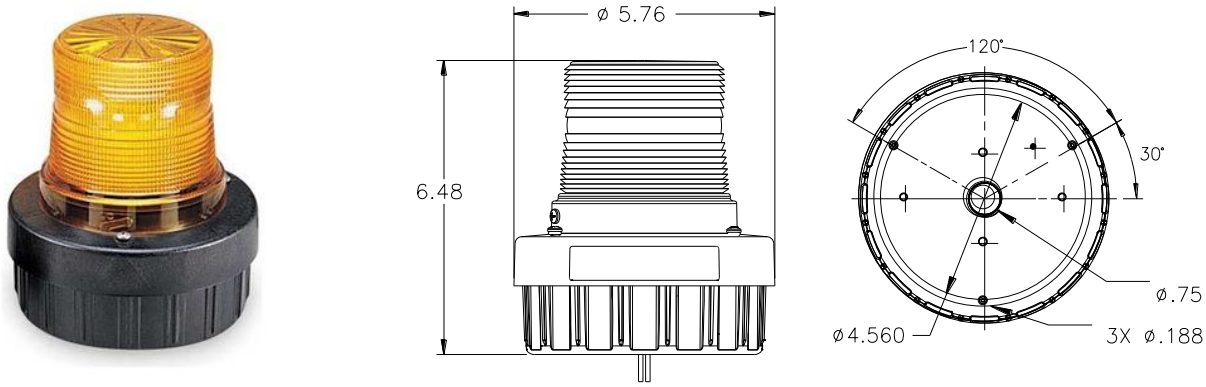
9 - Dimensional Drawings

9.1 - ASR-490-A-B Wind Monitor/Alarm Dimensions



490-A-B Series Wind Speed Monitor/Alarm (Figure 2)

9.2 - AV1-LED Series Combination Audible and Visual Signal Light Dimensions



Optional AV1 Series Combination Audible/Visual Signal (Figure 3)

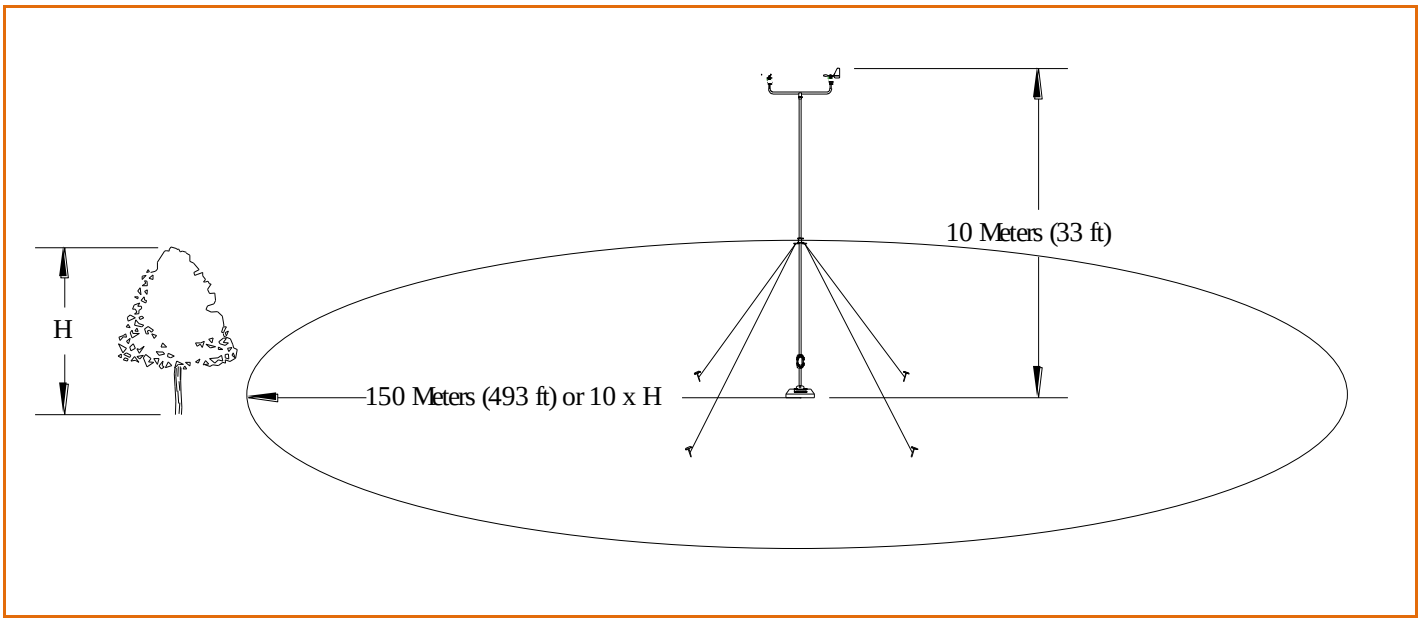
10 - Wind Sensor Installation

10.1 - Single Mast Mounted or Top Mounted Anemometers

The most important aspect of any accurate wind measuring system is the selection of the monitoring location or site and the actual placement of the anemometer and the wind direction vane on the tower or mast. The wind instruments must be installed in order to place the sensors in a clear and undistorted wind path.

The anemometer and wind direction vane should be mounted on a well-designed, sturdy cross arm like the Richards BHC-36-C-SS. The BHC-36-C-SS cross arm locates the wind sensors the required 36" apart to prevent each instrument from disturbing the others wind path (Figure 5).

Under ideal conditions the location of the instrument tower should be installed in an open area free from any obstructions within 150 meters (493 feet) in all directions of the site. If there are any obstructions near the tower, the sensor height should be adjusted so that it will be at least 10 times the height of the particular obstruction (Figure 4). Wind sensors mounted on roof tops should be installed at a height of 1.5 times the height of the building. For basic meteorological installations, the anemometer and wind vane should be mounted on top of the mast at a height of 10 meters (33 feet) above ground level.



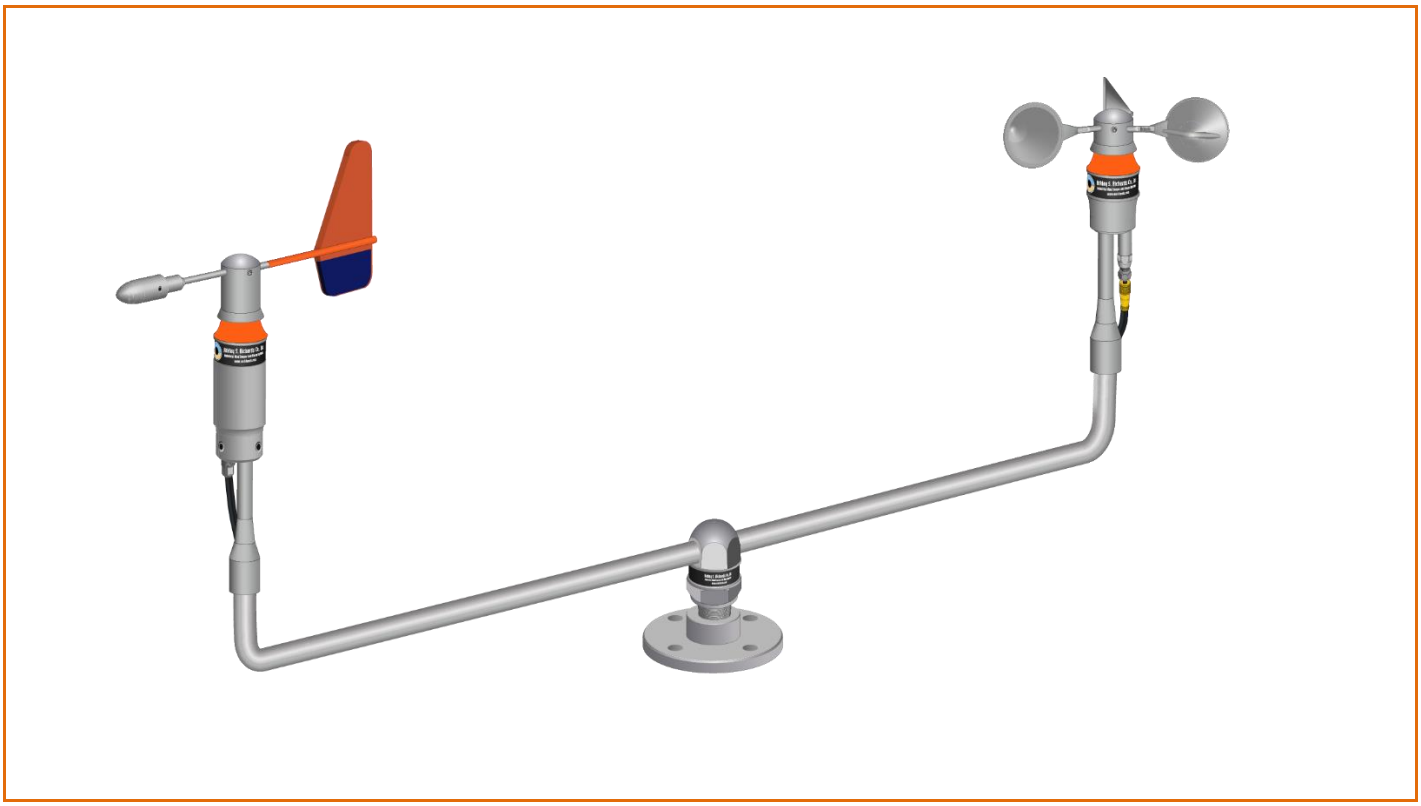
C5C Series Anemometer Installation (Figure 4)

10.2 - Tower Mounted or Multiple Side Mounted Anemometers

Anemometers which will be mounted on tall wind resource towers must be installed out of any potential turbulence caused by the tower itself. Most towers will have two anemometers at each height to record data. If the prevailing wind direction at the site is known, the first anemometer should be mounted into the wind 60 degrees to the right. This will position the anemometer where the wind flow is the least distorted. The second redundant sensor should also be positioned into the wind but 60 degrees to the left. All of the anemometers should be mounted on a boom which extends 12 times the diameter of the tower. If the prevailing wind direction at the site is not known, anemometer pairs should be mounted 180 degrees and extended out the same 12 times the diameter of the tower.

It is important to remember that the boom itself will cause some wind flow distortion and this must be taken into consideration. It is recommended that anemometers positioned at the end of booms should be mounted 15 diameters above the supporting boom.

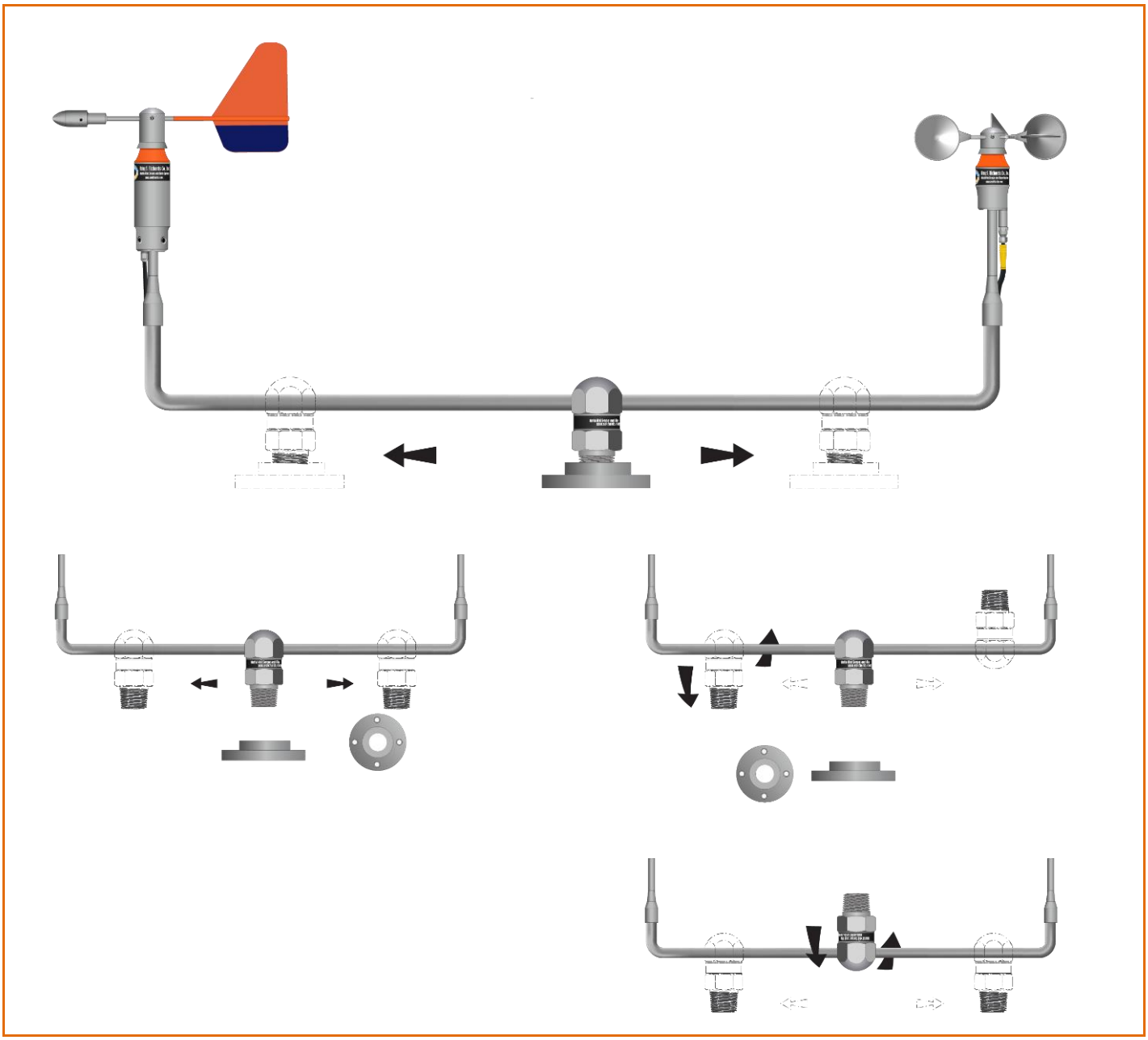
10.3 - Mounting C5C Anemometers and D5C Wind Vanes to BHC-36-C-SS Adjustable Cross Arms



Wind Sensor to Cross Arm Installation (Figure 4a)

The Richards C5C Anemometer and D5C Wind Vane will mount to any standard .5” O.D. tubing. In order to simplify the installation of wind speed and direction sensor sets we developed the BHC-36 Series of cross arms. The Arklay Richards adjustable BHC-36-C-SS Wind Sensor Cross Arm (Figure 4a and 4b) was specifically designed to position the wind sensors the required 36” apart to prevent each instrument from disturbing the others wind path. The cross arm also has two .5” O.D. posts for mounting the sensor pair and a 1.0” NPT Female coupling to mount to a vertical pipe mast or horizontal boom.

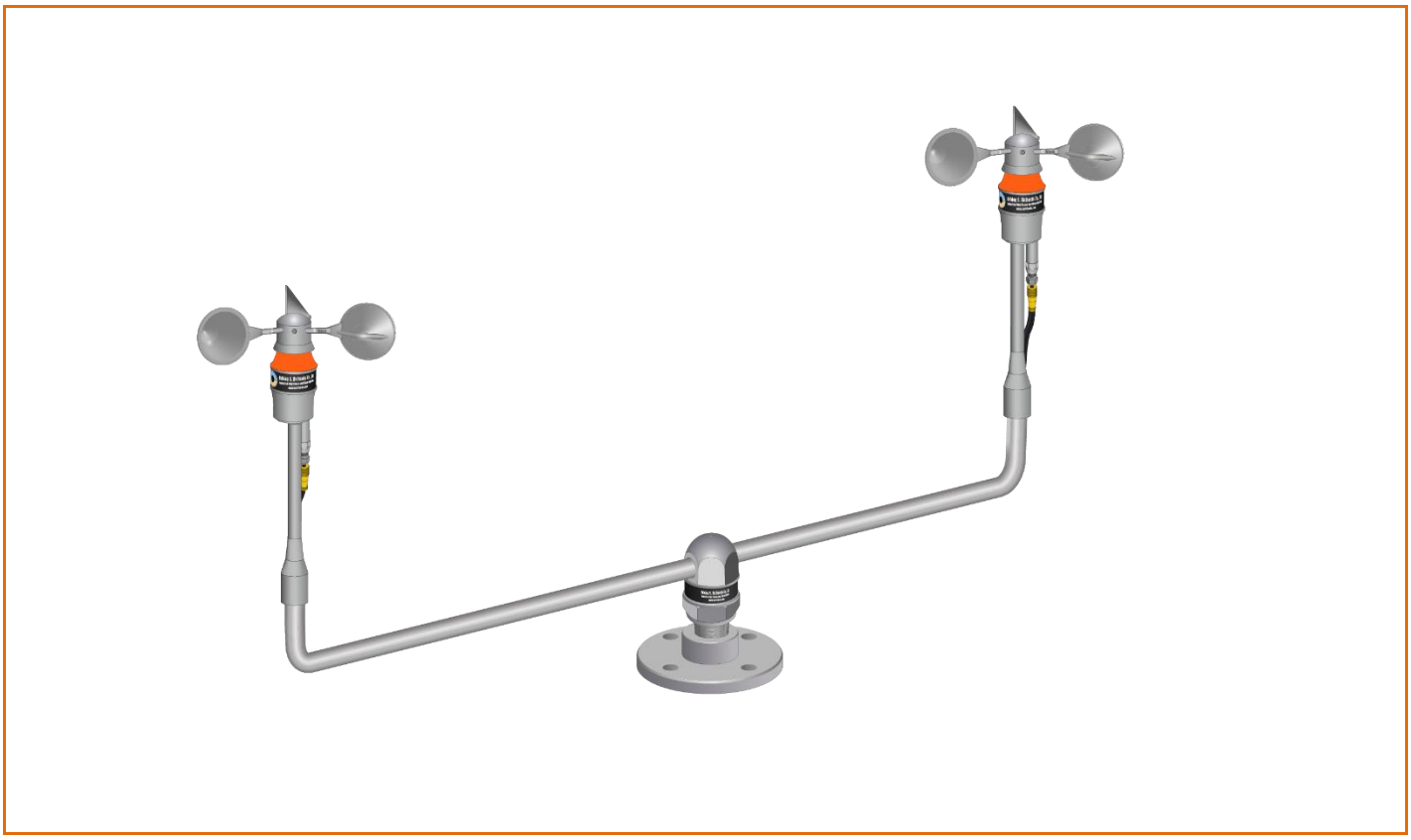
The C5C Anemometer and D5C Wind Direction Vane both utilize two set screws to secure the sensor to the .5” O.D. tubing or mounting post. The threads on the screws have been coated from the factory with an anti-vibration material to help prevent them from becoming loose. The sensors should be placed on the mounting posts and all set screws tightened securely.



Adjustable Cross Arm Mounting Options (Figure 4b)

The Arklay Richards adjustable BHC-36-C-SS Wind Sensor Cross Arm was designed to allow the wind sensors to mounted in a variety of positions. The central mount has a set screw which allows the mount to slide horizontally on the arm and rotate 360 degrees. Sensors can now be mounted on roofs or equipment which are not level. It also allows the arm to be mounted under strictures like bridges or building overhangs.

⚠ **Do not put permanent Loctite products on the threads of these screws!** If required only use removable Loctite products.



Anemometer Redundant Pair to Cross Arm Installation (Figure 5)

The Richards C5C Anemometer and D5C Wind Vane will mount to any standard .5” O.D. tubing. In order to simplify the installation of wind speed and direction sensor sets we developed the BHC-36 Series of cross arms. The Arklay Richards BHC-36-C-SS Wind Sensor Cross Arm (Figure 5) was specifically designed to position the wind sensors the required 36” apart to prevent each instrument from disturbing the others wind path. The cross arm also has two .5” O.D. posts for mounting the sensor pair and a 1.0” NPT Female coupling to mount to a vertical pipe mast or horizontal boom.

The C5C Anemometer and D5C Wind Direction Vane both utilize three set screws to secure the sensor to the .5” O.D. tubing or mounting post. The threads on the screws have been coated from the factory with an anti-vibration material to help prevent them from becoming loose. The sensors should be placed on the mounting posts and all set screws tightened securely.

⚠ **Do not put permanent Loctite products on the threads these screws!** If required only use removable Loctite products.

10.4 - Mounting C5C Anemometers and D5C Wind Vanes to C-MMA-16-06 Mast Adapters

Many applications require only a single anemometer or wind vane mounted on a mast or pole. For this type of application, the C-MMA-16-06 mast adapter (see photo 4) is available. The adapter is machined from solid 316ss bar stock for strength and corrosion resistance. The C-MMA-16-06 adapter has a 0.5” O.D. sensor mount on one end and a female 1.0” NPT thread on the other. The C-MMB-16-06 adapter has a 0.5” O.D. sensor mount on one end and a male 1.0” NPT thread on the other. These adapters allow the use of standard pipe and fittings to install the wind sensors. The overall length of the mast adapter is 6.0” and the 0.5” O.D. sensor mount section is 3.0”.

The C-MMA-16-06 Mast Adapter (Photo 4)

11 - Grounding, Electrostatic Discharge (ESD), and Lightning Protection

Anemometers and wind vanes are typically installed in remote open areas and at significant heights from the ground. This type of installation by nature will subject wind sensors to potential damage if certain precautionary measures are not taken. Improperly grounded sensors mounted on masts or towers are at potential risk to severe electrical damage from the accumulation of a static electrical charge and a subsequent electrostatic discharge (ESD). ESD will not only damage your anemometer and wind vane but also any connected loggers and displays.

Wind sensors are also frequently damaged by direct lightning strikes and stray voltages from indirect strikes. Quality wind measuring systems can become a substantial investment and must be protected from ESD damage through earth grounding and from lightning strikes through proper lightning protection techniques. In order to protect yourself from injury and your instruments from damage, consult with a qualified electrician to ensure that the tower and all instruments are earth grounded and a quality lightning protection system has been properly installed.

12 - Wiring Information

12.1 - Wire Color Codes for C5C and C5CH Series Anemometers (Table 1)

Anemometer Model	Conductor 1 Color	Conductor 2 Color	Output Type or Power
C5C-1263-1-AC	Black (-) (Coil Reference)	White (+) (Coil Hz Out)	AC Frequency
C5C-1263-1-SP	Black (Reed Switch)	White (Reed Switch)	Switch Pulse
C5CH-3263-1-AC (Heated)	Black (-) (Coil Reference)	White (+) (Coil Hz Out)	AC Frequency
C5CH-3263-1-SP (Heated)	Black (Reed Switch)	White (Reed Switch)	Switch Pulse
C5CA-1264-1-SP (High Res)	Black (Reed Switch)	White (Reed Switch)	Switch Pulse
C5CH Heater Element	Black (-) V out Terminal	Red (+)V out Terminal	12 Volts DC

13 - Wind Sensor Signal Protection from (EMI) or Electrical Noise

13.1 - Wind Sensor Shielded Cable Information

All Richards wind sensors are provided with twisted and shielded cables. It is very important that any cables used with the sensors also be properly shielded to prevent electromagnetic interference (EMI) from sources near the installation. Wind sensor cables should not be run near power cables or other noise generating sources. Electrolytic processes, heavy motors, generators, transformers, induction heating, relay controls, and control wire are some of the more common noise sources which can disrupt wind sensor signals.

⚠ ***When wiring anemometers or wind vanes, always use a high-quality shielded cable and avoid (EMI) sources which may disrupt your sensor signals.***

14 - LW-1261-C Series Wind Speed LCD Displays

14.1 - Wiring LW-1261-C Wind Speed Displays to your C5C-1263-1-AC Anemometer

LW-1261-C Wind Speed Displays come standard with a 50ft length of shielded cable. C5C series anemometers are manufactured with a 108” length of cable. To prevent signal problems, it is very important that all the same color wires be connected together and also the shield drain wire. On wind speed systems the black (-) wires should be connected together. The white (+) wires should also be connected together. The shield drain wires should be connected together as well.

⚠ ***When wiring the LW-1261-C instrument to the anemometer, always maintain the wire color codes. Black to black, white to white and shield drain to shield drain.***

15 - Periodic Wind Sensor Maintenance

15.1 - Cleaning of the Anemometer

In order to maintain the peak performance and high accuracy of your Richards C5C Series Cup Anemometer, it is important to periodically inspect them for any accidental damage, wear, or excessive dirt build up on the instrument. Visually inspect the sensor for any excessive accumulation of dirt, dust, bird droppings, or any other foreign material collecting on the outer surfaces of the rotor cups or instrument housing. Clean any of this build-up with a damp soft cloth to prevent scratching the sensor's green or black protective coatings. Solvents and cleaning fluids should not be used since they may also damage the sensors protective coatings.

15.2 - Physical Damage Inspection

All wind sensors in the field should be inspected periodically for any signs of physical damage. Anemometers can on occasion be struck by birds or flying debris which may inflict slight damage to the sensors. The C5C Anemometers rotor arms should also be checked to make sure that they are straight. Any rotor arms with minor damage can be carefully re-straightened in the field if required. Severely damaged units should be returned to the factory for repair and recalibration.

It is important to inspect the anemometer signal and heater element cables for signs of damage. Cables which are not securely fastened to the tower or mast can blow in the wind and cause wear damage to the cables. Any cables which show signs of wear or damage should be repaired immediately.

15.3 - Removable Wind Sensor Shaft Towers

All Richards wind sensors utilize a specially designed removable shaft tower mounted between the rotor and housing assemblies. The shaft tower has been installed and factory torqued to provide a weather tight O-ring seal. The tower should remain secure for the service life of the unit but should be routinely inspected. To check, grasp the tower with your hand and confirm that it remains hand tight. If the sensor tower has become loose, grasp the tower and firmly again tighten by hand. Place the included torque pin into the hole and turn about 1/8 of a turn.

⚠ ***Do not use a wrench to tighten the tower. The use of tools will damage the green, black, or blue protective coating on the sensor.***

15.4 - Testing Sealed Precision Bearing Condition

The C5C Series Cup Anemometers have stainless steel shafts which rotate using a pair of sealed precision stainless steel ball bearings with a special low viscosity synthetic lubricant for extreme meteorological conditions or areas of high turbulence. It is normal for these bearings to wear over time while the sensor is in service. In order to maintain the peak performance and accuracy of your sensors, it is recommended that these bearings be replaced every two years or at any time it is determined that they have become worn. Some of the more severe installations may require more frequent bearing changes as on a yearly basis. Wind sensor ball bearings should be checked once a year. Under average low wind conditions, the

precision bearings used in C5C Series Anemometers have a typical service life of up to 2 years. The actual condition of the bearings can easily be determined in the field with a few simple tests without the removal of the sensor.

Both the C5 and C5C Anemometers can utilize the same bearing test procedures. Gently grasp the rotor and check for any wobble or side play in the bearings. Gently pull up on the rotor and observe the amount of shaft endplay. There should only be between .005" to .010" of end play.
Tap one of the rotor cups into slow rotation and observe the stopping motion of the rotor assembly. The Anemometer rotor should spin smoothly and return to a slow even stop without grabbing, binding, or any audible noise. Continue checking the rotor motion 360 degrees around the sensor. Each time the anemometer it should return to a slow even stop.

After performing these simple tests, if any of the ball bearings show signs of significant wear or binding, they should be replaced. It is important that both bearings always be replaced as a set. Any C5C Anemometer found with worn ball bearings or noticeable threshold increases above an acceptable level should be replaced by a qualified technician or returned to the factory for service and recalibration in our wind tunnel. Please follow our outlined instrument returns process if required.

16 - Regulatory Compliances and Test Standards

16.1 - Wind Tunnel Calibration Test Standards

ASTM D 5096-02 (Standard Test Method for Determining the Performance of a Cup or Propeller Anemometer)

ISO 17713-1 (Meteorology Wind Measurements Part 1: Wind Tunnel Test Methods for Rotation Anemometer Performance)

17 - Replacement Parts and Accessories

17.1 - Parts List for Consumables and Accessories (Table 2)

C5C and C5CH Series Anemometer Parts and Accessories	Part Number
Buck Horn Cross Arm for Compact Sensors (36", 316ss)	BHC-36-C-SS
Heater Control Box for C5CH Series Anemometers, 120 VAC	SJB-1263-H-VA
Mast Adapter for Compact Wind Sensors (6", 316ss, 1" Female NPT)	C-MMA-16-06
Replacement Bearing Set (Top, Bottom, Standard Lubrication)	BRNG02-OF, BRNG03-OF
Replacement Bearing Set (Top, Bottom, Marine Lubrication)	BRNG02-MRG-10, BRNG03-MRG-10
Surge Protector	PI-325-C
Instrument Cable (Two Wire Standard, White/Black)	20I01-PP-S-TW

Wind Sensor Cable (Anemometer, Shielded, Drain, White/Black)	20I01-PP-S-SD-DW
Wind Sensor Outdoor Junction Box	SJB-1263-X
Wind Speed Display, Stainless Steel Flush Mount Housing, (LCD)	LW-1261-C
Wind Speed Recording Kit	PI-W-110
Wind Speed Transmitter, 4-20 mA, 0-100 MPH, NEMA 4x, FG Enclosure	A70-SL6-N4XFG-C5C

18 - Warranty and Service Information

18.1 - The Arklay S. Richards 5-Year Warranty

The Arklay S. Richards Company is extremely proud of the superior quality, performance, and durability of our industrial wind sensors. We expect all our C5 Series Anemometers and D5 Series Wind Direction Vanes to provide many years of trouble-free service for our customers. We stand by our products and guarantee that your Richards wind instrument will be free from any defects in materials or craftsmanship for a period of 5 years from your original invoice date. If at any time within this warranty period, your C5 Series Anemometer or D5 Series Wind Direction Vane is found to be defective, we will repair or replace the unit at no cost. This warranty does not include consumable components consisting of ball bearings, shafts, or sensor damage caused by improper installation, negligent handling, unauthorized modifications, lightning strikes, ESD damage, power surges, lack of necessary maintenance, or flying debris.

19 - Sensor Return Instructions

If at any time your C5 Series Anemometer or D5 Series Wind Direction Vane requires service for general repairs, maintenance, or recalibration in our wind tunnel, please follow our instrument return instructions. All Richards C5 Anemometers and D5 Wind Direction Vanes are shipped in custom made boxes for maximum protection of the sensors during transit. All instruments returned for service should be shipped back in the same packaging.

Before instruments can be returned you must contact us to obtain a Return Material Authorization or RMA number and provide us with your instrument serial number and details regarding the reasons for return. If the sensor is being returned for repair, please submit a report which details the following information; the reason for returning the unit, description of the problem with the sensor, where the sensor what installed, how many sensors have this particular problem, what type of electronics were driving and controlling the sensor, and the power source type and voltage used.

20 - Return Mail Address

20.1 - All wind instrument returns should be sent prepaid to the following address.

Arklay S. Richards Co., Inc.
Wind Instrument Services
72 Winchester Street
Newton Highlands, MA 02461 USA

21 - Arklay S. Richards Co., Inc. Sales and Support Contact Information

Phone: 617.527.4385
Fax: 617.964.3746
Email: sales@asrichards.com
Website: www.arklayrichardswind.com

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